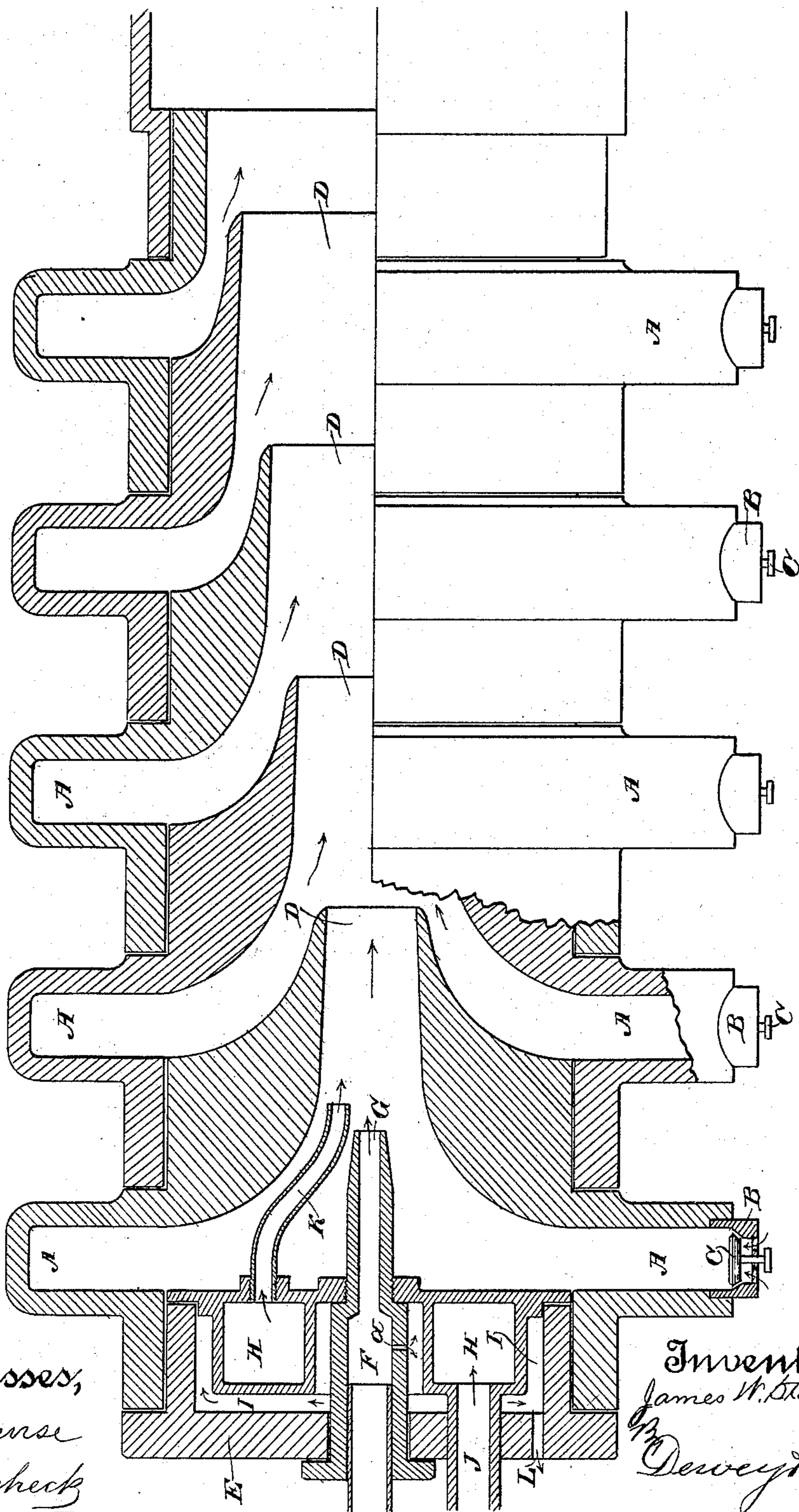


(No Model.)

J. W. STANLEY.
AIR INJECTOR AND OIL BURNER.

No. 533,400.

Patented Jan. 29, 1895.



Witnesses,
B. H. Hourse
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By
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UNITED STATES PATENT OFFICE.

JAMES W. STANLEY, OF OAKLAND, CALIFORNIA.

AIR-INJECTOR AND OIL-BURNER.

SPECIFICATION forming part of Letters Patent No. 533,400, dated January 29, 1895.

Application filed August 15, 1894. Serial No. 520,401. (No model.)

To all whom it may concern:

Be it known that I, JAMES W. STANLEY, a citizen of the United States, residing in Oakland, Alameda county, State of California, have invented an Improvement in Air-Injectors and Oil-Burners; and I hereby declare the following to be a full, clear, and exact description of the same.

My invention relates to a device for burning oil, and combining with it jets of air and steam.

It consists of a series of independent separable air supply nozzles, a jet tube through which steam is delivered centrally through said nozzles, and an oil supply device with a means for heating the same before it is delivered into the injector, and in certain details of construction which will be more fully explained by reference to the accompanying drawing, in which the figure is a longitudinal section through my device.

My apparatus consists of a series of circular chambers A having extensions B below, with air inlet valves C, and central nozzles D, with a common axis, each succeeding nozzle from the first to the last increasing in size and capacity. These chambers have rearward extensions, and each one is so constructed as to receive the next one behind which is fitted to it as shown.

E is an annular cap or chamber fitted to the extension of the first or rearmost of the air chambers, and through the center of this cap passes the steam inlet passage F having a discharge nozzle G which delivers upon the same axial line with the air nozzles D which are situated in front of it. Surrounding this inlet passage and nozzle is an annular oil chamber H, which surrounds the steam inlet passage F and lies within the cap E. The front of the oil chamber forms also the front of the cap E fitting against its inwardly projecting flanges, as shown, thus forming a chamber I which surrounds the oil chamber H, and also extends behind it.

J is an inlet pipe through which oil is delivered into the annular chamber H under a sufficient amount of pressure to cause it to flow through the chamber and be discharged through the delivery pipe K. These two pipes are arranged with relation to each other so that the inlet pipe is at the rear of one

side of the chamber H while the discharge pipe leads out from the front of the opposite side.

In the lower side of the steam inlet pipe F is made a small hole *a*, and through this hole the more moist portion of the steam which is passing through the pipe and nozzle, and which, being heavier, always moves along the bottom of the pipe, will be delivered into the chamber I which surrounds the oil chamber H. This steam surrounding the oil chamber will gradually heat the oil which is received into the chamber, and raise its temperature to a degree depending upon the proportionate size of the oil chamber, the surrounding steam chamber, and the temperature of the steam which is admitted into this surrounding chamber.

At the bottom of the chamber I is a small passage L through which the steam and condensed water therefrom escapes from the chamber I.

The passage *a* is so small that its effect upon the steam within the inlet passage F is not noticeable, and the larger portion of the driest of the steam passing through this passage, is delivered through the nozzle G.

The discharge pipe K from the oil chamber is so disposed that the oil is delivered from its end directly in front of the steam nozzle G, and it is blown into a fine spray by the action of a steam jet, and the steam and oil thus passing through the first of the air nozzles will, by the vacuum produced in the air chamber, open the air valve and draw in a certain portion of air which, mingling with the oil and steam, still further subdivides the oil and makes a finer spray of it. Each additional air nozzle supplies a further quantity of air, and being of larger diameter, allows the body of steam, oil and air to constantly expand and be more intimately mixed as it passes through each nozzle until after leaving the final nozzle of largest diameter, it is delivered into the furnace in a condition most suitable for combustion, on account of the fineness to which the spray has been comminuted, and the quantity of air intimately mingled therewith to support its combustion.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. An injector and oil burner consisting of a nozzle having its base enlarged at right angles to the line of projection of the nozzle to form an air chamber, an extension from below said chamber provided with air inlet valve, a steam pipe discharging axially in line with said nozzle, an oil supply and means for heating the oil and discharging it into the same discharge nozzle.

2. An injector and oil burner consisting of a series of independent nozzles having their bases enlarged at right angles to the line of projection of the nozzles, each of said chambers having a rearward extension whereby it receives and is fitted to the next adjacent one, means for supplying air to each of said chambers, a steam inlet pipe discharging axially in line with said nozzles, an oil supply and means for heating the oil and discharging it into the same discharge nozzle.

3. An injector and oil burner consisting of a series of nozzles each of which has its rear end enlarged to form an air chamber, and has an extension from the rear adapted to receive and be fitted to the adjacent nozzle, an extension from below the chamber, having an air inlet valve, a cap fitting the rear extension of the rearmost nozzle, a steam pipe discharging through the axis of the nozzle, and oil supply, and means for heating the oil and discharging it into the same discharge nozzle.

4. An air injector and oil burner consisting of a discharge nozzle, a cap or casing fitting the rear of the nozzle having a central steam

pipe and discharge nozzle, an annular oil chamber fitted within said cap and chamber around the steam pipe, having a passage at one side through which oil is admitted thereto, and a passage and discharge pipe from the opposite side through which oil is delivered therefrom into the line of the steam discharge jet, a passage made in the steam supply pipe opening into the chamber surrounding the oil chamber upon the lower side of said pipe whereby the more moist portion of the steam escapes into said chamber and acts to heat the oil in the supplemental chamber during its passage from the delivery to the discharge pipe and an escape passage from the exterior chamber for the products of condensation of the same admitted thereto.

5. The combination, of a series of nozzles having suitable air chambers with air inlets and check valves controlling said inlets, the apertures of said nozzles increasing in capacity from the rear nozzle of the series, to the discharge nozzle at the front, a cap and chamber fitting the rear of the air chamber, a steam pipe discharging through the axis of the air nozzles, and means for supplying oil into the line of the steam discharge.

In witness whereof I have hereunto set my hand.

JAMES W. STANLEY.

Witnesses:

JAMES T. NORTON,
WILLIAM F. STANLEY.