JOHN HOUPT.

2 Sheets--Sheet 1.

Improvement in Steam-Engines.

No. 115,208.

Patented May 23, 1871.

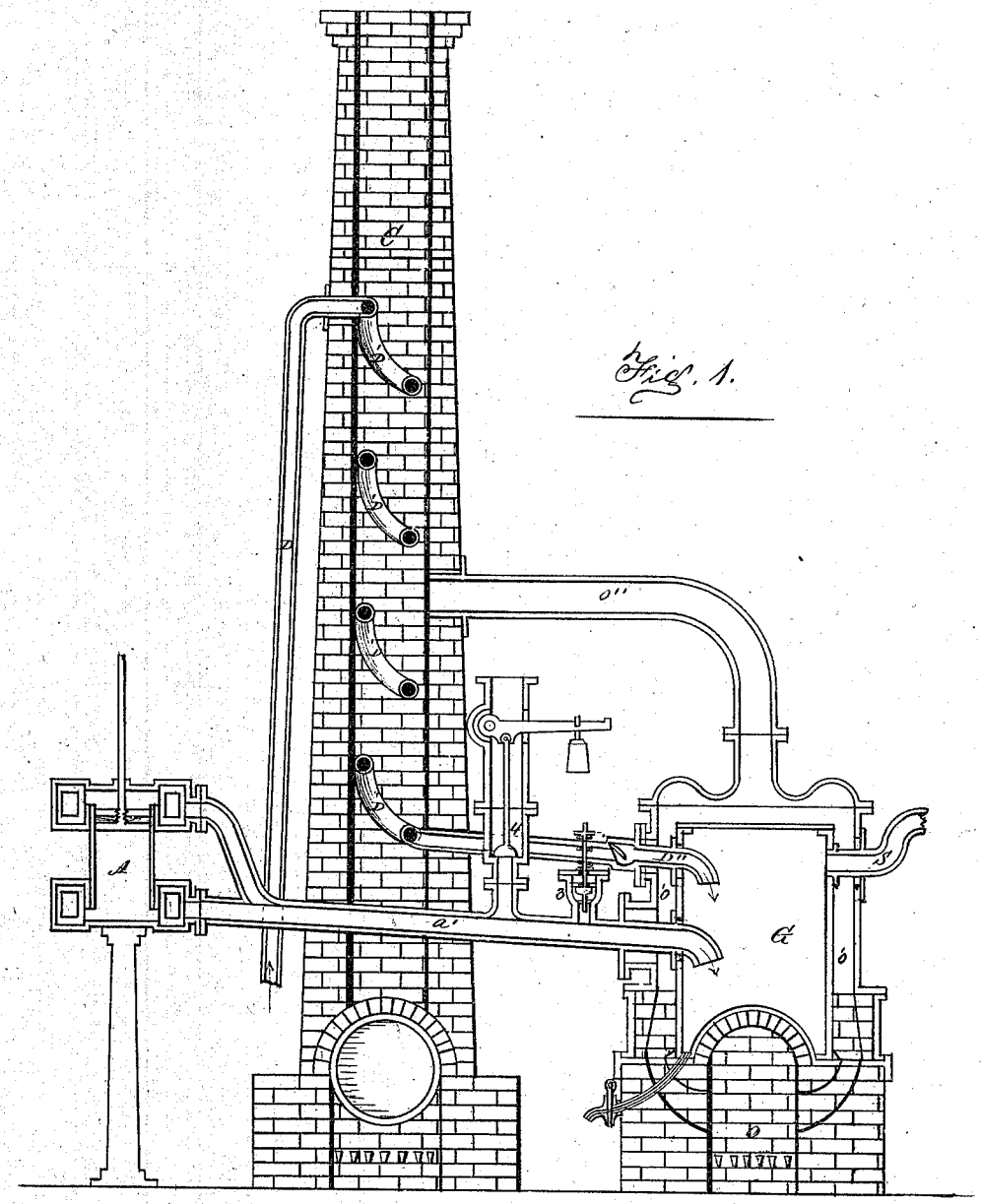


Fig. 1.

Witnesses:

Wm Morrison

Wm H Morrison

Inventor— John Houpt

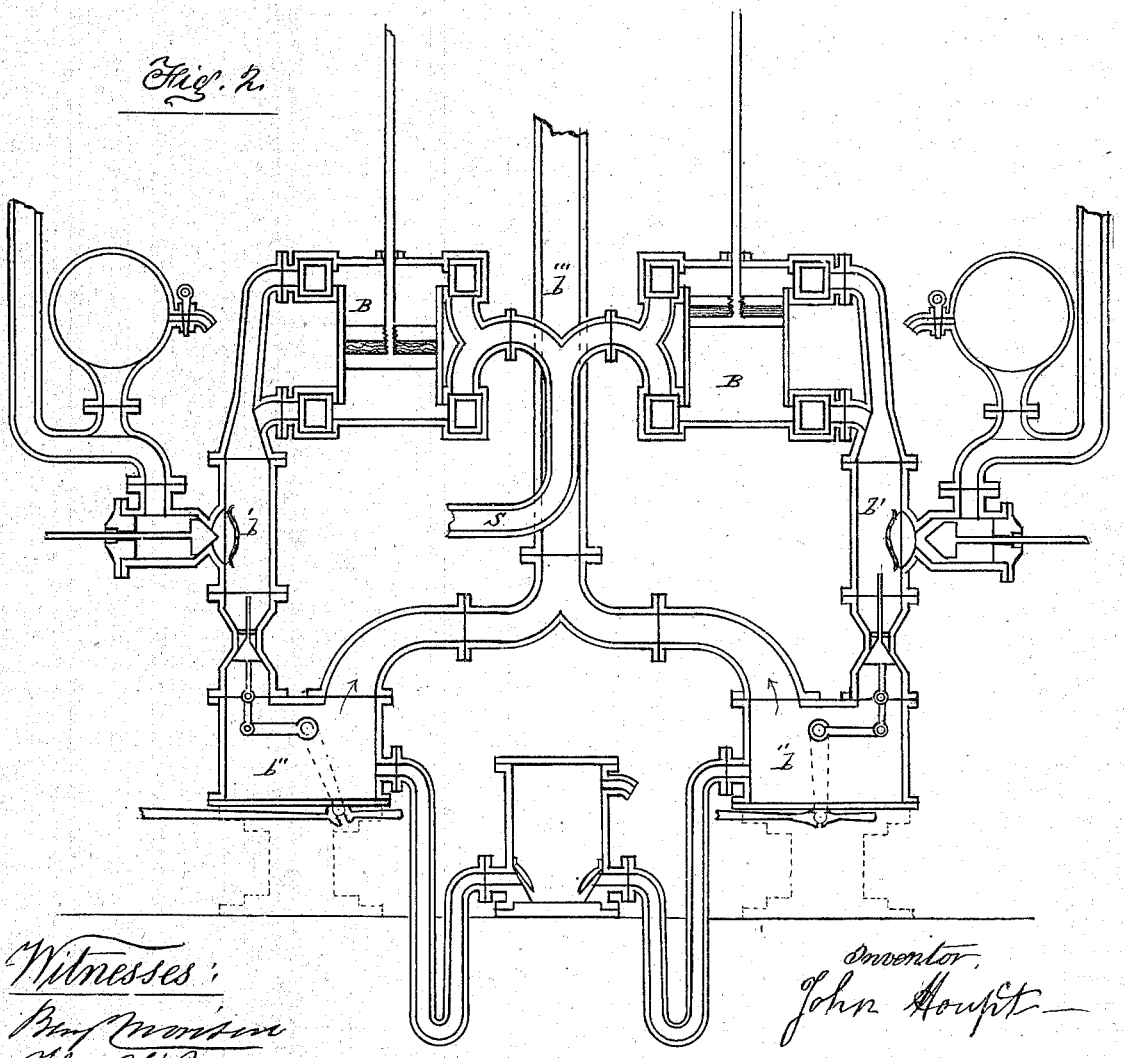
2 Sheets--Sheet 2.

JOHN HOUPT.

Improvement in Steam-Engines.

No. 115,208. Patented May 23, 1871.

Fig. 2.



Witnesses:

Burt Morrison

Wm. H. Morrison

Inventor.

John Houpt

UNITED STATES PATENT OFFICE.

JOHN HOUPT, OF SPRINGTOWN, PENNSYLVANIA.

IMPROVEMENT IN STEAM-ENGINES.

Specification forming part of Letters Patent No. 115,203, dated May 23, 1871.

I, JOHN HOUPT, of Springtown, in the county of Bucks and State of Pennsylvania, have invented certain Improvements in Steam-Engines, of which the following is a specification:

Nature and Object of the Invention.

My improvements relate to the combination of a plurality of low-pressure engines with a primary high-pressure steam-cylinder, having a self-clearing jet-condenser, and a superheater of the exhaust steam communicating between it and the low-pressure engines, for which Letters Patent were allowed to me on the 19th day of October, 1870; and my present invention consists in the combination of a hot-air-supplying apparatus with the superheater of the exhaust steam in such a manner that hot air will be forced into the latter during the operation of the engines; the object of this part of my invention being to aid in increasing the heat and quantity of the steam in the said superheater, and thus economize the fuel of the special furnace beneath the same during the operation of the low-pressure steam-cylinders connected therewith.

Description of the Accompanying Drawing.

Figure 1 is a central section of the high-pressure steam-cylinder and the superheater, in direct communication, drawn in the same vertical plane, together with a central section of the main chimney, and a contained spiral pipe for heating air for the superheater, the said chimney and pipe being shown as in a vertical plane in rear of the first-named vertical plane, the pipes which connect the superheater with the said chimney and the spiral air-heating pipe, respectively, being obliqued backward accordingly. Fig. 2 is a detached central vertical section of a pair of connected low-pressure steam-cylinders with their respective jet-condensers and hot-wells, and a hot-water reservoir, with an escape-pipe for the waste steam, in common.

General Description.

The high-pressure steam-cylinder A communicates, by its exhaust-pipe a', directly with the steam-chamber of the superheater G, and this steam-chamber communicates, through the branched pipe S, with the pair of low-pressure steam-cylinders B B. The small furnace-flue o'' of the superheater G opens into the main or boiler-furnace chimney C, and the pipe D for supplying hot air to the said superheater extends upward from any suitable air forcer or blower, not shown, outside of the chimney, and, entering the latter at a sufficient height, descends in large spiral coils down through the flue of the chimney C to a point at a short distance above the furnace, where it passes out through the side of the chimney, and at D'' enters and opens downward into the steam-chamber of the superheater G. The exhaust-pipe a' is provided with an inward-opening valve, 3, to provide against the possibility of a collapse of the steam-chamber of the superheater G on stopping off the heat for some length of time, and also with an outward-opening valve, 4, to limit the degree of pressure in the said steam-chamber.

The general construction and arrangement of the steam-cylinder A and superheater G are the same as are shown in Fig. 1 and described in the specification of my said allowed application of the 19th of October, 1870, with the important exception that the self-clearing jet-condenser and its necessary adjuncts, between the said steam-cylinder of high pressure and the superheater therein shown, are, in the present application, entirely dispensed with, the exhaust steam of the cylinder A passing directly into the superheater G, as herein shown in Fig. 1.

The superheater G, as herein shown in Fig. 1, I have made of the most simple construction; but for a practically-working engine I would prefer something of the tubular form as being more effective for the purpose.

The low-pressure cylinders B B are in communication with the same steam-supplying pipe S, and are intended to operate together to give steady rotary motion to the same main shaft of an engine, by means of cranks arranged at a right angle to each other, not shown, and thus, of course, render a ponderous fly-wheel unnecessary. Each one of the pair of low-pressure cylinders B B is provided with its respective self-clearing jet-condenser b', and the necessary hot-wells b'' b'', and escape-pipe b''' for the waste steam, substantially as represented in Fig. 2, and as de-

scribed and set forth in my said allowed application; and therefore any further description in relation to the low-pressure cylinders herein set forth need not here be given, except to state that it is my intention to attach to the one superheater G as many of such pairs of low-pressure cylinders as the power or capacity of the said superheater G may be competent to operate.

Operation.

Suppose the high-pressure steam-cylinder A to be working at a pressure of fifty pounds of steam to the square inch, the exhaust entering the superheater G will expand in proportion to the capacity of the latter, producing, say, a pressure therein of five pounds to the square inch, the outlet-valve 4 being weighted to open after that degree of pressure is obtained. The low-pressure cylinders B B can then be operated by a pressure of five pounds to the square inch of their respective pistons, a vacuum in their respective condensers *b' b'* being produced as described in my said allowed application, provided the pressure of the steam in the said superheater G be kept up to five pounds to the square inch.

This working power in the superheater G will be kept up by means of the small special furnace *o* beneath the same, in connection with the surrounding flue-space *o'*, which opens into the main chimney C through the flue-pipe *o''*, aided, if desirable, by means of the air-heating pipe D, the coils of which, being kept heated by the hot draft of the main chimney C, heat the air which is to be driven through them by means of any suitable blower attached to the air-receiving end of the said pipe D, and the consumption of fuel in the special furnace *o* is thus greatly diminished.

It will be understood that the working steam-pressure in the cylinder A and in the superheater G may be increased proportionately to, say, one hundred pounds or more in A, and ten pounds or more in G; and that for producing such a high pressure in A a small superheater, of sufficient strength, heated by a special furnace, may be attached between the usual steam-generator and the cylinder A in the usual well-known manner, so that the steam from the generator may be sufficiently superheated for the purpose, and thus the extra cost of a sufficiently-strong steam generator or boiler for the purpose avoided.

Claim.

I claim as my invention—

In combination with the superheater G, the air heating and supplying pipe D, operating to aid in increasing the heat and quantity of the steam in the superheater G, substantially as and for the purpose hereinbefore set forth.

JOHN HOUPT.

Witnesses:
BENJ. MORISON,
WM. H. MORISON.