

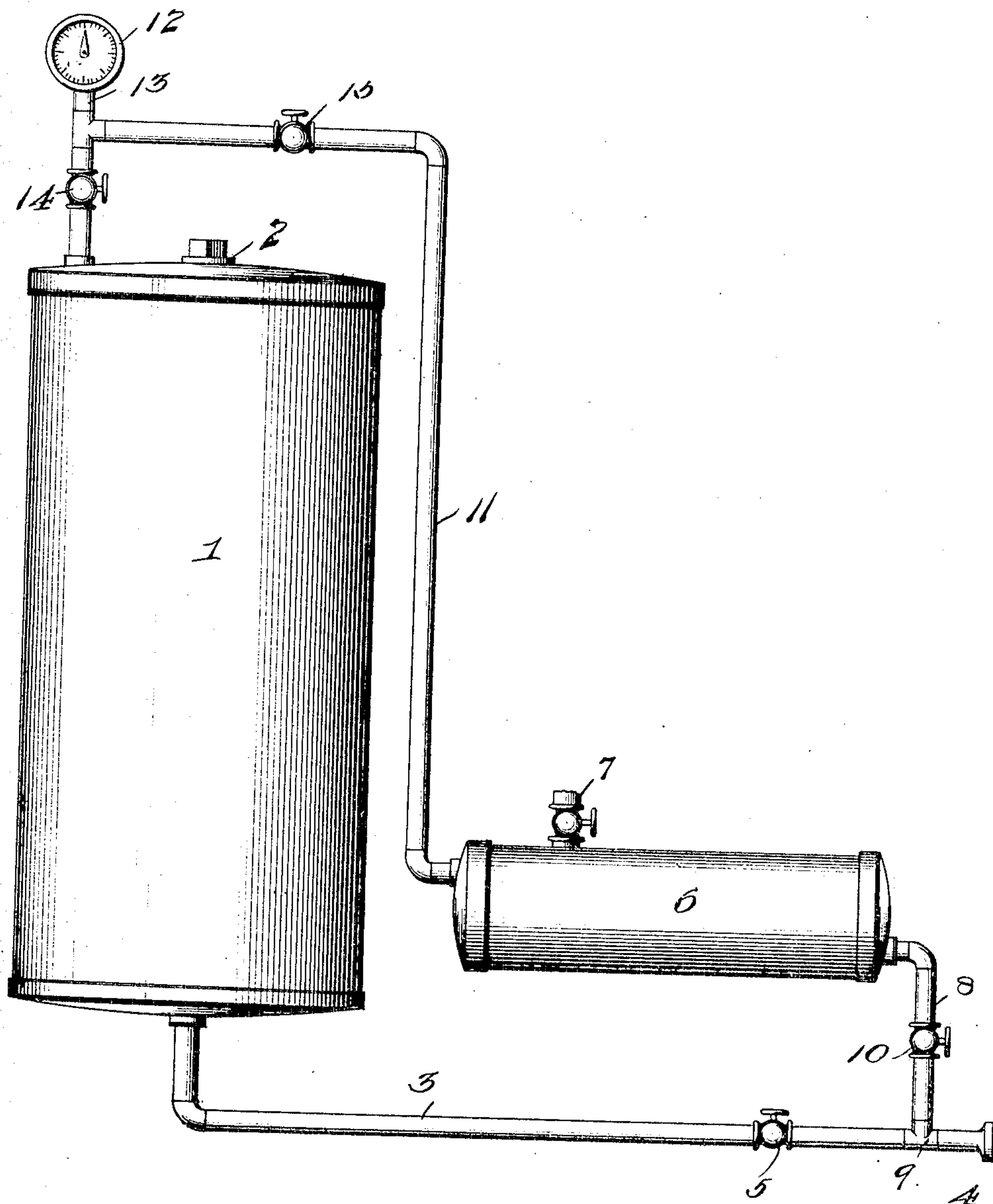
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PATENTED JULY 16, 1907.

J. F. STAFFORD.

PROCESS OR METHOD OF BURNING CRUDE PETROLEUM.

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Witnesses
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UNITED STATES PATENT OFFICE.

JEROME F. STAFFORD, OF MINNEAPOLIS, KANSAS.

PROCESS OR METHOD OF BURNING CRUDE PETROLEUM.

No. 860,418.

Specification of Letters Patent.

Patented July 16, 1907.

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To all whom it may concern:

Be it known that I, JEROME F. STAFFORD, of Minneapolis, in the county of Ottawa, State of Kansas, have invented a certain new and useful Process or Method of Burning Crude Petroleum, of which the following is a specification.

The object of my invention is to promote the economical use of crude petroleum for fuel and similar uses by provision of means for its substantially complete combustion without smoke, soot or other objectionable product, to a degree which might in anywise interfere with the operation of the apparatus employed.

Crude petroleum, say of 28 test, or the like oil, burns in the atmosphere with a noticeable discharge of smoke and with a viscous residuum. The presence of these two products of combustion tends in a comparatively short time to clog any jet or pipe discharge orifice which may be used for the purpose. The use of air or other oxygenous fluid for the atomization of the oil has been employed with a view of facilitating its combustion. The comminution of the oil in a spray affords a desirable method of presenting the oil for combustion by breaking it into small particles and thereby reducing the mass and multiplying its superficial area. That method of presentation, for reasons just stated, I prefer to employ, but I employ it in connection with a novel method of supplying oxygen to the oil. Pure oxygen might be employed in my process to advantage so far as results are concerned, but oxygen being expensive, I prefer to employ an oxygenous fluid, preferably air, which, supplied in sufficient quantity in the proper manner, affords both oxygen for the support of combustion and pneumatic energy for the comminution of the oil.

My method of supplying air or other oxygenous fluid to oil for the promotion of its combustion will be better understood through reference to the accompanying drawing, which illustrates a simple and preferred form of apparatus for carrying out my process, and which constitutes a part of this specification.

Accordingly, referring to the accompanying drawing, in which a view, in side elevation, of a preferred form of apparatus for the practice of my process is shown, 1 indicates an air-tight tank or reservoir of any desired capacity for holding a supply of crude oil. It is provided with a filling-plug 2, which when in place renders the tank 1 air-tight, but which may be removed for replenishing the tank with oil as often as required. From the bottom of the tank 1 an oil-supply pipe 3 leads to a jet or burner 4, which is also designated as the point of combustion. The burner 4 may be of any desired construction adapted to deliver oil from the pipe 3 in combustible form. It may be located also at any convenient point and as far re-

moved from the tank 1 as convenience may dictate. The illustration presented in the drawing is intended to be only diagrammatical and of suggestive scope sufficient to afford full explication of the principle of my invention.

The pipe 3 is preferably provided with a valve 5 by which the flow through the pipe 3 may be regulated or completely interrupted, at will.

6 indicates an air-tank of any suitable form and dimensions. It is provided with a valve-controlled filling nipple 7, to which a compressor may be connected at will, and it is connected as by a pipe 8 with the pipe 3. The point of connection indicated by the numeral 9 of the pipe 8 with the pipe 3 is preferably between the valve 5 and the burner 4; but it is essential to my process that the point 9 should be located at a distance, preferably in practice a few inches, from the burner 4, so that air under pressure confined within the tank 6 and pipe 8 may be discharged into the body of oil contained within the pipe 3, thereby at the same time subjecting it to pressure by which in passing through the burner 4 it may be comminuted and at the same time supplied with oxygen for the support of its combustion and the promotion of said combustion to substantially the highest degree of completeness.

The pipe 8 is preferably provided with a valve 10 for control or interruption of the supply of air, as desired.

In practice I prefer to employ an air pressure of approximately thirty pounds per square inch, although a much higher pressure may be used to advantage. The pressure which I employ is termed a high one as distinguished from low pressures of a few pounds or less sometimes used in oil burners, but inadequate for proper aeration of the oil. I also prefer to provide a pipe 11, affording communication between the tank 6 and the upper end of the tank 1, by means of which air pressure may be supplied to the tank 1 for cleaning it and blowing out the residue, as well as for supplying a force-feed behind the oil contained within the tank 1, if the viscosity of the oil render employment of a force-feed necessary or desirable. I also prefer to employ a pressure-gage 12 in connection with the pipe 11 adapted to register the air pressure communicated from the reservoir 6. The pressure-gage is preferably carried upon a branch 13 of the pipe 11, which, upon opposite sides of said branch, is preferably provided with valves 14 and 15, by which the tank 1 and the gage 12 may be independently shut off from communication with the pressure gage or the tank 6 at will.

From the foregoing specification, the following statement of what constitutes my invention will, it is believed, be clearly intelligible.

My invention is based upon the introduction of an oxygenous fluid, under pressure, into a confined body

of liquid oil a short distance before it reaches the point of combustion, which is also the point of its liberation from confinement.

It is found in practice that the result of the process herein defined is the discharge of the oil from the burner, indicated by the numeral 4 in the drawing, in finely comminuted form, or in a spray, with the result that a perfect combustion of the oil ensues. The result of discharging the oxygenous fluid into the confined stream of oil at a point approximate to but well removed from the burner 4 is distinct from that obtained by mere atomization, or by atomization derived from discharge of air against or into the oil at its point of liberation. Atomization or comminution of the oil might be derived by pressure only, such as might be produced from discharge of the pipe 11 into the tank 1, for instance, and atomization of an air current discharged against the oil at its point of liberation is known in the art. From either or both of these methods my invention is distinguished, both in the mode of operation and in the results obtained.

The burner 4 being of any preferred construction,

as specified, it may be, under the terms of this specification, of the atomizer type; but whatever its construction be, even if it be of the atomizer type, my invention contemplates the introduction of air into the body of the oil before it reaches the burner, and is, therefore, clearly distinguishable from the atomizer type of burner, to the extent that that type of burner may be actually employed in addition to it.

What I claim is:

The process or method of effecting combustion of crude petroleum or the like, which consists in the continuing discharge into a confined stream of liquid oil at a distance from the point at which combustion of the oil takes place, of an oxygenous fluid under pressure sufficient to effect substantially perfect combustion simply upon ignition in air of the liberated oil, discharging the oil into the atmosphere, thereby effecting its comminution through reduction of the said pressure, and igniting the oil substantially at its point of discharge.

In testimony whereof I have hereunto signed my name in the presence of two subscribing witnesses.

JEROME F. STAFFORD.

Witnesses:

EARL C. SWEET,
J. E. JOHNSTON.