

(No Model.)

R. & E. W. BARLOW.
OIL GAS FUEL GENERATOR.

No. 546,375.

Patented Sept. 17, 1895.

Fig. 1

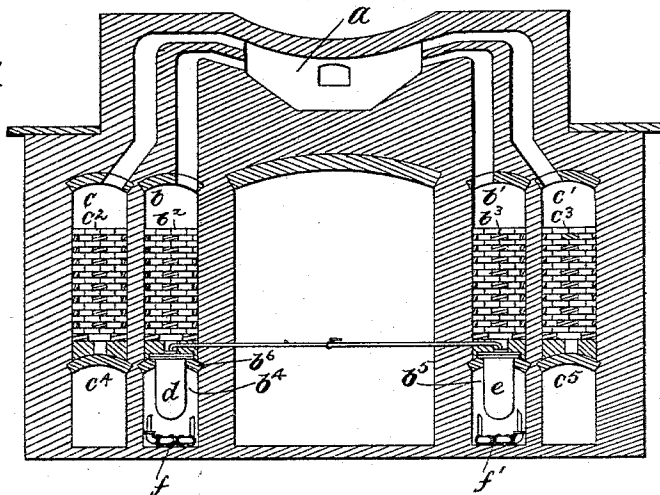


Fig. 2.

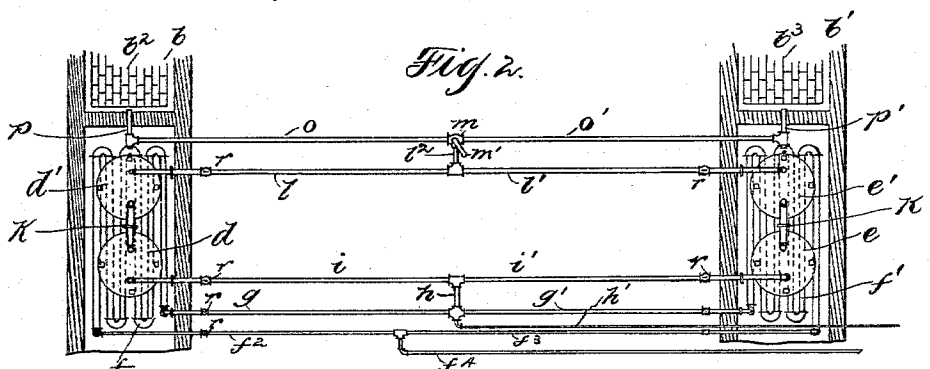
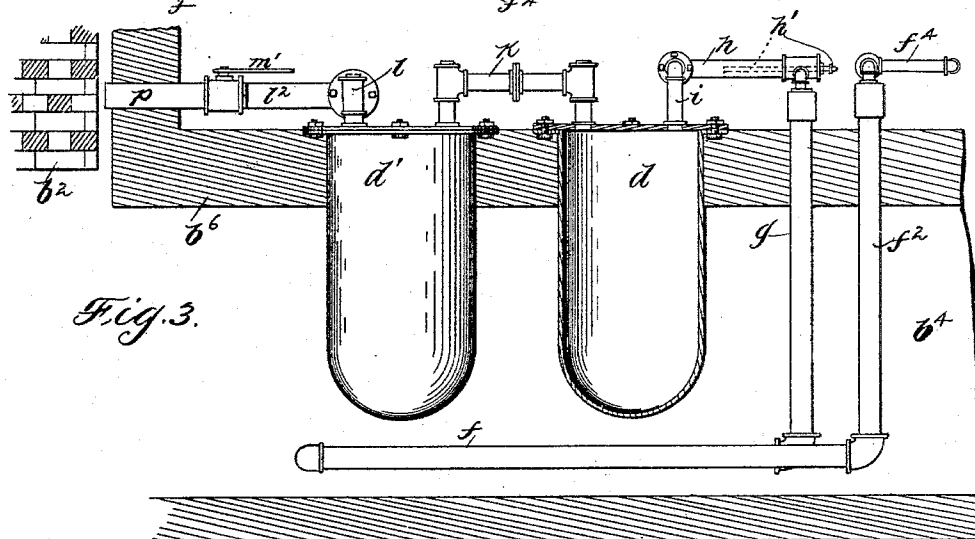


Fig. 3.



Witnesses:

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UNITED STATES PATENT OFFICE.

ROBERT BARLOW AND EDWARD W. BARLOW, OF CHICAGO, ILLINOIS.

OIL-GAS-FUEL GENERATOR.

SPECIFICATION forming part of Letters Patent No. 546,375, dated September 17, 1895.

Application filed April 25, 1895. Serial No. 547,107. (No model.)

To all whom it may concern:

Be it known that we, ROBERT BARLOW and EDWARD W. BARLOW, citizens of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Oil-Gas-Fuel Generators, (Case No. 1.) of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

Our invention relates to an oil-gas-fuel generator as applied more particularly to a furnace of the regenerative type, the object of our invention being to provide means whereby heat may be applied to the mixed oil and steam to gasify the same before coming in contact with the checker-work, and our invention contemplates the use of the waste heat of the products of combustion for this purpose.

In accordance with our invention we provide one or more retorts which may extend into the flues leading from the gas-chamber, whereby the retorts absorb heat from the products of combustion as the products pass through the flue. The mixed oil and steam is passed through the retorts and absorbs heat, whereby the mixture is highly heated or gasified. We provide one or more of the gas-retorts in each of the flues leading from the two gas-chambers of the regenerative type of furnace, the oil and steam being adapted to continuously traverse all of the retorts, while a valve is provided adapted to direct the mixture after passing through the retorts into either of the gas-chambers, according as the run is being made in one direction or the other.

Referring to the accompanying drawings, Figure 1 is a sectional view of a regenerative furnace embodying our invention. Fig. 2 is a sectional view of a portion of the furnace, the retorts and connecting-pipes being shown in plan. Fig. 3 is a partial sectional view of a portion of the furnace, showing the retorts and connecting-pipes in elevation.

Like letters refer to like parts in the several figures.

We have illustrated our invention in connection with the usual form of regenerative furnace, in which a central hearth *a* is pro-

vided, communicating with which, upon opposite sides, are gas-chambers *b b'*, filled with checker-work *b² b³*, the gas-chamber *b* being in communication with a flue *b⁴*, which may be connected with the smoke-stack or which may be sealed, the usual butterfly valve being provided for this purpose. Likewise the chamber *b'* is connected with a flue *b⁵*, which may be sealed or connected with the smoke-stack. Upon either side of the hearth *a* are also provided hot-air chambers *c c'*, filled, respectively with checker-work *c² c³*, the chamber *c* being in communication with the flue *c⁴*, which, through the agency of a valve, may be connected with the external air or with the smoke-stack. Likewise the chamber *c'* communicates with the flue *c⁵*, which may be connected with either the smoke-stack or the external air. Retorts *d d' e e'* are supported in the upper wall *b⁶* of each of the flues *b⁴ b⁵*, leading from the gas-chambers, the ends of the retorts projecting into the flue, whereby the products of combustion passing through the flue may come in contact with the retorts and impart heat thereto. Within the flues *b⁴ b⁵*, and situated, preferably, beneath the retorts, are provided the coiled pipes or superheaters *f and f'*, through which steam is adapted to be passed, the steam being thus superheated. The ends of the coils are connected by pipes *f² f³*, respectively, with the steam-supply pipe *f⁴*. The opposite ends of the coils are connected by pipes *g g'*, respectively, with a pipe or mixing-chamber *h*, into which extends the oil-pipe *h'*, which is connected with an oil-supply. The pipe *h* is connected by pipes *i i'* with the retorts *d* and *e*, respectively, the pipes communicating with holes provided in the covers of the retorts. The retorts *d* and *e* are joined with the retorts *d'* and *e'*, respectively, by means of the pipes *k k'*. Pipes *l l'* extend from the retorts *d' e'* to a common pipe *l²*, which is connected with a valve *m*, provided with a valve stem or handle *m'*, the valve being connected by pipes *o o'* with the gas-burners *p p'*, which extend through the walls of the gas-chambers *b b'* and are adapted to direct oil or steam against the checker-work within the gas-chambers. The steam entering by the pipe *f⁴* passes by means of pipes *f² f³* to the coils *f f'*, in passing through which the steam becomes super-

heated, the steam then passing by pipes *g g'* to the mixing-chamber *h*, where the steam mingles with the oil introduced by the pipe *h'*. The mixed oil and steam divides and passes by means of pipes *i i'* to the retorts *d e*, the jet of admixed oil and steam being directed vertically downward as it enters the retorts, striking the curved or spherical bottom of the retorts and being deflected upward, the mixture then passing by means of pipes *k k'* to and through the retorts *d' e'*, the mixture absorbing heat during the passage through the retorts and becoming more or less gasified. The mixture then passes by means of pipes *l l'* to the valve *m*, and is directed through the pipe *o* or through the pipe *o'*, according as the valve is turned to permit flow in one direction or the other. The mixture is thus continuously passing through the retorts of both flues, while the fuel may be supplied to either one or the other of the gas-chambers, as may be desired, through the agency of the valve *m*. While a run is being made in one direction the flue *c⁴* is open to the external air while the flue *b⁴* is sealed, mixed steam and oil being supplied to the chamber *b* where it comes in contact with the highly-heated refractory material *b²* and is converted into a gas, the gas then passing into the hearth *a*, where it comes in contact with the heated air passing through the checker-work in the chamber *c*. The products of combustion pass from the hearth through the chambers *b'* and *c'*, the flues *b⁵* and *c⁵* being at this time in communication with the smoke-stack. The products of combustion passing through the flue *b⁵* thus come in contact with the retorts *e e'* therein, the retorts thus becoming heated. The retorts *d d'* in the flue *b⁴*, which is sealed, absorb the heat which has been stored in the flue by the previous gas-run. The retorts are thus continuously in contact with considerable heat. After a run of some twenty minutes or more the direction of the run is reversed, the flue *c⁵* being thrown open to the air, the flue *b⁵* being sealed, and the flues *b⁴ c⁴* being connected with the smoke-stack, the mixed oil and steam being cut off from the chamber *b* and being directed to the chamber *b'* through the agency of the valve *m*. We provide valves *r* in the several pipes, so that the retorts upon one side may be cut off while the others remain in active operation, it being thus possible to make changes or repairs without shutting down the gas-run, means being thus afforded

also for cleaning out the retorts by directing double the amount of steam through one of the sets of retorts for a short period. We have illustrated the retorts as provided with spherical bottoms, the inlet-pipes being adapted to direct the jet of mixed steam and oil downward to impinge against the spherical end, whereby the oil and steam are diverted upward to readily pass out of the retort; but while this is a very desirable feature it is not essential that the retorts be thus constructed.

Having described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. In a regenerative furnace, the combination with retorts situated in the flues leading from the gas chambers, of means for passing mixed oil and steam continuously through the retorts of both flues, pipes extending between said gas chambers and said retorts and a valve for directing the oil and steam issuing from the retorts into one or the other of the gas chambers; substantially as described.

2. The combination with a super-heater situated in each of the flues leading from the gas chambers, of a steam pipe connected with said super-heaters at one end, a mixing chamber connected with the opposite ends of said super-heaters, an oil pipe leading into said mixing chamber, retorts situated in said flues and connected with said mixing chamber, a valve connected with said retorts and connections between said valve and each of said gas chambers, whereby the oil and steam may be directed into either of said gas chambers at will, through the agency of said valve; substantially as described.

3. The combination with the super-heaters *ff'* situated in the flues *b⁴ b⁵*, of the steam pipe *f⁴*, pipes *f² f³* connecting said pipe *f⁴* with the super-heaters, mixing chamber *h*, pipes *g g'* connecting the super-heaters with said mixing chamber, oil pipe *h'*, retorts *d d'* and *e e'*, pipes *i i'* connecting said mixing chamber with said retorts, valve *m*, pipes *l l'* connecting said retorts with said valve, and pipes *o o'* extending to the gas chambers; substantially as described.

In witness whereof we hereunto subscribe our names this 20th day of April, A. D. 1895.

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EDWARD W. BARLOW.

Witnesses:

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