

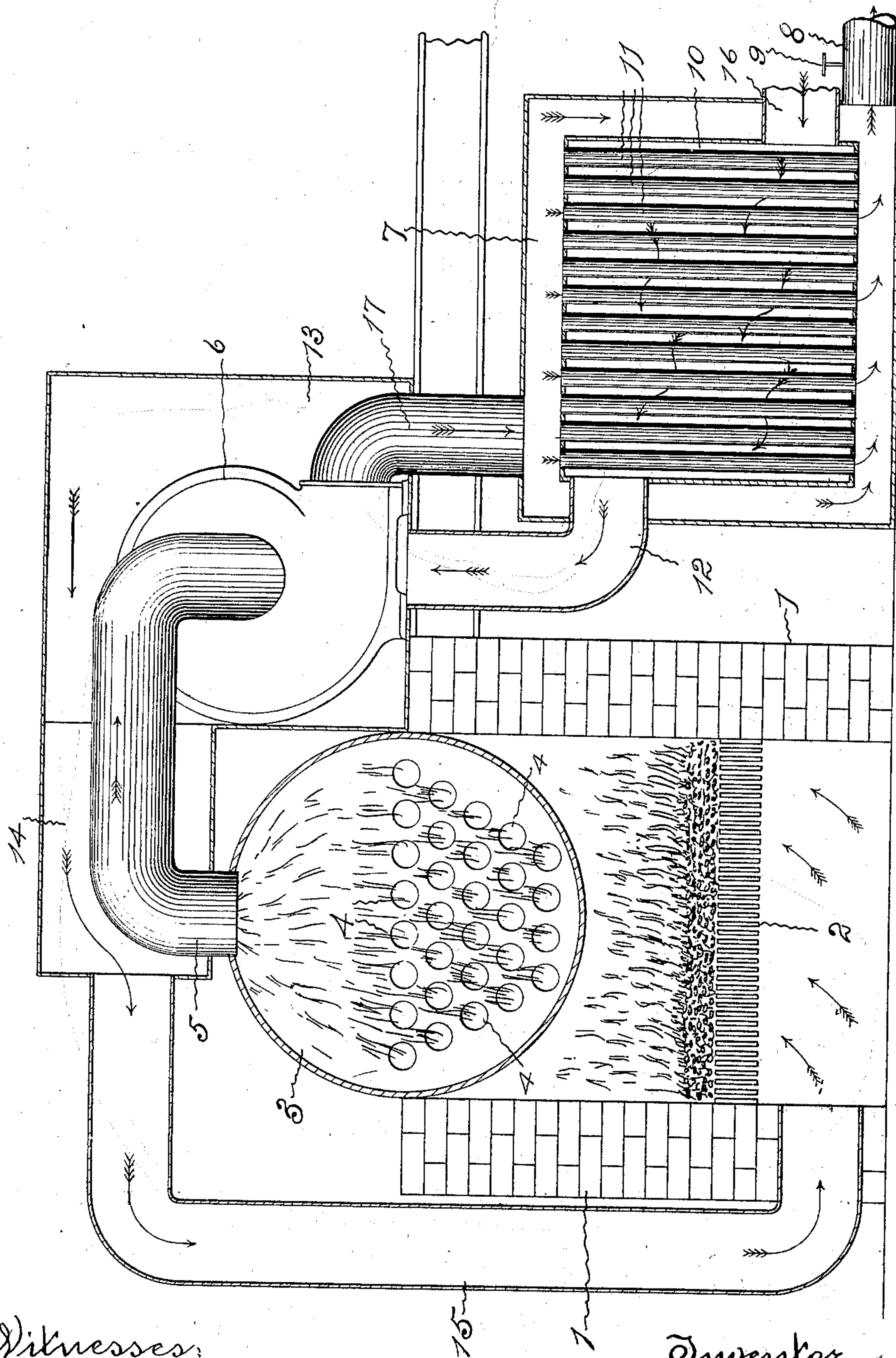
No. 654,302.

Patented July 24, 1900.

A. W. CASE.
HOT DRAFT SYSTEM.

(Application filed Oct. 13, 1897.)

(No Model.)



Witnesses:

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UNITED STATES PATENT OFFICE.

ALFRED WELLS CASE, OF HIGHLAND PARK, CONNECTICUT.

HOT-DRAFT SYSTEM.

SPECIFICATION forming part of Letters Patent No. 654,302, dated July 24, 1900.

Application filed October 13, 1897. Serial No. 655,037. (No model.)

To all whom it may concern:

Be it known that I, ALFRED WELLS CASE, a citizen of the United States, residing at Highland Park, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Hot-Draft Systems, of which the following is a specification.

The invention relates to those systems which furnish heated air under induced draft to the furnaces of boilers for assisting the combustion of the fuel.

The object of the invention is to provide a simple and durable system for inducing a hot-air draft to furnaces, which is so constructed that the largest possible amount of the heat of the products of combustion of the fuel that would otherwise pass off through the stack will be utilized for raising the temperature of the inflowing air, whereby a hot fire will be maintained on the grate with an economical expenditure of fuel.

The invention resides in a system for this purpose which is so arranged that the inflowing air that is drawn by the suction of a pressure-blower is caused to pass for a considerable distance adjacent to and be subjected for an extended interval to the heated products of combustion as they are drawn from the furnace and are passed outwardly under pressure by the blower, and therefore part the more readily with heat, so that the inflowing air will be raised to a high temperature when it reaches the grate, as more particularly hereinafter described, and pointed out in the claims.

The accompanying drawing shows a portion of a furnace and boiler provided with a system which embodies the invention, parts being broken away to facilitate illustration.

The walls 1 of the furnace shown in the view are constructed of brick in the ordinary manner and support any common form of grate 2. The boiler 3, with the usual flues 4, is held by the walls of the furnace, and the products of combustion of the fuel on the grate pass to the rear and then forward through the flues and out through the suction-pipe 5. The water in the boiler of course absorbs but a portion of the heat of the products of combustion, there being considerable heat remaining and passing out through the

suction-pipe. The suction-pipe is connected with the inlet of a pressure-blower 6 of common construction, and the outlet 17 of this blower communicates with a chamber 7, provided with an outlet 8, that may lead to any stack or other gas and cinders receiver or consumer. The outlet of this chamber has a damper 9, whereby the size of the outlet-orifice may be adjusted and the pressure in the chamber regulated.

Within the chamber 7 is an inner chamber 10, and tubes 11 extend through the walls of this inner chamber, so that the products of combustion that are drawn from the furnace by the suction of the blower are in traveling from the inlet to the outlet of the chamber 7 not only caused to surround the chamber 10, but also to pass in the tubes through the chamber.

Communicating with the inner chamber 10 is an inlet-pipe 16 and an outlet-pipe 12. This outlet-pipe 12 communicates with a chest 13, that incloses the pressure-blower. The chest 13 is shown as communicating with a smaller chest 14, that incloses a portion of the suction-pipe near where it connects with the boiler. Communicating with this smaller chest 14 is a pipe 15, that extends through the walls and opens into the ash-pit beneath the grate of the furnace.

The pressure-blower, which may be similar in construction to that set forth in United States Patent No. 621,030, issued March 14, 1899, can be operated by any convenient power, and when in operation causes an induced draft from the fire-box of the furnace through the flues of the boiler and the suction-pipe to the blower, from which the draft is forced to the chamber 7, about the walls, and through the tubes in the chamber 10 and out to the stack or other gas and cinder receiver or consumer. This draft, induced by the action of the blower, causes an inflow of air through the pipe 16, chamber 10, and pipe 12 to the chests 13 and 14 and from these through the pipe 15 to the ash-pit and fire for supporting the combustion of the fuel. As the inflowing air passes through the chamber 10, which is entirely inclosed within the chamber 7 and through the chests 13 and 14, that inclose the blower and a portion of the suction-pipe, it becomes considerably heated by

the transference to it of heat from the hot products of combustion that are escaping and that of course heat the suction-pipes, the blower, and the interior of the chamber 7.

5 The inflowing air absorbs much heat as it passes through the chamber 10, for that chamber is heated by the hot outflowing products of combustion, which in the chamber 7 are under some pressure, and therefore rapidly

10 part with a large amount of heat to the inflowing cold air that is not under pressure. The inflowing air which is thus heated is also further heated in the chest 13, which is warmed by the heat that radiates through the walls

15 of the blower, and then the inflowing air, which is already quite hot, is still further heated as it passes through the chest 14, that surrounds the suction-pipe from the boiler. The air which reaches the chest 14 and has

20 already been heated to a considerable degree is raised to a higher degree of temperature by emanations from the products of combustion as they come directly from the furnace and convey much heat.

25 With this system the conductors and chambers are so arranged that as the temperature of the outpassing products of combustion becomes lower, due to the transference of heat to the inflowing air, the temperature of the

30 inflowing air becomes correspondingly higher. Thus the temperature of the inflowing air and outpassing products of combustion is kept very nearly equal in adjacent sections of the conductors. The inflowing air is subjected

35 for a considerable interval to the heat of the products of combustion and is so carried along with relation to the heated outpassing products of combustion that as it becomes more heated it is subjected to the influence

40 of a still hotter portion of the outflowing products of combustion. Thus the inflowing air is very hot when it reaches the grate. By subjecting the outpassing products of combustion to pressure in the pressure-chamber

45 they more readily part with heat to the inflowing air which is not under pressure, but is rather attenuated, as it is being sucked in, and as this is accomplished near the inlet the air is heated considerably as it commences to

50 flow inwardly. The draft of a system arranged in this manner can be regulated so as to produce a strong air-current without cool-

ing down the fire or wasting many units of heat.

This system is simple in construction and 55 in application, and it is durable and convenient to operate. Furnaces with one of these systems applied will generate steam in the boiler at a high pressure with an economical expenditure of fuel. 60

I claim as my invention—

1. In combination with the furnace of a steam-generator, a smoke-pipe leading from the furnace, a blower capable of generating air-pressure having its inlet connected with 65 the smoke-pipe, a chamber with its inlet connected with the outlet of the pressure-blower, into which chamber the products of combustion are delivered under pressure by the blower, the outlet from said chamber being 70 restricted, a chamber within the pressure-chamber, tubes extending through the inner chamber, a pipe connecting the outlet of the pressure-chamber with the smoke-stack, a duct for the passage of air for supporting 75 combustion opening through the pressure-chamber into the chamber within, a pipe extending from the inner chamber to a chamber surrounding the pressure-blower, and a pipe extending from the blower-chamber to 80 the furnace below the grate, substantially as specified.

2. In combination with the furnace of a steam-generator, a smoke-pipe leading from the furnace, a blower capable of generating 85 air-pressure having its inlet connected with the smoke-pipe, a chamber with its inlet connected with the outlet of the pressure-blower, into which chamber the products of combustion are delivered under pressure by the 90 blower, the outlet from said chamber being restricted, a pipe connecting the outlet of the pressure-chamber with the smoke-stack, and a duct for the passage of air for supporting combustion extending to the furnace below 95 the grate, the duct, a portion of the distance being surrounded by and a portion of the distance surrounding sections of the passage for the outflowing products of combustion, substantially as specified.

ALFRED WELLS CASE.

Witnesses:

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