

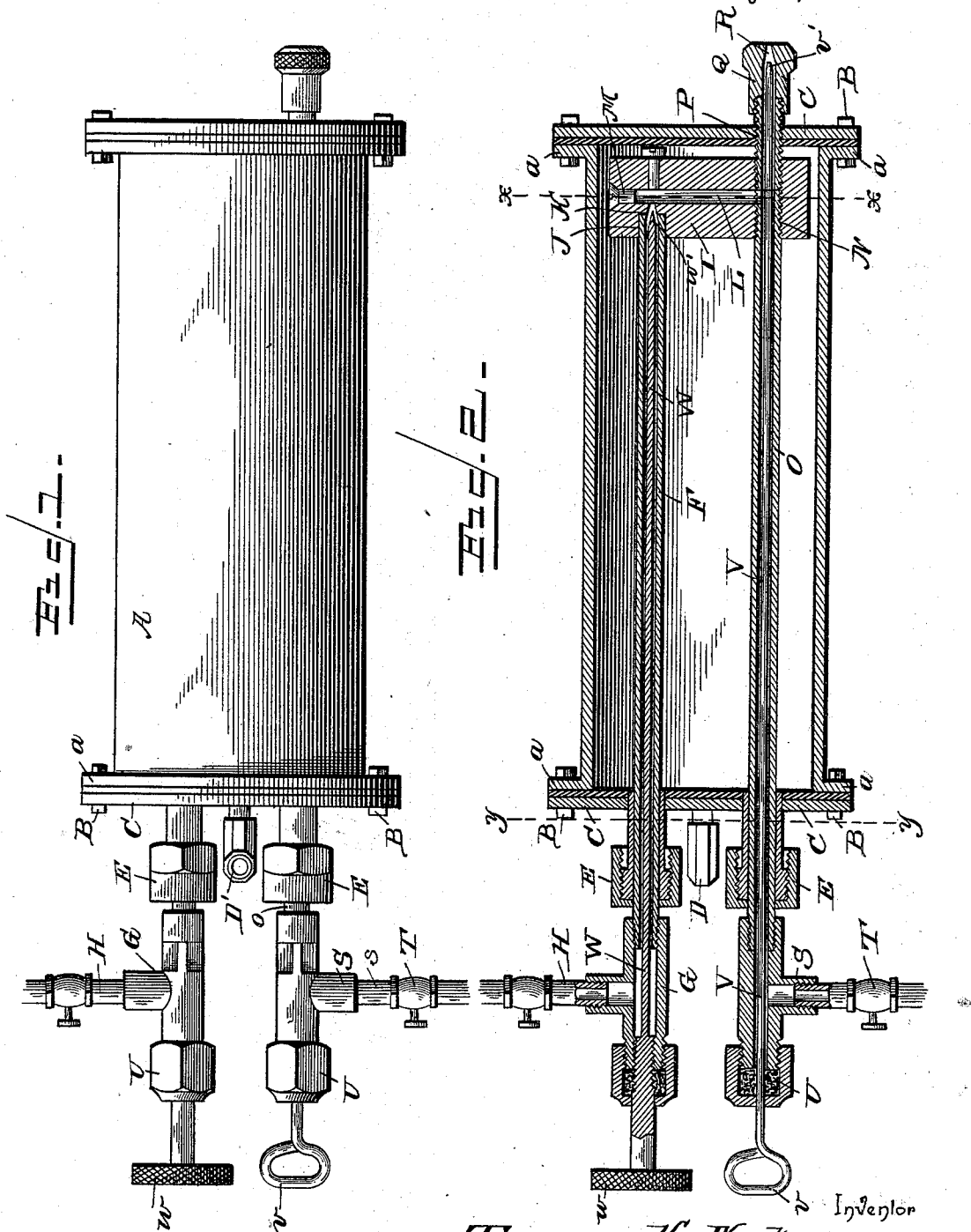
(No Model.)

2 Sheets—Sheet 1.

T. K. NICKERSON.
HYDROCARBON BURNER.

No. 519,339.

Patented May 8, 1894.



Inventor
Truman K. Nickerson,

Witnesses
E. K. Stewart.
D. C. Mahan.

By his Attorneys,

C. A. Snow & Co.

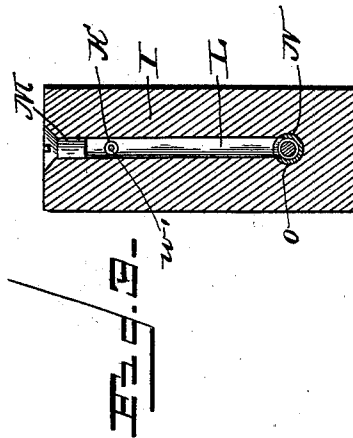
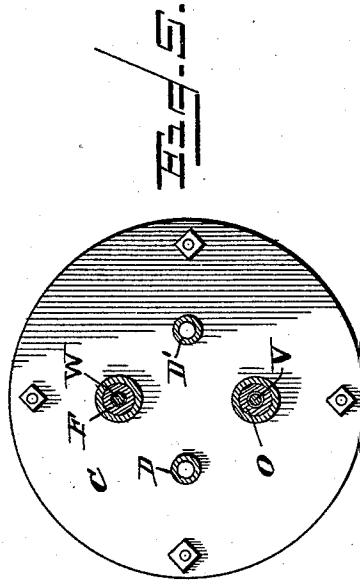
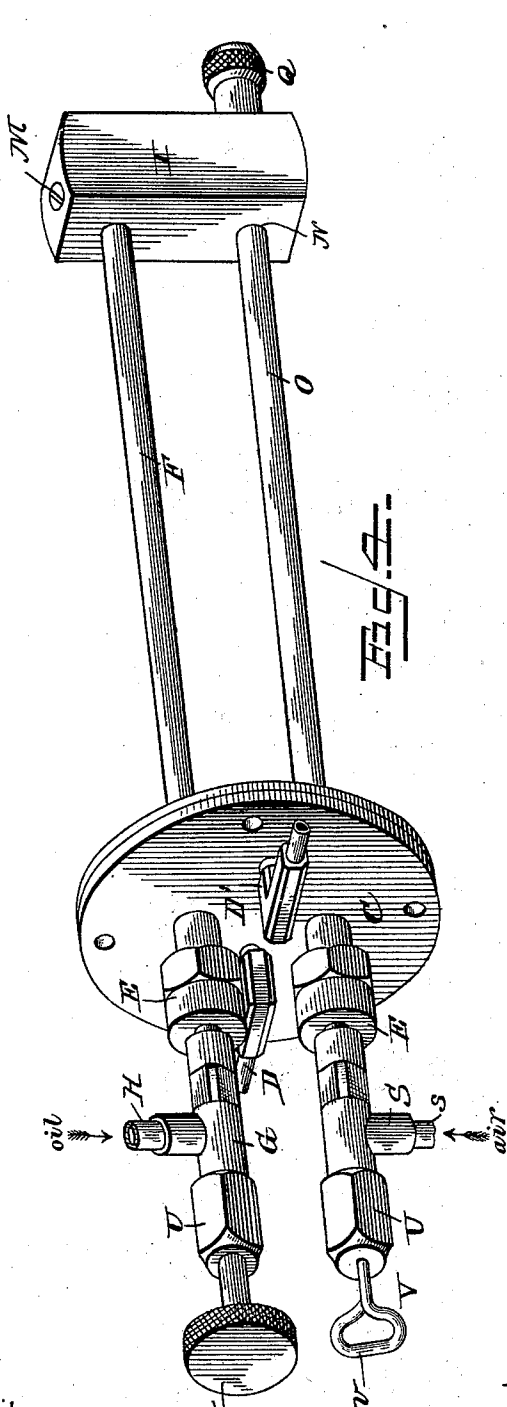
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2 Sheets—Sheet 2.

T. K. NICKERSON.
HYDROCARBON BURNER.

No. 519,339.

Patented May 8, 1894.



Witnesses

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UNITED STATES PATENT OFFICE.

TRUMAN K. NICKERSON, OF MAQUOKETA, IOWA.

HYDROCARBON-BURNER.

SPECIFICATION forming part of Letters Patent No. 519,339, dated May 8, 1894.

Application filed October 13, 1893. Serial No. 488,074. (No model.)

To all whom it may concern:

Be it known that I, TRUMAN K. NICKERSON, a citizen of the United States, residing at Maquoketa, in the county of Jackson and State of Iowa, have invented a new and useful Hydrocarbon-Burner, of which the following is a specification.

This invention relates to hydrocarbon burners; and it has for its object to provide an improved burner especially adapted for use in lime or cement kilns where it is necessary for a force to assist the draft of the kilns.

To this end the main and primary object of the present invention is to provide an improved burner in which the vaporization and atomization of the oil are effectively secured, so that a complete combustion of the liquid fuel is had at the burner-tip thereof, and at the same time providing a burner producing a perfectly dry heat without employing the direct action of steam under pressure, while also avoiding the many disadvantages to atomization by cold air.

With these and other objects in view, which will readily appear as the nature of the invention is better understood, the same consists in the novel construction, combination, and arrangement of parts hereinafter more fully described, illustrated, and claimed.

In the accompanying drawings:—Figure 1 is a side elevation of the hydrocarbon burner constructed in accordance with this invention. Fig. 2 is a central vertical longitudinal sectional view thereof. Fig. 3 is a vertical sectional view on the line $x-x$ of Fig. 2. Fig. 4 is a detail in perspective of the burner device proper removed from its inclosing shell or casing. Fig. 5 is a detail section on the line $y-y$ of Fig. 2.

Referring to the accompanying drawings, A represents an inclosing cylindrical shell or casing provided with the opposite flanged ends a , to which are removably bolted on the bolts B, the opposite steam tight shell or casing heads C, whereby a perfectly steam tight space is provided inside of the shell or casing, to provide means for the free circulation of steam to heat up and vaporize the liquid fuel employed in the burner, and the steam is admitted into such space through the steam inlet pipe D, and is exhausted therefrom through the exhaust or outlet pipe D', both of said pipes D and D', being connected

to one of the heads of the shell or casing. The steam tight head of the shell or casing to which the steam pipes D and D', are connected, is provided at both sides of said steam pipes with the off-standing packing boxes E, one of which receives the oil feed pipe F, projecting through the said packing box and extending into the shell or casing to a point near the opposite head thereof, and said oil feed pipe F, has coupled to the outer end thereof the T-coupling G, to one side of which is connected the main oil supply pipe H, which leads to a suitably arranged oil tank, from which the oil is preferably forced under an air pressure equaling the pressure of the air introduced into the burner for atomizing purposes. The inner open end of the oil feed pipe F, is connected to the connecting head I, located within the shell or casing at one extreme end thereof. The said connecting head I, consists preferably of a block of steel and is provided at one side near its upper end with the socket or recess J, which receives the inner end of the oil pipe F, and is provided in its base with the tapered valve opening K, providing communication between the oil feed pipe F, and the vertical vapor passage L. The vertical vapor passage L, is bored vertically in the head I, and is plugged at its upper end with a plug M, so that it is kept closed, while at the same time being capable of easy cleaning, and the lower end of said vapor passage L, terminates at the pipe opening N, piercing the head transversely so as to snugly receive one end of the combined air and burner pipe O. The combined air and burner pipe O, is arranged to fit at one end in the other one of the packing boxes E, and beyond the block I, in which it fits, the other opposite end of said pipe O, projects through a perforation P, in one of the heads of the shell or casing, and is exteriorly threaded to receive the removable burner tip Q. The burner tip Q, is provided with a tapered opening R, whereby the vaporized and atomized liquid fuel may readily find escape so as to be burned directly as it issues from the tip.

The receiving end of the air and burner pipe O, has coupled thereto the T-coupling S, from one side of which leads the air supply pipe s, which in turn leads from a suitable air compressor, and is provided with a valve T, located at a convenient point therein to

provide means for properly regulating the flow of air admitted into the pipe O. The outer end of the coupling S, and also the outer end of the coupling G, of the oil feed pipe support the packing boxes U, in which are mounted to slide the rods V and W, respectively, having at their outer ends the manipulating wheels *v* and *w*, and inner tapered ends *v'* and *w'*, respectively. The rod V, which is disposed inside of the air and burner pipe O, is adapted to be moved in and out of the tapered opening of the burner tip, for the purpose of cleaning such opening in case it should happen to become clogged from any hard substances, while the other rod W, which is arranged to move inside of the pipe F, is adapted to have its inner tapered end *w'*, work into the tapered valve opening K, in the connecting head I, thereby providing means for properly regulating the flow of oil into the vertical vapor passage L, and communication between said vertical vapor passage and the air and burner pipe O, is maintained through the vapor opening X, which pierces the pipe O, and registers with the lower end of said vapor passage.

Now from the foregoing it is thought that the operation and construction of the herein described vapor burner will be readily apparent. By reason of maintaining a circulation of live steam throughout the interior of the inclosing shell or casing, means are provided for thoroughly heating up the pipes E and O, without mixing the steam together with the oil and air, and therefore all thick earthy substances, which crude oil contains more or less, are completely vaporized, so that the same do not interfere in any particular with the free working of the herein-described burner, and by the time the oil reaches the combined air and burner pipe, the same is thoroughly vaporized and in the best possible condition for atomization under the jet or force of the air passing through the pipe O. Now at this point, it is to be also observed that the steam in the shell or casing necessarily heats up the air to a very high degree, and thereby provides means for putting the air in the best possible condition for thoroughly atomizing the vaporized oil in the tip end of the pipe, so that as it issues out of the burner tip the ignition will be quick and dry, and will therefore specially adapt the burner for kiln use. The construction herein described also provides means whereby the length of flame from the burner can be increased or diminished by regulating the supply of oil without affecting the pressure in the pipe O, and without necessitating the regulation of such pressure also, and another advantage accruing from the employment of the herein described burner, in the connection specified, is that the exhaust or outlet steam pipe D', may be led into the hot air draft channel of the kiln, thereby completely utilizing the steam.

Changes in the form, proportion and the minor details of construction may be resorted to without departing from the principle or sacrificing any of the advantages of this invention.

Having thus described the invention, what is claimed, and desired to be secured by Letters Patent, is—

1. In a hydrocarbon burner, the combination with a steam tight shell or casing having removable heads one of which is provided with packing boxes; of a connecting head located within one end of said casing and provided with a pipe opening and a vertical vapor passage communicating therewith, an oil feed pipe arranged within said casing and extending through one of the packing boxes and fitted at its inner end into said connecting head to communicate with the vertical vapor passage, a suitable valve arranged within the oil feed pipe to control the opening into the vapor passage, a combined air and burner pipe also disposed within the casing and extending through the other packing box and having its inner end fitted in the pipe opening of the connecting head and extending through an opening in that end of the casing, a burner tip removably fitted onto one end of the combined air and burner pipe, and a suitable valve arranged within the combined air and burner pipe, substantially as set forth.

2. In a hydrocarbon burner, the combination with an inclosing steam heating casing; of the connecting head located within and at one end of said casing and provided with a transverse pipe opening, a vertical vapor passage, a socket or recess at one side, and a tapered valve opening located in the base of said socket or recess and opening into said vertical vapor passage, an oil feed pipe disposed within said casing and provided at its outer end with a packing box and having its inner end fitted in said socket or recess of the connecting head, a reciprocating valve rod mounted to work in said packing box of the oil pipe and to work into said tapered valve opening, a separate and independent combined air and burner pipe disposed within said casing and projecting through and beyond one end thereof, said air and burner pipe being fitted in the pipe opening of said connecting head and provided with a vapor opening registering with said vapor passage and at one outer end with a packing box, a removable burner tip fitted to the other end of said air and burner pipe, and the reciprocating cleaning rod arranged to work inside of said air and burner pipe, substantially as set forth.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

TRUMAN K. NICKERSON.

Witnesses:

THOMAS MARTIN,
LEMUEL OWEN.