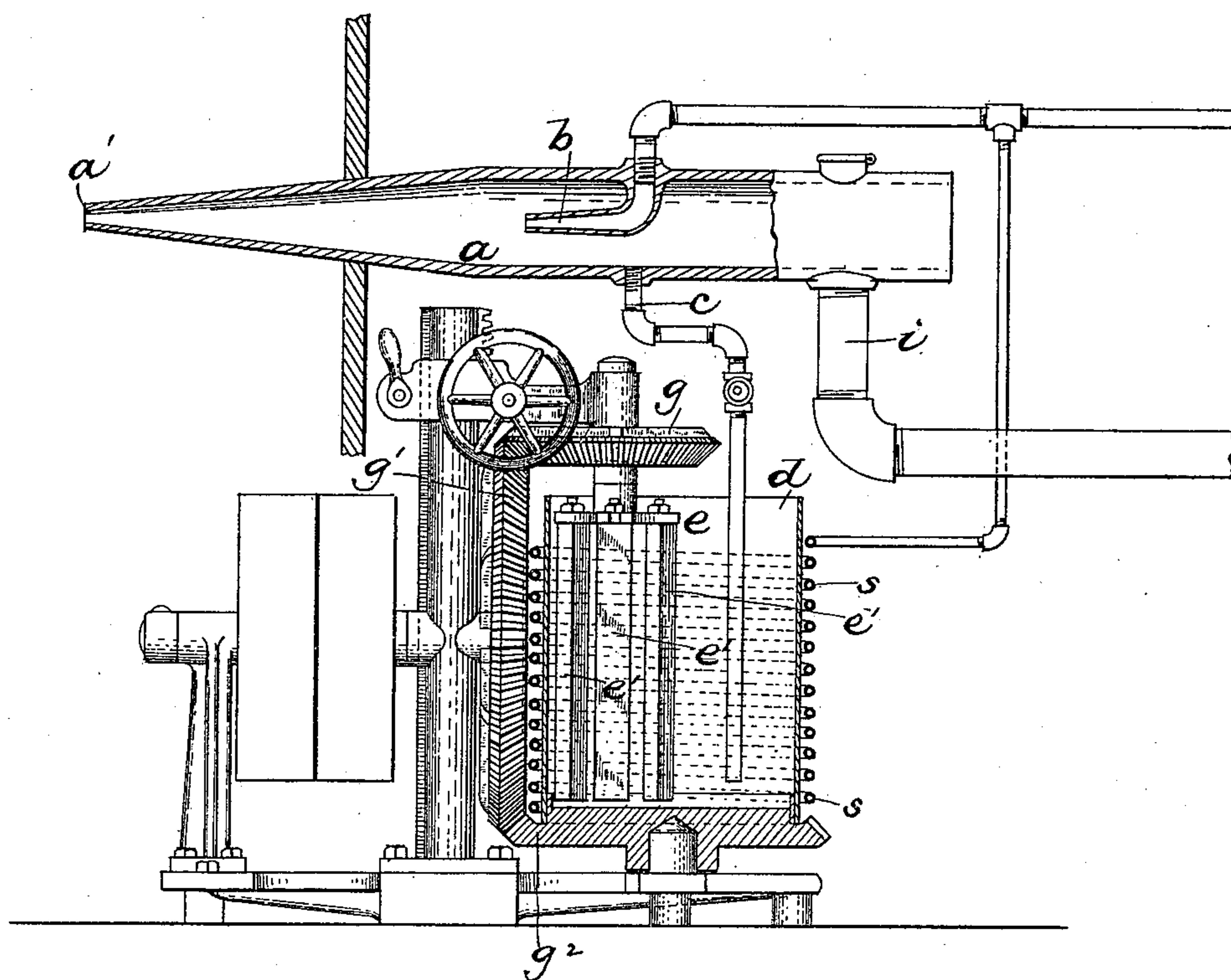


(No Model.)

W. M. ABBOTT.
APPARATUS FOR BURNING LIQUID FUEL.

No. 438,790.

Patented Oct. 21, 1890.



WITNESSES:

H. T. Brown.

C. S. Carter.

INVENTOR:

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UNITED STATES PATENT OFFICE.

WARREN M. ABBOTT, OF BOSTON, MASSACHUSETTS, ASSIGNOR OF ONE-HALF
TO HARVEY K. FLAGLER, OF SAME PLACE.

APPARATUS FOR BURNING LIQUID FUEL.

SPECIFICATION forming part of Letters Patent No. 438,790, dated October 21, 1890.

Application filed July 10, 1890. Serial No. 358,322. (No model.)

To all whom it may concern:

Be it known that I, WARREN M. ABBOTT, of Boston, in the county of Suffolk and State of Massachusetts, have invented certain new
5 and useful Improvements in Apparatus for Burning Liquid Fuel, of which the following is a specification.

This invention relates to apparatus for the combustion of liquid fuel, such as the usual
10 hydrocarbons, which are atomized or converted into spray by a jet of steam and ignited while in the atomized condition. Burners for this purpose usually comprise a conduit or
15 nozzle into which the oil is admitted, a steam-supply nozzle within said conduit, and an oil-supply pipe connected with an oil-reservoir and arranged to conduct oil into the conduit, the arrangement being such that the oil is
20 atomized or converted into spray within the conduit by the action of the steam, the atoms of oil being expelled from the mouth or nozzle portion of the conduit and there ignited.

My invention has for its object to provide means for the admixture of a suitable chemical
25 or compound with the atomized oil to facilitate its combustion and cause the entire consumption of the carbon, so that the heat generated will be more intense and the combustion will be entirely free from smoke.

30 To this end the invention consists in the combination, with a burner of the class above described, of a reservoir to contain oil and a chemical solution of such nature as to promote the combustion of the oil when in an
35 atomized form, said reservoir communicating with the burner through a suitable pipe arranged to admit the oil and the solution mixed therewith to the conduit or casing of the burner, so that the mixture may be atom-
40 ized by the steam admitted thereto, and an agitator in said reservoir, whereby the oil and the chemical solution may be kept intimately mixed or mingled, said agitator preventing the separation of the oil from the solution, all
45 of which I will now proceed to describe.

The accompanying drawing represents a vertical central section of the apparatus embodying my invention.

50 In the drawing, *a* represents a conduit or casing, having one end contracted and termi-

nating in a nozzle or burner *a'*, through which the atomized oil is expelled, and at which the atoms are ignited.

b represents a steam-injecting nozzle within the conduit *a*, the same being suitably con- 55 nected with the steam boiler or generator.

c represents an oil-supply pipe, which is connected to an oil-reservoir *d*, and is arranged to deliver oil into the casing *a* in such relation to the nozzle *b* that the steam from 60 said nozzle will atomize the oil.

In carrying out my invention I provide the oil-reservoir *d* with a rotary agitator *e* of any suitable construction, the same being here shown as a shaft provided with blades or 65 wings *e'*, one end of the shaft projecting outside of the reservoir and being provided with a bevel-pinion *g*, whereby it may be rotated by means of a suitable bevel-gear *g'*, the latter meshing with a bevel-gear *g''*, attached to 70 the tank *d*, so that the tank and agitator are simultaneously rotated.

In operating the apparatus a suitable quantity of a chemical solution, which may be of the kind described in the pending applica- 75 tion of Harvey K. Flagler for Letters Patent for method of burning liquid fuel, is placed in the reservoir *d* with the oil which is to be consumed, said solution being composed of the following ingredients, of which about the fol- 80 lowing proportions are used for every gallon of liquid fuel consumed, viz: sea-water, one-half gallon; fresh water, one-half gallon; crude nitrate of soda, four ounces; sal-niter, four ounces; common salt, four ounces; Glauber's 85 salts, four ounces; sal-ammoniac, one-half ounce, and borax, one-half ounce. The agitator is set in motion, and its motion is continued during the entire period of consumption of the liquid fuel, the solution and the oil 90 being thus kept intimately mixed, so that they pass together through the pipe *c* and are together atomized by the steam from the nozzle *b* within the casing *a*.

The mixture of the oil and chemical solu- 95 tion will be facilitated by heating the tank *d* and its contents, and this may be accomplished by a steam-coil *s*, surrounding the tank, or by any other suitable means. I prefer to heat the oil and chemical to as high a 100

point as is practicable without vaporizing the oil, and I find that by this treatment the oil and solution are kept thoroughly mixed. The tank should be in close proximity to the
5 burner, so that the oil and solution will not lose their heat to any material extent in passing from the tank to the burner. When the mixed oil and solution reach the burner, they are still more intimately mixed by the
10 action of the jet of superheated steam introduced by the steam-nozzle *b*.

I claim—

1. The combination, with a burner for liquid fuel, comprising a chamber or conduit terminating in a burner and a steam-injecting
15 nozzle therein, of a reservoir adapted to contain a mixture of oil and a chemical solution, a connection between said reservoir and the

casing of the burner, and an agitating or stirring device in said reservoir, whereby the oil 20 and the chemical solution are kept mixed, as set forth.

2. The combination of the atomizing-burner, the tank connected by a pipe or tube therewith, means for heating said tank and its 25 contents, and an agitating device in said tank, as set forth.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, this 30th day of 30 June, A. D. 1890.

WARREN M. ABBOTT.

Witnesses:

C. F. BROWN,
A. D. HARRISON.