H. B. MYER.

STEAM GENERATOR.

No. 49,431. Patented Aug. 15, 1865.

Fig. 4.

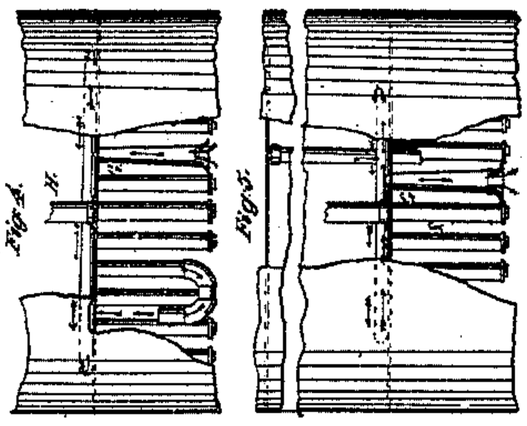


Fig. 5.

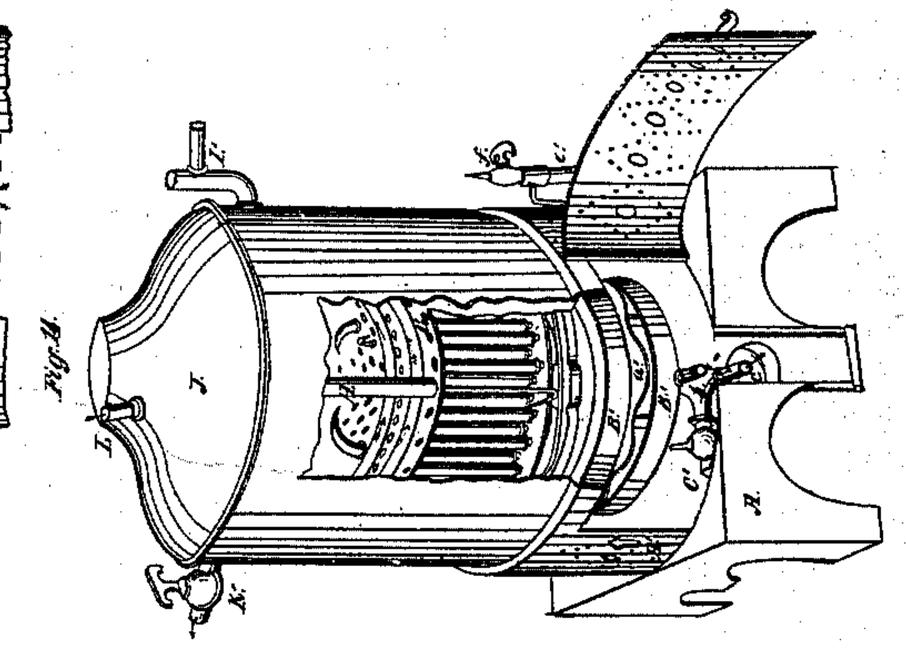


Fig. 3.

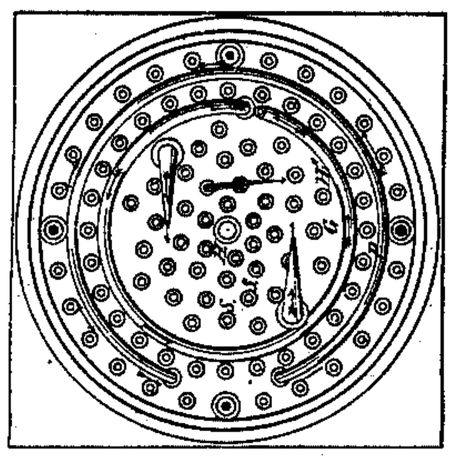


Fig. 12.

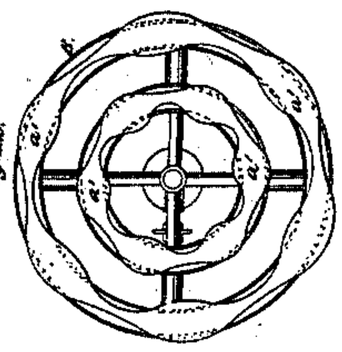


Fig. 13.

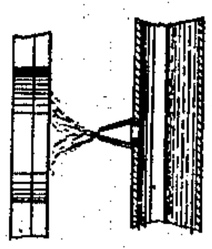


Fig. 2.

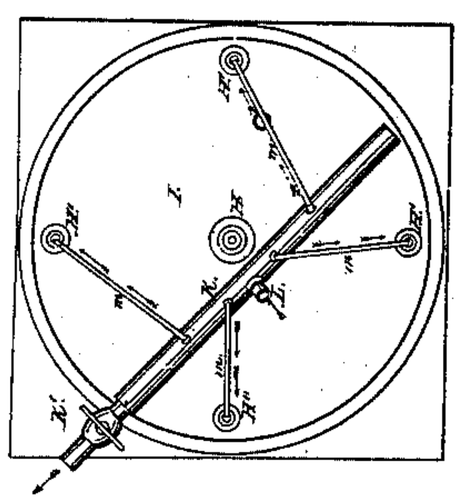


Fig. 9.

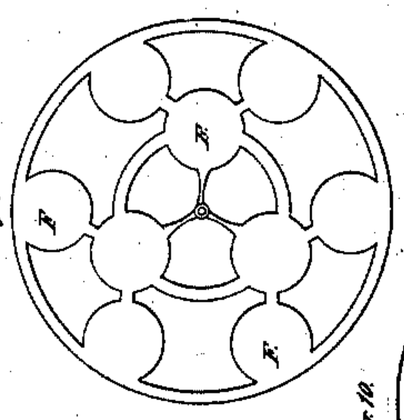


Fig. 11.

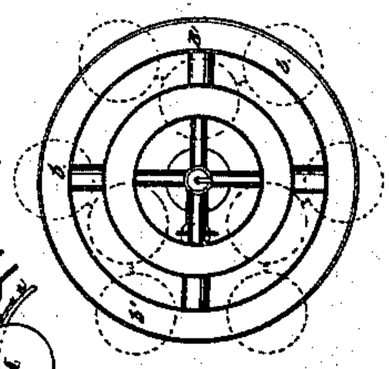


Fig. 10.

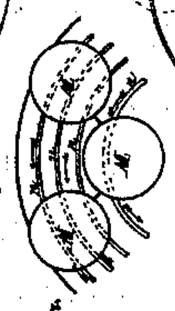


Fig. 1.

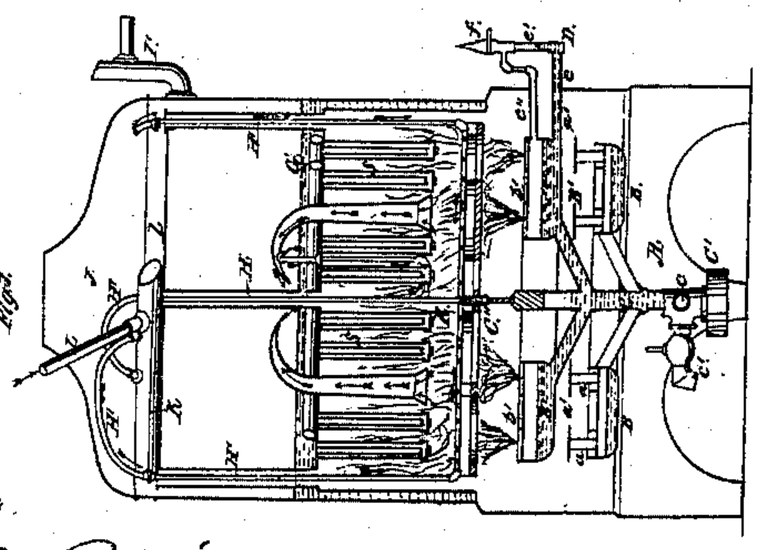


Fig. 8.

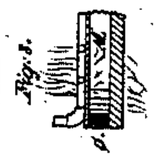


Fig. 7.

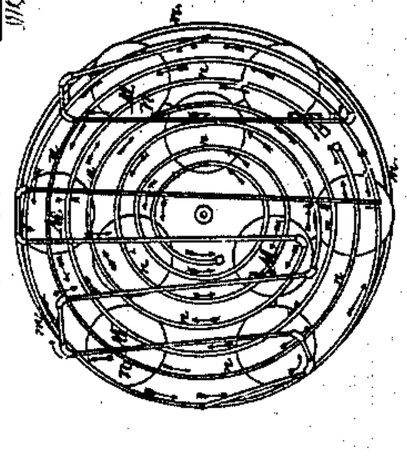
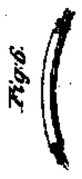


Fig. 6.



Witnesses.

W. D. L. Partridge

A. V. McClellan

Inventor.

Henry B. Myer

UNITED STATES PATENT OFFICE.

HENRY B. MYER, OF CLEVELAND, OHIO.

IMPROVED STEAM-GENERATOR.

Specification forming part of Letters Patent No. **49,431**, dated August 15, 1865.

To all whom it may concern:

Be it known that I, HENRY B. MYER, of Cleveland, in the county of Cuyahoga and State of Ohio, have invented new and useful Improvements in Caloric Apparatus for Generating Steam, &c., by the use of Hydrocarbon Oils; and I do hereby declare that the following is a full and complete description of the construction and operation of the same, reference being had to the accompanying drawings, making part of this specification, in which—

Figure 1 is a vertical section. Fig. 2 is a transverse section of the top of the steam-chamber. Fig. 3 is a transverse section at the upper end of the steam-generating tubes. Figs. 4 and 5 are vertical sections of the tubes. Fig. 6 is a section of a tube for superheating the steam for the purpose of decomposing and igniting the same in the heating-furnace. Fig. 8 is a section of the deflectors or heating-disks. Fig. 10 is the under side of Fig. 7. Fig. 11 is the top of the reservoir for containing the oil for combustion. Fig. 12 is another oil-reservoir for burning naphtha when first starting the combustion, which reservoir is placed just below the reservoir, Fig. 11. Fig. 13 is an enlarged section of Fig. 11, with the heating-disks shown in Figs. 7 and 9 in place; and Fig. 14 is a perspective view of the whole generator, having a portion of the front removed for the purpose of showing the interior.

A in Figs. 1 and 14 shows the base or foundation of the generator. This may be of any convenient form and size suited to the size of the steam-generator.

A′ shows a perforated circular base, which is in height about one-third the diameter of the apparatus. This part constitutes what may be called the "fire-chamber." The perforations in the sides are for the admission of air to support the combustion.

B B′ represent the oil-reservoirs for containing the oil used in combustion for the production of heat. The lower one, B, is designed to contain naphtha or other light oil for use in starting the fire, and has no interior communication with the reservoir B′. It is charged through the pipe *b*. The reservoir B is in the form of a hollow ring, with a trough-like depression upon the upper side, which is provided with holes *a*, Fig. 1, for the escape of the burning gas. Metallic deflectors *a′* are placed just above the reservoir B, for the purpose of distributing the heat more evenly around the reservoir B′.

In getting up steam the reservoir B is filled with naphtha or other light volatile oil, the trough on the upper side of the reservoir being partly filled, and this is ignited, and once filling will burn a sufficient length of time to ignite the heavier oil in the reservoir B′, which is placed immediately above it.

The reservoir B′ is constructed in a form similar to that of B, and is provided with holes *b′* for the escape of gas. The arms that support the hollow ring or rings (for there may be one or more of these) are hollow, and communicate with the interior of the reservoir B′, and also with the center stem which forms its central support, as seen at C in Fig. 1. The oil is admitted from a fountain of proper elevation through the pipe *c*, and the flow to the reservoir is regulated by means of a stop cock. The oil can all be drawn off from the reservoir B′ by means of the cock *c′*.

For the purpose of being always able to determine the exact quantity of oil in the reservoir B′, I attach the fluid-level indicator D. (Shown in Figs. 1 and 14.) This consists of a pipe, *e*, which connects with the lower portion of the reservoir, passing out through an opening in the circular base, A′, where it turns at right angles, and at which point is inserted a glass tube, *e′*, fitted oil-tight, and communicating with the reservoir. The upper end is provided with a short metallic tube and stop-cock, *f* which can be opened for the escape or admission of air. The glass tube which connects *e* and *f* has an exposed length equal to the depth of the reservoir, and is set and supported on a line horizontal thereto, the upper end being supported by a brace *f′*. By means of this indicator the height of oil can always be observed.

The lower end of the tube C is loaded with a weight, C′, and the upper end is connected at C″ by a link or swivel-joint to a rod, E, which passes down through the main smoke-flue, as shown in Fig. 1; but it may be supported upon a flexible joint by any other suitable means, the object being to suspend the reservoirs in such a manner that the rocking of a boat or

the oscillations of a car will not throw them from a general level position.

About four inches above the reservoir B′, I place a series of deflectors, F. (Shown detached in Fig. 9.) Each one of these has its center directly above one of the orifices *b′* in the reservoir B′, as indicated in Fig. 11. These deflectors soon become red-hot, and radiate their heat upon the upper surface of the reservoir B′, and by this means the temperature of the oil in B′ is kept at an inflammable point, and is thus converted into gas, which escapes through the orifices *b′* and is consumed, as before stated.

G in Figs. 1, 3, 4, 5, and 14 represents the floor of the water and steam chamber. From its under side depend a series of double heating-tubes or steam-generators, which open into the space above the floor G. The tubes are closed at the lower end, and the flame and heat from the burning oil circulates freely among them.

There are five flues which carry off the products (gases) of combustion, one of which is in the center, through which the rod E passes, as seen at H in Figs. 1 and 2. The others, H′, are arranged near the margin of the generator, as shown in Fig. 2. One of these, H″, after passing the floor G of the generator, passes in a coil around the bottom of the water-chamber for the purpose of increasing the heating-surface. The flue shown at P takes one turn around the chamber and returns to the fire-box below, thus increasing the heating-surface.

In Figs. 1 and 2 is represented the upper floor, I, of the steam-chamber. The pipe that conducts the steam to the engine leads out below this, and is shown at I′ in Figs. 1 and 14.

Immediately above the floor I is placed a conical cap, J, forming a gas or smoke chamber, although with perfect combustion no smoke is formed. It is in this chamber that the flues H H′ terminate. Within it is also situated the pipe K, which receives steam through the connection L, either from the exhaust-port of the engine or directly from the steam-chamber below the floor I.

The pipe K is provided with a stop-cock, K′, for discharging any water that may become condensed in it.

From the upper side of the pipe K a series of small pipes, *m*, lead off and pass down through the flues H′, and are elaborated into helical coils, as shown in Fig. 7. These helical coils rest upon and connect with inverted cup-like deflectors M, the terminating end of each coil connecting with three cups (more or less may be used) by a small orifice on the inside, as shown at *n* in Figs. 8 and 10, Fig. 10 showing the under side of the cups. These inverted cup-like deflectors are in number equal to and are arranged to correspond with the deflectors F, and, with the helical coils attached, rest immediately upon them, leaving, however, a very thin space between the edge of the cup M and the deflector F, as seen at *o*, Fig. 8, for the escape of the flame arising from the combustion of the gas formed from the decomposed steam. The steam, by being conveyed for so long a distance through the helical pipes *m*, which are located in the hottest part of the fire-chamber, becomes decomposed into its elementary constituents—oxygen and hydrogen gases—and the instant these combined gases impinge upon the heated surface of the deflectors F they inflame and greatly intensify the heat in the fire-chamber and among the generating-tubes S, as shown in Fig. 1.

There are several modifications that may be made to the devices herein named, in regard to structure and arrangement, which may be adopted without departing from the leading features set forth in the following claims. I therefore hold myself at liberty to make such modifications in structure and arrangement as may be found convenient, so long as I keep within the limit, spirit, and meaning of my claims.

What I claim as my improvement, and desire to secure by Letters Patent, is—

1. A swinging reservoir suspended within the fire-box of a steam-generator and beneath the generating-surface of the same, for containing hydrocarbon oils, substantially as shown and described.

2. A reservoir, B, for containing naphtha or other light oils used for inducing combustion in the oil-reservoir B′ above it, in the manner and for the purpose as shown and described.

3. The combination of the reservoirs B and B′ with the deflector *a′*, placed between them, substantially as shown and described.

4. The combination of the reservoir B′ with the fluid-level indicator D, substantially as shown and described.

5. The deflectors F, in combination with the reservoir B′, as and for the purpose described.

6. The inverted cups or deflectors M, placed above the deflectors F, for the purpose of receiving and distributing the superheated steam, substantially as shown and described.

7. The combination and arrangement of the deflectors F and the inverted cups M, substantially as and for the purpose described and shown.

8. The combination of the superheating helical pipes *m* with the inverted cups M, substantially in the manner shown.

9. The circular flues H″ and P, placed in the base of the water-chamber, substantially as shown and described.

HENRY B. MYER.

Witnesses:
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A. W. MCCLELLAND.