

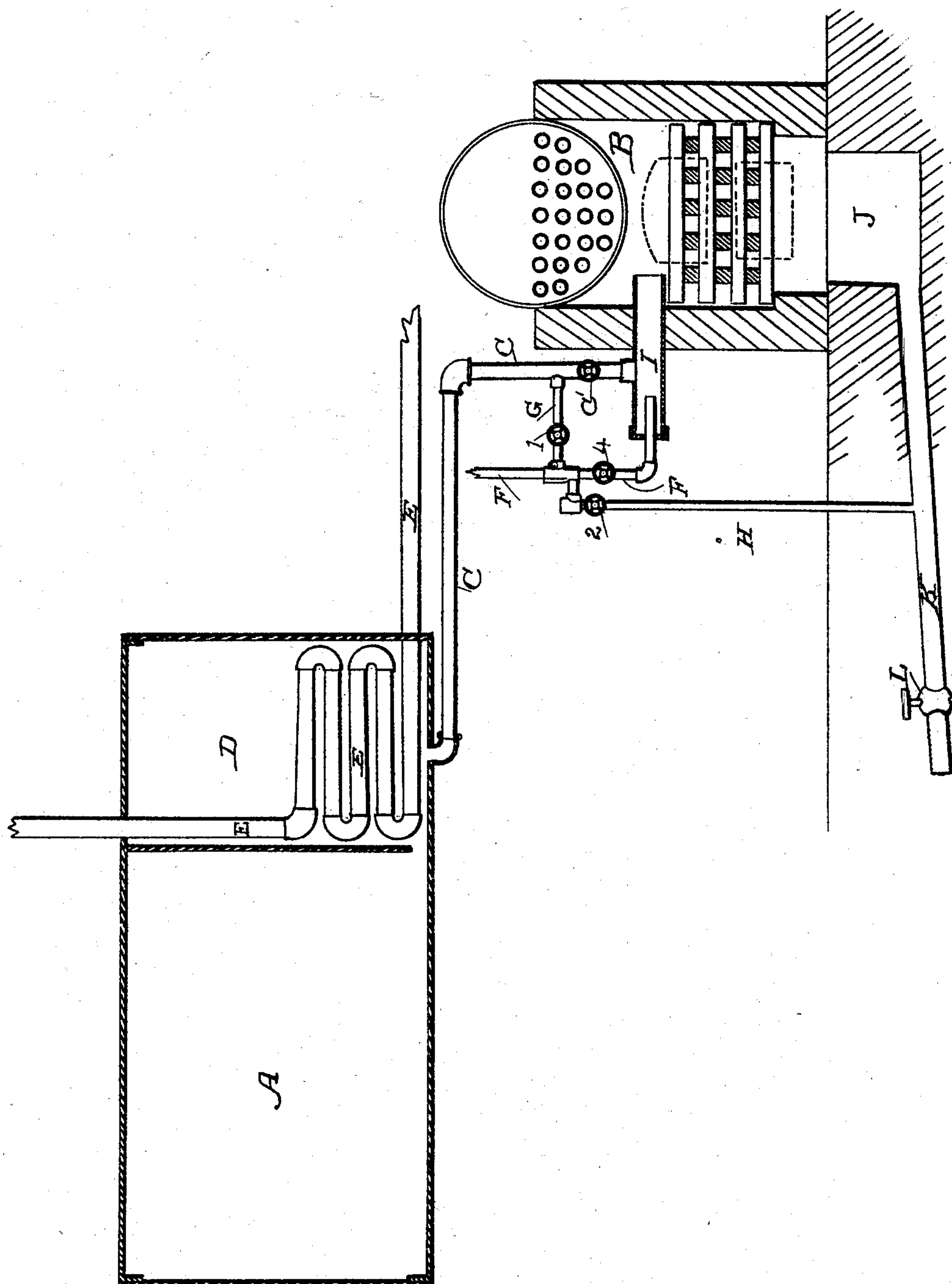
(No Model.)

J. P. ENGLE.

MEANS FOR UTILIZING WASTE PRODUCTS OF PETROLEUM.

No. 505,395.

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UNITED STATES PATENT OFFICE.

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MEANS FOR UTILIZING WASTE PRODUCTS OF PETROLEUM.

SPECIFICATION forming part of Letters Patent No. 505,325, dated September 19, 1893.

Application filed March 9, 1893. Serial No. 465,278. (No model.)

To all whom it may concern:

Be it known that I, JACOB P. ENGLE, a citizen of the United States, residing in the city and county of San Francisco, State of California, have invented an Improvement in Means for Utilizing Waste Products of Petroleum; and I hereby declare the following to be a full, clear, and exact description of the same.

10 My invention relates to a means for utilizing the waste products of petroleum arising from the manufacture of gas, and it will be more fully explained by reference to the accompanying drawing, in which the figure represents a form of apparatus adapted for this purpose.

The object of my invention is to utilize the waste products of petroleum, which are found in conjunction with water, and have a specific gravity so nearly the same that it is impossible to separate them by ordinary means.

In the manufacture of gas from petroleum a part of the waste product which arises therefrom is unlike coal tar, from the fact that it is so nearly of the same specific gravity with the water that it will not separate by gravitation. Furthermore, the constituents of this petroleum oil are tough and elastic and cover the globules of water so that the necessary heat required to convert the water into steam and thus evaporate it, will only serve to create a foam which on cooling again leaves the original constituents the same as before boiling. In order to utilize this waste of petroleum to the best advantage for fuel purposes, I employ the following apparatus:

A is a reservoir of considerable size, and situated sufficiently high to allow the material to flow from it by gravitation to a boiler furnace B through suitable pipes C. Upon one side of this reservoir I separate off a portion D by means of a partition or diaphragm so arranged that the material will seek its level in both parts, and as it is drawn out of the part D through the pipe C, it will continue to be supplied from the part A, while for heating purposes the smaller compartment is practically separate from the larger one.

50 Within the part D is a coil of pipe E which receives exhaust steam from the engine, or, if preferred, direct from the boiler, and by

which the material in this compartment is heated as highly as may be desired, both for the purpose of making it flow more freely 55 and to raise the temperature somewhat, before it is introduced into the furnace. This coil of pipe may be supplied either from the boiler or by exhaust steam.

Within the furnace B I employ, in place of 60 the grate, a series of iron bars or old railroad rails laid alternately at right angles with each other, and piled up in the form of what is known as cob work, and above this the pipe I enters in an approximately horizontal 65 position, so that the material delivered from the pipe C into I may be discharged and spread over the upper layer of iron bars, thence trickling down over the bars below, and eventually falling into a pit or receptacle J beneath the boiler furnace. 70

F is a steam pipe receiving its steam from the boiler and having a jet tube at the end of the pipe I, through which a jet of steam is allowed to pass into the pipe by opening 75 a cock 4. This jet of steam disperses the liquid which is received from the reservoir chamber D, and discharges it with considerable force in the form of a spray over the iron bars before described within the furnace. That portion of the material which is capable of being burned, becomes ignited and burns fiercely within the furnace, making a good fuel for the production of steam, while a portion falls down between the bars, 85 and is delivered into the pit J, as before described, where it continues to burn until the inflammable portion is exhausted. From this pit a discharge pipe K conveys the non-inflammable material away, and it may be 90 drawn off from time to time by opening a cock at L.

G and H are small steam pipes which may be connected directly with the pipe F, before described, and are provided with cocks 1 95 and 2, by which the steam is allowed to flow through them or be cut off. These pipes open respectively into the pipes C and K, and through them a jet of steam may be allowed to flow at pleasure for the purpose of 100 cleansing and warming these pipes. The reason for this is that where this waste of product is allowed to stand for any considerable time in pipes, it becomes thickened in such

a manner as not to flow freely, and by the use of these steam jets, the pipes are readily cleansed and heated so that the material will again flow as desired.

5 The apparatus being in readiness, a fire is first made with shavings and light material which may be mixed with inflammable oil, and fire maintained sufficient to raise steam in the boiler. The small steam jet pipes are
10 then used for a short time to warm and clear the pipes, and the engine being started the exhaust steam passing through the pipe E will in a few moments heat the material in the compartment D sufficiently to allow it to flow
15 freely. The cock 4 in the pipe F is now opened, and a jet of steam passes through the pipe I, after which the feed valve C' in the pipe C is opened to allow sufficient material to flow into the supply pipe I from which it
20 is discharged by the jet of steam passing through the pipe F and distributed over the hot bars which disintegrates it and the inflammable portion burns, while the remainder falls through into the chamber J, and is drawn
25 off as previously described. The material may be delivered into the furnace either continuously in a small quantity or in charges.

By closing the cock in the discharge pipe K, and admitting a jet of steam from the pipe
30 H, this steam will be discharged into the material within the pit J, and will agitate it so that any inflammable material not yet consumed will rise to the surface and burn.

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

1. An apparatus for utilizing the waste products of petroleum, consisting of the furnace having bars of iron laid parallel and trans-
40 versely in series one above the other, a combustion chamber located beneath said bars, a pipe by means of which the material is delivered into the furnace above the bars, the steam jet pipe opening into said delivery pipe,
45 a tank situated above the level of the furnace, a pipe through which the material is led from said tank to the furnace inlet pipe, a controlling cock by which the flow is regulated, and means for heating the material
50 within the tank, substantially as herein described.

2. An apparatus for utilizing the waste products of petroleum, consisting of a furnace having iron bars laid in masses or tiers with-
55 in the furnace, a tank situated above the level of the furnace, into which the material

is first received means for heating the material within the tank, a pipe leading from the tank to the furnace supply pipe, a steam jet
60 pipe opening into the furnace supply pipe whereby steam is injected with the material into the furnace above the iron bars which are laid therein, a combustion chamber situated below the furnace adapted to receive the
65 waste material which passes down through the bars, and a discharge pipe through which said waste material is drawn off, substantially as herein described.

3. An apparatus for utilizing the waste products of petroleum, consisting of a boiler fur-
70 nace having iron bars laid in masses, one above the other, a tank situated above the level of the furnace, a pipe leading from the tank and connecting with a supply pipe which opens into the furnace above the bars there-
75 in, means for heating the material within the tank, a jet tube opening into the supply pipe and delivering steam with the material into the furnace, a combustion chamber situated below the furnace adapted to receive the uncon-
80 sumed material which passes down through the bars of the furnace, a discharge pipe communicating with said chamber and through which the waste material is drawn off, steam
85 pipes connecting with the boiler and provided with cocks, said pipes opening into the main supply pipe and into the discharge pipe of waste material whereby said pipes are cleansed
90 and heated to insure a free flow of the material therein, substantially as herein described.

4. In an apparatus for utilizing the waste products of petroleum, a tank, a supply pipe leading therefrom to deliver material to a boiler furnace by gravitation, a filling of
95 masses of iron within the furnace over which the material is sprayed and upon and below which it is burned, a combustion chamber below the ash pit for the surplus material, a discharge pipe leading from the chamber with
100 a stop cock therein, a steam jet pipe opening into the discharge pipe between the cock and receiver whereby the steam is directed into the receiver when the cock is closed or dis-
105 charged outwardly when it is opened, substantially as herein described.

In witness whereof I have hereunto set my hand.

JACOB P. ENGLE.

Witnesses:

S. H. NOURSE,
GEO. H. STRONG.