

No. 660,429.

P. W. HANFORD.
BOILER.

Patented Oct. 23, 1900.

(Application filed Feb. 14, 1900.)

(No Model.)

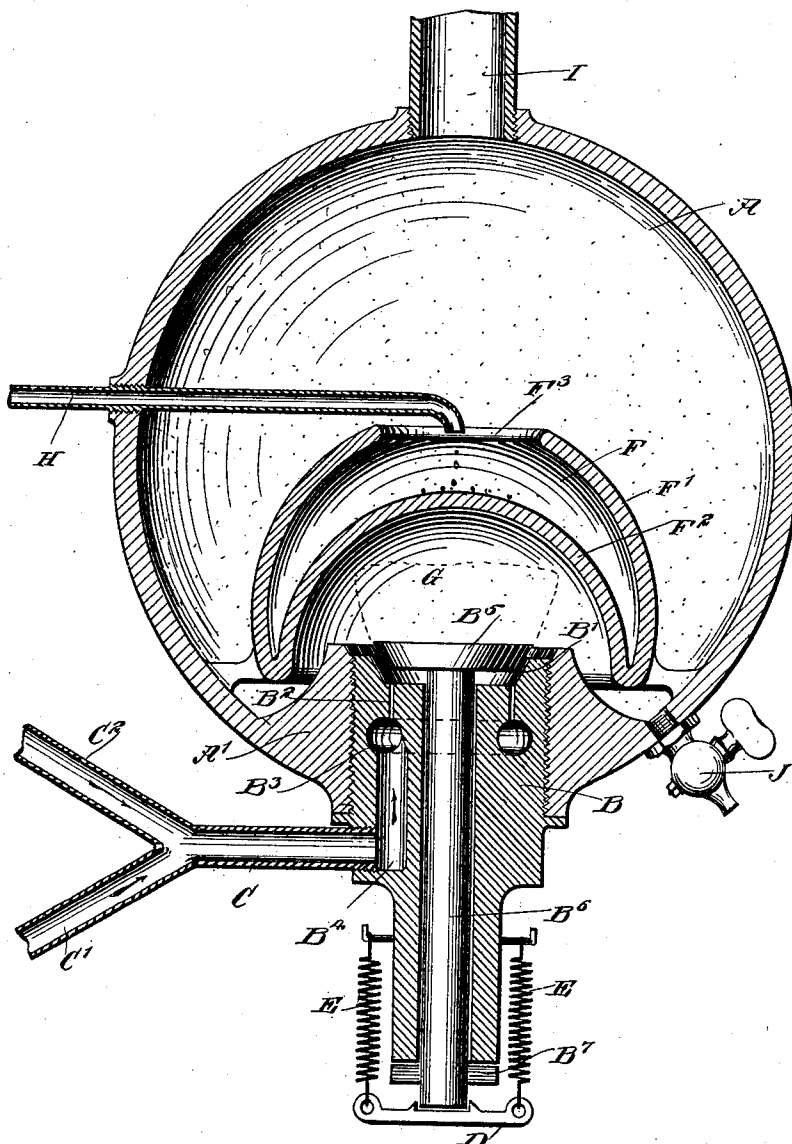


Fig. 1

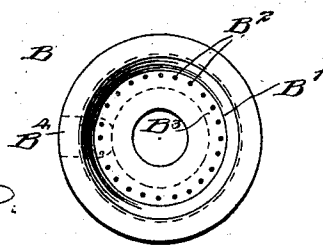


Fig. 2

WITNESSES:

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PERCY WARREN HANFORD, OF OAKESDALE, WASHINGTON.

BOILER.

SPECIFICATION forming part of Letters Patent No. 660,429, dated October 23, 1900.

Application filed February 14, 1900. Serial No. 5,207. (No model.)

To all whom it may concern:

Be it known that I, PERCY WARREN HANFORD, a citizen of the United States, and a resident of Oakesdale, in the county of Whitman and State of Washington, have invented a new and Improved Boiler, of which the following is a full, clear, and exact description.

The invention relates to boilers having internal combustion of fuel; and its object is to provide a new and improved boiler which is simple and durable in construction and arranged to insure a rapid generation of the motive agent with the expenditure of a comparatively small amount of fuel, the combustion of the fuel being continuous and the combustion and vaporization taking place under pressure in a closed vessel.

The invention consists of novel features and parts and combinations of the same, as will be fully described hereinafter and then pointed out in the claims.

A practical embodiment of my invention is represented in the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in both the views.

Figure 1 is a sectional side elevation of the improvement, and Fig. 2 is a plan view of part of the burner.

The improved boiler is provided with a vessel A of tubular, spherical, or other form, an offset A' being formed at the bottom to receive a burner B, having its body made in the shape of a plug screwing in said offset A', as is plainly indicated in Fig. 1. The burner B is provided on the top and inside of the vessel A with a depressed burner-seat B', to which lead feed-apertures B² from an annular channel B³, formed in the burner-body, a vertical channel B⁴ leading to said annular channel and a feed-pipe C leading into the channel B⁴, as shown in Fig. 1. The feed-pipe C is connected with a suitable source of fuel-supply in the form of gas, oil, or a mixture of both, so that the fuel passes in a minutely-divided state through the feed-apertures B² to the burner-seat B' to be burned thereon under a regulating-valve B⁵, held on a stem B⁶, extending through the burner-plug to be engaged at its outer end by a cross-bar D, supported on contractile springs E to cause said cross-bar to normally hold the valve B⁵

off the seat B', as is plainly illustrated in Fig. 1, the upward movement of the stem B⁶ being limited by a stop-pin B⁷, adapted to rest against the outer end of the burner-plug.

Directly over the burner, within the vessel A, is arranged a water-compartment F, having its outer wall F' approximately semi-spherical and its bottom F² concave, so as to form a semispherical combustion-chamber G directly over the burner B, as indicated in Fig. 1. The top of the outer wall F' is formed with an opening F³ for the escape of the steam from the compartment F into the vessel A and also for the introduction of water by way of the pipe H, extending through the side wall of the vessel A and connected at its outer end with a suitable source of water-supply. The lower end of the compartment or chamber F is supported by suitable means from the vessel A, sufficient space being between the projection A' and the walls of said compartment for the escape of the products of combustion into the vessel A. The top of the latter is provided with an outlet-pipe I for conducting motive agent to the motors to be driven.

Near the bottom of the vessel A is arranged an outlet-cock J for drawing off any water of condensation that may accumulate in the bottom of the vessel.

The operation is as follows: When the several parts are in the position shown in Fig. 1 and the fuel in the burner-seat B' is ignited by electric or other means and water is passed into the compartment F then the heat from the burner causes a quick vaporization of the water, the vapors passing from the compartment into the vessel A, from which the vapors are withdrawn through the pipe I for actuating motors or for other purposes.

The feeding of the water is regulated to such an extent that very little water accumulates in the compartment F, it being understood that the combustion of the fuel and the vaporization of the water are continuous and takes place under pressure in the vessel A.

In case excessive pressure is in the vessel A then the valve B⁵ is caused to move downward toward the valve-seat B' to regulate the flame of the burner to diminish the generation of motive agent for the time being until

the pressure is reduced within the chamber A. As soon as the pressure has been reduced the springs E return the valve B⁵ to its normal uppermost position, so that full combustion of the fuel again takes place in the combustion-chamber G for the purpose previously described. Thus the valve B⁵ is a safety-valve, as it regulates the combustion of the fuel and consequently the generation of steam; but in addition the vessel A is provided with a suitable safety-valve of any approved construction, but not shown.

Having thus fully described my invention, I claim as new and desire to secure by Letters Patent—

1. A boiler comprising a vessel, a burner in said vessel, and a chamber located over said burner and connected with a liquid-supply, the said chamber having an opening in its top and the bottom of the chamber being concaved to form a combustion-chamber for said burner, substantially as shown and described.

2. A boiler comprising a vessel, a burner in said vessel, and a chamber connected with a liquid-supply and located over said burner, the top of said chamber having an opening for the admission of liquid to said chamber and the escape of vapors therefrom, and the bottom of said chamber forming a combustion-chamber for said burner, the said combustion-chamber opening into said vessel, substantially as set forth.

3. A boiler, comprising a vessel, a burner in said vessel and having a regulating-valve controlled by the pressure in said vessel, and a water-chamber connected with a water-

supply and located over said burner and having an opening at the top for the water to pass into the chamber, the opening also serving for the escape of the vapors, the bottom of the chamber being concaved to form a combustion-chamber for said burner, substantially as shown and described.

4. A boiler, comprising a vessel, a burner in said vessel and having a regulating-valve controlled by the pressure in said vessel, a water-chamber connected with a water-supply and located over said burner and having an opening at the top for the water to pass into the chamber, the opening also serving for the escape of the vapors, the bottom of the chamber being concaved to form a combustion-chamber for said burner, and a water-supply pipe discharging into the water-chamber, as set forth.

5. A boiler comprising a vessel having an outlet-pipe at its top, a burner inserted in the bottom of said vessel and having a regulating-valve controlled by the pressure in said vessel, a chamber located within said vessel over said burner and having an opening in its top, a liquid-supply pipe extending through the wall of the vessel and discharging into the said chamber, and a valve-controlled outlet in the bottom of said vessel, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

PERCY WARREN HANFORD.

Witnesses:

BERTHA B. HANFORD,
E. H. HANFORD.