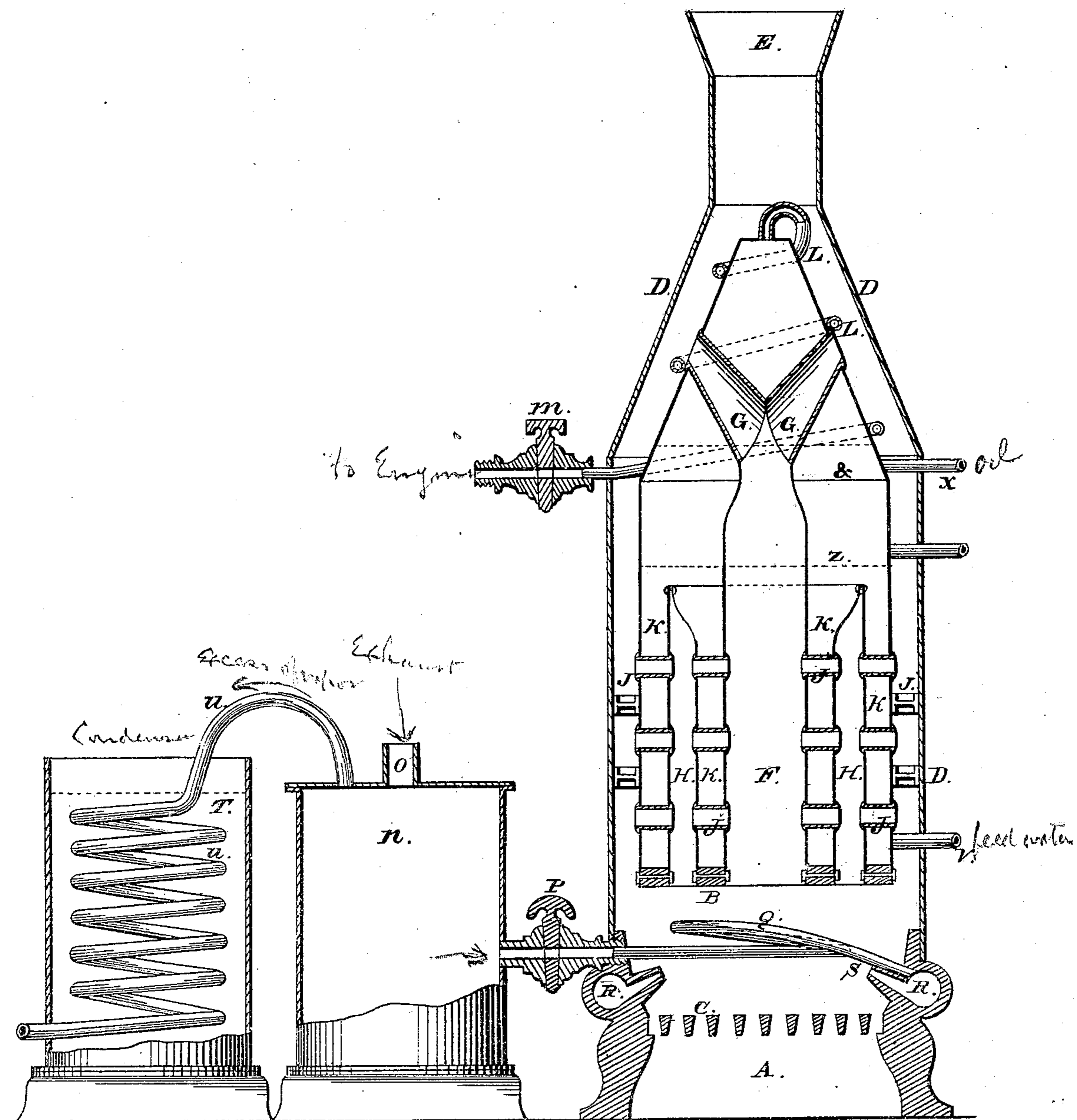


C. CARPENTER, Jr.

Generating and Burning Hydrocarbon Vapors.

No. 143,061.

Patented September 23, 1873.



Witnesses

Edw. W. Down  
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# UNITED STATES PATENT OFFICE.

CALVIN CARPENTER, JR., OF SEEKONK, MASS., ASSIGNOR OF ONE-HALF  
HIS RIGHT TO JAMES B. MADELL, OF PROVIDENCE, R. I.

## IMPROVEMENT IN DEVICES FOR GENERATING AND BURNING HYDROCARBON VAPOR.

Specification forming part of Letters Patent No. **143,061**, dated September 23, 1873; application filed  
June 28, 1873.

*To all whom it may concern:*

Be it known that I, CALVIN CARPENTER, Jr., of the town of Seekonk, in the county of Bristol and State of Massachusetts, have invented a new and useful Improvement in Devices for Generating and Burning Hydrocarbon Vapor for Mechanical Uses, or any use to which it may be applied; and in order that it may be understood, I do hereby declare the following specification, with reference to the drawings annexed thereunto, to be a clear, full, and exact description of said invention.

The object of this invention is to cheapen the first cost of motive power, and make it more safe to use from danger of explosions. The invention consists in devices for generating and burning steam in union with any good hydrocarbon oil, crude petroleum oil of 45° gravity being preferable.

The oil and water are put in the boiler together, the latter being made extra strong for safety; the oil, being specifically lighter, will float upon the water. The water, being heated below the oil, to from 300° to 400° Fahrenheit, passing up in steam through it, vaporizes all of the portions thereof, separating the gasoline, the naphtha, the kerosene, and the light lubricating-oil from the crude petroleum, about two-thirds of the bulk of the oil uniting with the steam to carbonize it and give it an excess of hydrogen, making the vapors in the boiler hydrocarbonized steam. This vapor is passed through a superheater, to be heated to the temperature of from 600° to 800° Fahrenheit. It may then be used directly as steam to operate steam-engines for motive power, in the ordinary manner of using steam, or as fuel for heating purposes. After being used in the engine it is exhausted into a receiver, passing through the same into another superheater in the furnace under the boiler, where it is again superheated, and then transmitted through a blow-pipe apparatus to burn as a blast-flame to keep up the generation of the mixed vapors in the boiler.

To regulate the pressure of the exhaust vapor in this receiver for the blow-pipe apparatus, and prevent an excess of back pressure upon the engine, a still-worm is attached to

the receiver to conduct away any excess of pressure therein through a condenser kept filled with cool water. The vapor so condensed can be fed back to the boiler with the oil-charge, when it is fed in, by any suitable pumping apparatus.

Ordinary fuel, such as coal or wood, is employed when the boiler is first charged, until vapor is generated sufficient to supply the blow-pipe apparatus.

Care must be taken when charging the boiler with its contents to leave a stop-cock open for the vapor to pass off when first generated, which conducts from the vapor-chamber any portion of air that may be therein, and prevents the nitrogen from being united with the vapor under pressure in the boiler, which would cause an explosion in the superheater. This stop-cock may open into the still-worm to save such portions of oil as may pass over in the first vapor raised. The residuum oil not vaporized in the boiler by steam may be drawn off therefrom when needed, to give place to new charges of oil.

The process of boiling the oil with the water in the boiler refines and purifies it, making it a better lubricator for machinery than the stilled and pressed paraffine oils. The paraffine-wax portions being retained in the oils make it more lasting for machinery.

To carry out this process of generating hydrocarbon vapor and heat completely, I first construct a strong boiler by forming it of concentric annular chambers, the walls of each chamber being secured by any number of cross-binder flues sufficient to hold the walls together firmly, and prevent them from expanding apart by extraordinary pressure, which also serve the purpose of giving an extra increase of fire-surface. The inside wall of the first concentric annular chamber forms a flue through the middle of the boiler, which branches into several flues at or above the oil-line, which serve to heat the vapor in the space above the oil. A pipe, made to pass out the top of the vapor-chamber, and spirally around the outside thereof, and terminating in a stop-cock outside of the smoke-jacket, for the purpose of connecting the same with a conduit-pipe leading to a steam-engine, acts

as a superheater for the vapor, and is heated by the smoke and flame going up from the furnace. A receiver of suitable dimensions, into which the vapor from the engine exhausts, is connected by a pipe leading therefrom with a coil in the furnace, which acts as another superheater, terminating in a circular pipe around the furnace, which is provided with a suitable number of nozzles opening into the furnace, which act as blow-pipe conduits for the superheated steam to be burned. A still-worm in a water-tank condenser is connected with said receiver to conduct off and condense any excess of vapor in the latter not necessary for carrying on combustion in the furnace, the condense-oil portions being returned to the boiler.

This still-worm and condenser thus regulate the pressure in the receiver necessary to produce the blast-flame.

A full understanding of the construction of the several devices herein named, to enable the artisan to build the same, may be had by reference to the drawings annexed to this specification.

Figure 1 is an elevated longitudinal sectional view, showing the interiors of the several devices cut through the middle to exhibit their mechanical construction.

A represents the ash-pit to furnace under the boiler; B, the furnace for coal or other fuel to be put; C, the grate as in any ordinary furnace; D D D D, smoke-jacket and outside covering to boiler; E, smoke-pipe to smoke-jacket; F, central smoke-flue to boiler; G G, branch-pipe terminations of smoke-flue F, to heat the carbonized vapor rising from the top of the oil in the boiler; H H, first concentric annular smoke-flue outside from central smoke-flue F; I I, second concentric annular smoke-flue between outside of boiler and inside of smoke-jacket D D; J J J J, cross-binder smoke-flues leading through at right angles to the concentric smoke-flues, to con-

vey smoke and heat through the concentric annular water-chambers to boiler; K K K K, sectional view of said concentric annular water-chambers; L L L, coiled pipe around vapor-chamber to boiler, to superheat the vapor in the same, and conduct it to the engine; M, stop-cock to said coiled pipe, to let the vapor therein through to the engine or shut it off therefrom; N, receiver-chamber for the exhaust of the engine to pass into through pipe O; P, stop-cock to open and let in exhaust vapor from receiver to a pipe-coil, Q, connected therewith in the furnace, to again superheat the vapor; R R, circular pipe around furnace as a terminus of pipe-coil Q, into which nozzles S S are inserted to let the vapor into the furnace in the form of a blow-pipe blast for fuel; T, water-tank condenser with a still-worm pipe, U U, leading from receiver N, to condense the excess of vapor therein and regulate the back pressure of vapor in the receiver from crowding unnecessarily upon the engine; V, feed-water pipe to boiler; X, oil-feed pipe to same; Y, oil-pipe for drawing off residue oil from boiler not converted into vapor; Z, water-line to boiler and conjunction oil-line with water. &, top oil-line in boiler.

My locks, steam-gages, safety-valves, and water and oil indicators may be attached as in any ordinary boilers.

What I claim, and desire to secure by Letters Patent of the United States in the aforesaid inventions and improvements in making a new motive power, is—

The combination of exhaust-chamber N, the still-worm U with water-tank condenser T, the pipe-coil Q, and nozzles S S, for the purposes of regulating and applying the hydrocarbonized vapor of steam as fuel, as specified and set forth.

CALVIN CARPENTER, JR.

In presence of—

JOS. T. K. PLANT,  
W. A. BOSS.