(No Model.)

O. N. GULDLIN.

STEAM SUPPLY AND CIRCULATING SYSTEM FOR WATER GAS APPARATUS.

No. 524,108. Patented Aug. 7, 1894.

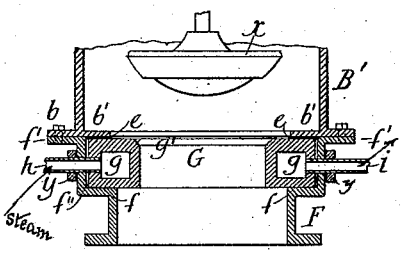

Fig. 3

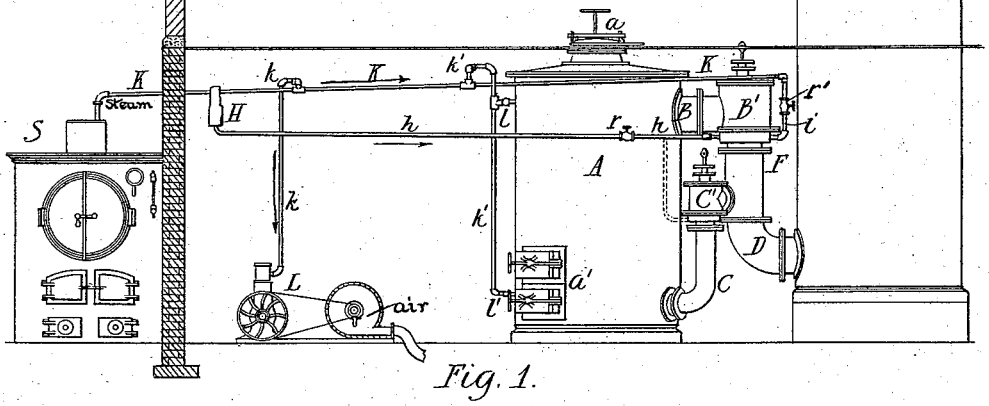

Fig. 1.

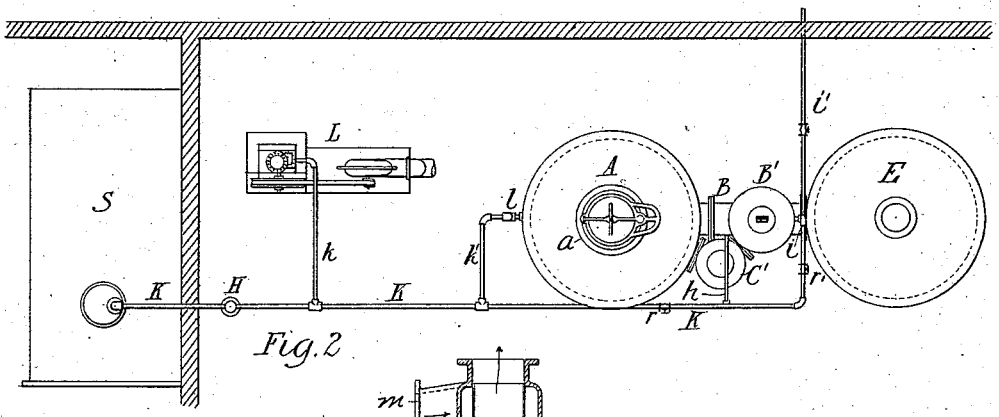

Fig. 2

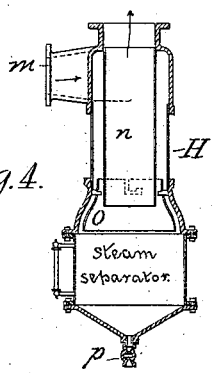

Fig. 4.

Witnesses
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UNITED STATES PATENT OFFICE.

OLAF N. GULDLIN, OF FORT WAYNE, INDIANA.

STEAM SUPPLY AND CIRCULATING SYSTEM FOR WATER-GAS APPARATUS.

SPECIFICATION forming part of Letters Patent No. 524,108, dated August 7, 1894.

Application filed November 21, 1893. Serial No. 491,590. (No model.)

To all whom it may concern:

Be it known that I, OLAF N. GULDLIN, a citizen of the United States, residing at Fort Wayne, in the county of Allen and State of Indiana, have invented certain new and useful Improvements in Steam Supply and Circulating Systems for Water-Gas Apparatus; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to means for circulating steam, cooling the valve-seats in a water-gas apparatus and producing dry or superheated steam to be supplied to the generator.

The object of my invention is to provide for separating the watery particles or wet steam from steam in the main supply pipes, and by means of the water of condensation or wet steam cooling the valve-seats on the main gas pipes of the apparatus, and at the same time producing dry or superheated steam, and thence conducting it into the main supply pipe leading into the generator.

In the manufacture of gas, it is important to supply perfectly dry or superheated steam to the generating furnace, in order to maintain the fuel at the proper temperature for completely decomposing the steam into hydrogen and carbonic oxide. It is also important and necessary to properly cool the valve-seats in the gas escape pipes leading from the generator to the superheater, and it is the particular object of my invention to cool such seats by means of wet steam or water of condensation taken from the main steam pipes, whereby I avoid the accumulation of sediment or deposits in such valve-seats and keep them clean and in good working order, and also superheat the steam passed through them and return it to the main steam supply pipes leading into the generator.

The matter constituting my invention will be defined in the claims.

I will now particularly describe my apparatus by reference to the accompanying drawings, in which—

Figure 1 represents an elevation of a gas apparatus and steam circulating pipes arranged for cooling the valve seats according to my invention. Fig. 2 represents a plan view of the apparatus. Fig. 3 represents a sectional detail view of the hollow valve seat and casing. Fig. 4 represents a sectional detail view of the steam separator.

My steam circulating system for cooling valve seats and producing dry steam is herein shown in connection with one of the well known forms of gas generating apparatus, such as that covered by the patent of F. D. Moses, in which the generator A, and superheater E, are constructed in the usual manner,—the generator being provided with the usual opening and lid, *a*, at the top and the doors, *a'*, at the bottom.

Gas escape pipes B and C lead respectively from the top and bottom of the generator and connect by pipe D with the superheater. The pipes B and C, are respectively provided with valve boxes B' and C', each of which, in practice, is provided with a hollow steam-cooled valve-seat with which connect steam inlet and outlet pipes, as will be described below.

The valve chamber, B' Fig. 3 has its shell or casing constructed at the bottom, with an outwardly turned flange, *b*, and an inwardly turned flange, *b'*, which latter projects over a recess containing the annular hollow valve seat. The valve seat section, F, is made detachable from the valve chamber and pipe connection and is constructed with an inwardly turned annular shoulder, *f*, forming an annular recess, *f''*, and also with the usual outer flange, *f'*, by means of which it is bolted to the flange of the valve chamber. The shoulder, *f*, and the inwardly turned flange, *b'*,—together form the annular recess *f''*, for receiving the annular hollow valve seat G. The valve seat, G, is formed with an interior annular channel, *g*, for the circulation of steam and with a beveled edge, *g'*, for forming a tight joint with the valve *x*, and it is also provided with screw-threaded openings in its outer walls in which are connected the steam inlet pipe *h* and outlet pipe *i*. The pipes *h* and *i* have long screw threads, permitting nuts, *y*, with washers, to be screwed on against the wall of the recess or pocket *f''*, for making a tight joint and holding the parts securely in place. When fitting the section, F, with its valve seat in place, a ring of asbestus or other packing *e* is inserted between the valve seat G, and flange, *b'*, for making a

tight joint, so that there can be no leakage of gas around the valve seat.

Steam is taken from the boiler S, through the main pipe K, for supplying the engine and generator. Pipe K, connects with a steam separator H, in which watery particles and wet steam are separated from the main supply, and the resulting water of condensation and wet steam are passed from the bottom of the separator, through pipe *h*, having a valve *r*, into the valve-seat, G of the valve chamber B′, where the watery vapor is heated and converted into dry or superheated steam, which passes out through the pipe, *i*, having valve, *r*′, which rises and connects with the elevated pipe K, forming part of the circulating system. I also provide a valved escape pipe, *i*′, connecting either directly with the hollow valve seat or with pipe, *i*, and leading to the outside of the building for blowing off steam when desired. It will be noted that the pipe *h*, is inclined downward from the separator H, so that any water of condensation forming in the separator will flow by gravity into the hollow valve-seat and be converted into steam.

In practice, a branch pipe may connect pipe, *h*, with the valve-seat of the chamber, C′, as indicated by dotted lines. The pipe, *k*, connects the main pipe, K, with the engine, L, for operating the air blower, and a pipe, *k*′, also leads from pipe, K, and connects by branches *l* and *l*′, respectively with the top and bottom of generator A. The superheated steam, rising from the hollow valve seat passes into the main pipe K, and thence is supplied, together with other steam, through pipe *k*′, and its branches *l* and *l*′ to the generator.

The steam separator, H, is constructed with a lateral or tangential inlet, *m*, a central outlet, *n*, for dry steam, an annular shield, *o*, and with a discharging valve, *p*, at the bottom, all as shown in Fig. 4. This separator thoroughly eliminates the watery particles from the steam, permitting the dry steam to pass on through the main pipe, K to the engine and generator, while the water of condensation and wet steam are passed off through pipe *h* to the hollow valve-seats.

Since the water of condensation is pure, there will be no deposit of lime or sedimentary matter in the valve-seat, and the latter will, therefore, remain in good working condition and be more durable than if ordinary water were used for cooling it. It will be noted that the dry or superheated steam escaping from the valve-seat, is immediately utilized in the generator for decomposition into water-gas.

This apparatus has proved very effective and economical in practical operation.

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

1. In a gas apparatus, a steam circulating system comprising a main supply pipe, a separator, a pipe for wet steam and water of condensation leading from said separator, a hollow valve-seat with which said pipe connects and placed in a valve chamber of a hot gas pipe, and a pipe for steam rising from said valve-seat and connecting with said main steam supply pipe, substantially as described.

2. In a gas apparatus, the combination with the generating furnace and its gas take-off pipe, having a valve chamber, of a hollow valve-seat in the chamber, a main steam supply pipe connecting with the interior of the generator, a pipe leading downward from said main steam supply pipe and connecting with said valve seat, and a pipe for dry steam rising from said seat and connecting with said main pipe, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

OLAF N. GULDLIN.

Witnesses:
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