

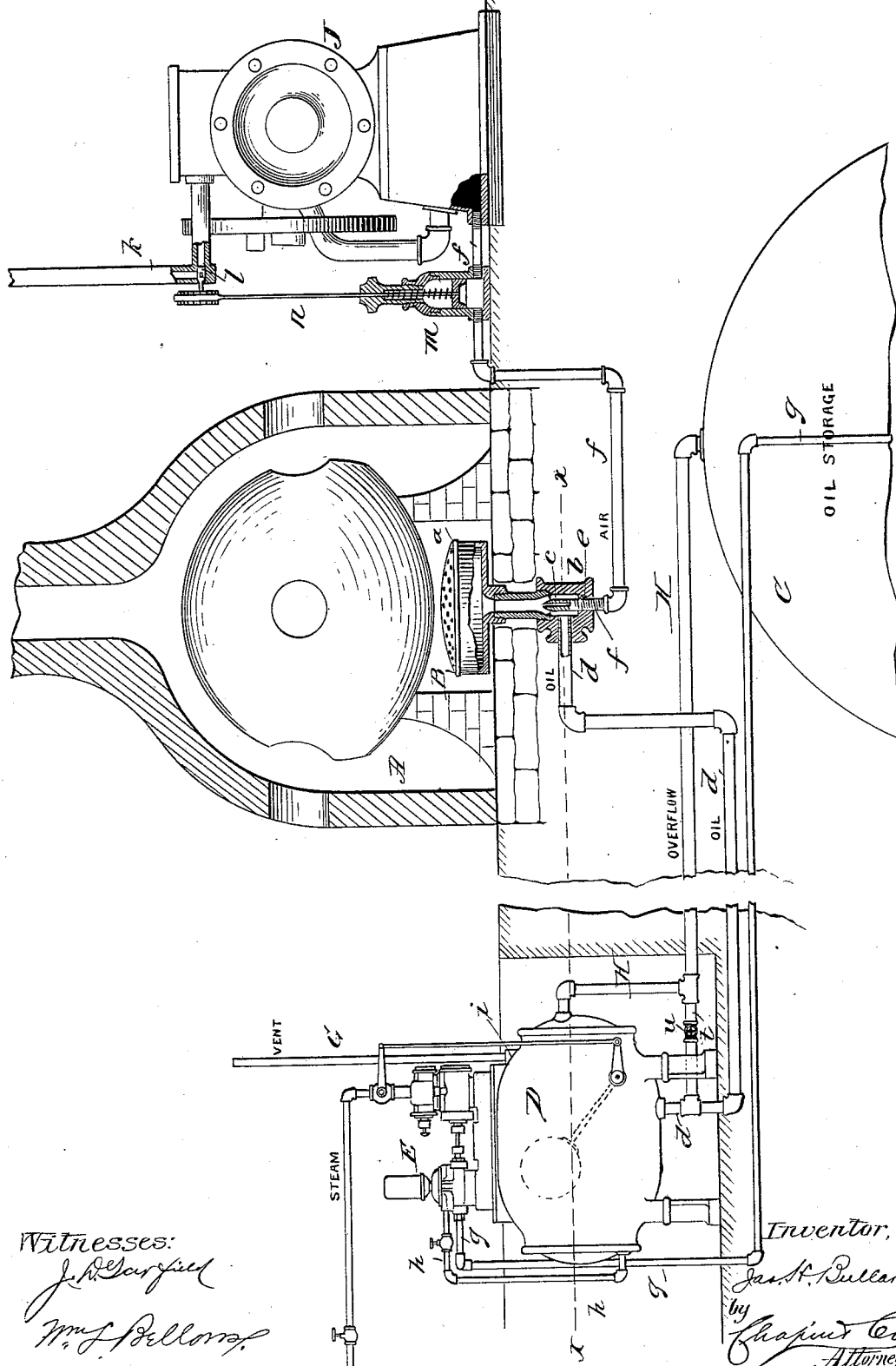
(No Model.)

J. H. BULLARD.

APPARATUS FOR BURNING HYDROCARBON OILS.

No. 419,411.



Patented Jan. 14, 1890.



Witnesses:

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 by  
  
 Attorneys.

# UNITED STATES PATENT OFFICE.

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## APPARATUS FOR BURNING HYDROCARBON OILS.

SPECIFICATION forming part of Letters Patent No. 419,411, dated January 14, 1890.

Application filed August 2, 1889. Serial No. 319,583. (No model.)

### *To all whom it may concern:*

Be it known that I, JAMES H. BULLARD, a citizen of the United States, residing at Springfield, in the county of Hampden and State of Massachusetts, have invented new and useful Improvements in Apparatus for Burning Hydrocarbon Oils, of which the following is a specification.

This invention relates to improvements in apparatus for burning hydrocarbon oils as fuel, the object thereof being to provide a simple and improved apparatus for the purpose named, which will possess the utmost safety in use, precluding at times when the apparatus is not running for use, as desired, any possibility of overflowage of or flooding by oil anywhere on the premises; and the invention consists in the novel arrangement and combination of parts, all substantially as will hereinafter more fully appear, and be set forth in the claims.

In the accompanying drawing, in which the present improved hydrocarbon burning apparatus is illustrated, the figure is a side elevation with some parts in central vertical section.

At the furnace A, in which the fire is to be employed and which here shown is a glass-melting furnace, is arranged a burner B, having a suitable construction, whereby the oil and air may become commingled as they issue therefrom, the burner particularly shown in said figure consisting of a circular casing *a*, apertured at its top and provided beneath with a coupling, as seen at *b*, for the proper connection therewith, at the side thereof, of the oil-supply pipe *d*, said coupling permitting axially the entrance to the lower vertical passage *e* of the burner of the air-supply pipe *f*, the end of which pipe, as shown, is projected a slight distance above the end of the oil-pipe, there being an inclosed annular space *c* around and below the tip of the air-supply pipe.

C represents a storage-tank, usually placed underground, or in any event below the level of the burner, and D represents a service tank or receptacle, a steam-pump E being shown for conveying oil through the suction-pipe *g* and the pipe *h* from said storage to said service tank. The level in said service-tank is automatically maintained by mech-

anism substantially such as shown and described in Letters Patent of the United States granted to me July 23, 1889, No. 407,638; or the desired height of oil in the service-tank may be maintained by other approved means, and from said service-tank at a point below the top of the oil therein. The before-mentioned oil-pipe *d* passes therefrom to the burner, as already set forth.

A vent opening into the air-space in the service-tank above the oil is formed, as at *i*, to which there is preferably connected a vent-pipe G, leading upwardly a suitable distance, as through the roof, whereby any vapors or gases which may be generated in the service-tank will not escape in proximity to the furnace. The provision of such vent insures the normal atmospheric pressure on the oil in the service-tank.

An overflow-pipe H leads from the interior of the service-tank at a point just above the desired oil-level therein to the storage-tank or other suitable receiver below the height of the burner.

J represents an air pump or compressor, which may be of any suitable construction, and from the air chest or chamber thereof the air-supply pipe *f* leads, the tip of which, as before mentioned, terminating within the burner a little above the point of entrance into said burner of the oil-supply pipe *d*. As particularly shown, the air-compressor is steam-driven, the steam-supply being conveyed thereto through the pipe *k*, in which at *l* is a valve, and adjacent said air-compressor, and between it and the said burner in the said air-supply pipe *f*, a piston-regulator *m* is provided, an engagement or connection being had between the piston-rod *n* of the regulator and said valve, whereby the supply of steam to drive the compressor will be automatically controlled by the pressure of air forced through said air-supply pipe to the burner, and substantially as described in Letters Patent of the United States granted to me February 5, 1889, No. 397,366.

Under the running of the air-compressor and the oil-pump air and oil are supplied to the burner in suitable quantities. The air issuing under the desired pressure from the tip of the pipe *f* within the burner at a point above the point of oil-entrance creates a suc-

tion, causing the oil to be also emitted with the air through the discharge aperture or apertures of the burner for combustion, and it will of course be understood that by the appliances comprised in the oil-pump service-tank and the conduit-connections shown for oil supply and feed the oil will be fed to the burner in suitable quantities, and the feed of oil into the service-tank will not at the time of running, or at any other time under any possibility, reach a height above the point of connection of the overflow-pipe with the service-tank. The ball-float device included in said service-tank is intended to secure the confinement of the oil within the stated limit as to height, and usually is efficient for such purpose; but the consideration of possible damage in the event of the oil in the service-tank reaching a point considerably above the level mentioned and indicated by the dotted line *xx* has induced the provision of the overflow-pipe, under which no apprehension need be had as to the safety of the apparatus.

A pipe *t* is provided between and in communication with the oil-supply pipe and the overflow-pipe having a cock or valve *u*, which latter is closed at all times during the running of the apparatus, and at the time of "shutting down" by opening the said valve *u* all the oil in the service-tank may be drained off into the storage-tank.

What I claim as my invention is—

1. In an apparatus for burning hydrocarbon oils, the combination, with an injector-burner having an air-injecting passage and an oil-opening, of a service-tank located with its oil-level but slightly above the oil-opening of the burner and provided with a vent-opening, and an oil-supply pipe leading from said service-tank to the oil-opening of the burner, an air-compressor and an air-inlet pipe leading therefrom to the air-injecting passage of the burner, arranged for operation substantially as and for the purpose set forth.

2. In an apparatus for burning hydrocarbon oils, the combination, with an injector-burner having an air-injecting passage and an oil-opening, of a service-tank located with its oil-level but slightly above the oil-opening of the burner and having an opening provided with a vent-pipe leading outwardly therefrom, and an oil-supply pipe leading from said service-tank to the oil-opening of the burner, and an air-compressor and an air-supply pipe leading therefrom to the air-injecting passage of the burner, substantially as and for the purpose set forth.

3. In an apparatus for burning hydrocarbon oils, the combination, with an injector-burner having an air-injecting passage and an oil-opening, the outer end of the air-injecting passage being nearer the discharge end of the burner than the oil-opening, of a service-tank located with its oil-level but slightly above the said oil-opening of the burner and provided with a vent-opening above the oil, an oil-supply pipe leading from

said service-tank to the oil-opening of the burner, and an air-compressor and an air-pipe leading therefrom to the air-injecting passage of the burner, substantially as and for the purpose set forth.

4. In an apparatus for burning hydrocarbon oils, the combination, with an injector-burner having an air-injecting passage and an oil-opening, of a service-tank located with its oil-level but slightly above the oil-opening of the burner and provided with a vent-opening, an oil-storage tank, and a power-driven pump suitably connected with said storage and service tanks for conveying oil from the former to the latter, means, substantially as described, for automatically controlling said pump, whereby the proper height of the oil in the service-tank may be maintained, an oil-supply pipe leading from said service-tank to the oil-opening of the burner, an air-compressor and an air-inlet pipe leading therefrom to the air-injecting passage of the burner, substantially as and for the purpose set forth.

5. In an apparatus for burning hydrocarbon oils, the combination, with an injector-burner having an air-injecting passage and an oil-opening, of a service-tank located with its oil-level but slightly above the oil-opening of the burner and provided with a vent-opening, an oil-storage tank, and a pump connected with said storage and service tanks for conveying oil from the former to the latter, an overflow-pipe leading from said service-tank at a point just above the oil-level therein to said storage-tank, and an oil-supply pipe leading from said service-tank to the oil-opening of the burner, and an air-compressor and an air-pipe leading therefrom to the air-injecting passage of the burner, substantially as and for the purpose described.

6. In an apparatus for burning hydrocarbon oils, the combination, with an injector-burner having an air-injecting passage and an oil-opening, of a service-tank located with its oil-level but slightly above the oil-opening of the burner and provided with a vent-opening, an oil-storage tank, and a pump connected with said storage and service tanks for conveying oil from the former to the latter, an overflow-pipe leading from said service-tank at a point just above the oil-level therein to said storage-tank, an oil-supply pipe leading from said service-tank to the oil-opening of the burner, and a pipe provided with a closing-valve connecting the said oil-supply and the overflow pipe, and an air-compressor and an air-inlet pipe leading therefrom to the air-injecting passage of the burner, substantially as and for the purpose described.

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