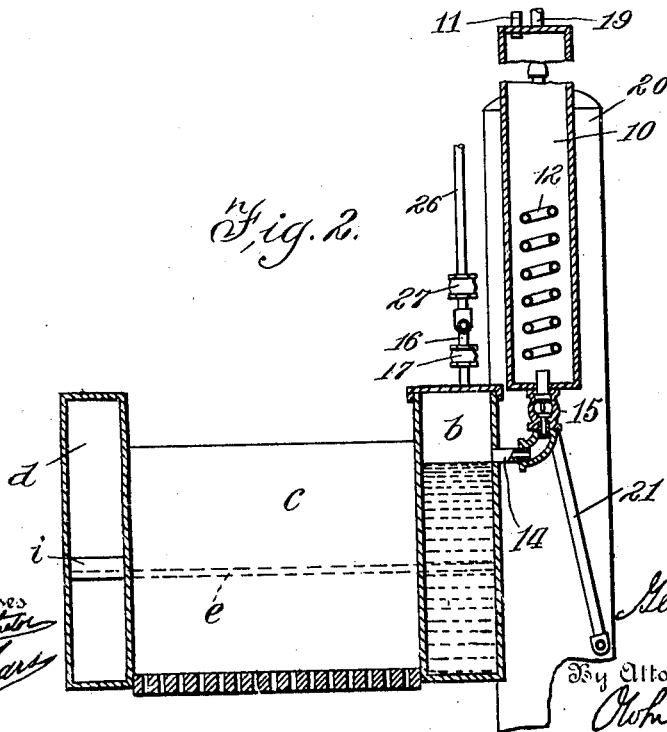
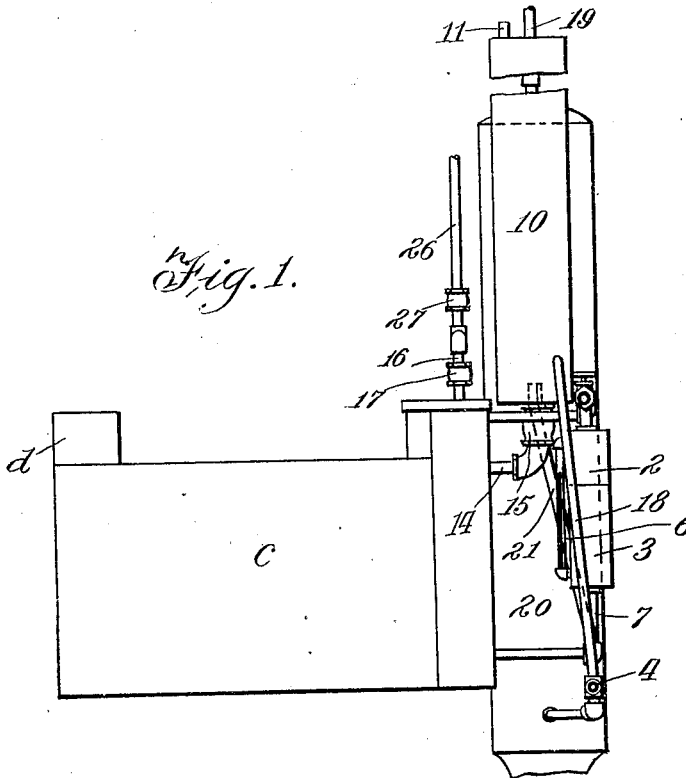


G. R. PROWSE.
 APPARATUS FOR GENERATING AND SUPERHEATING STEAM.
 APPLICATION FILED DEC. 28, 1908.

920,181.

Patented May 4, 1909.

3 SHEETS—SHEET 1.



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3 SHEETS—SHEET 2.

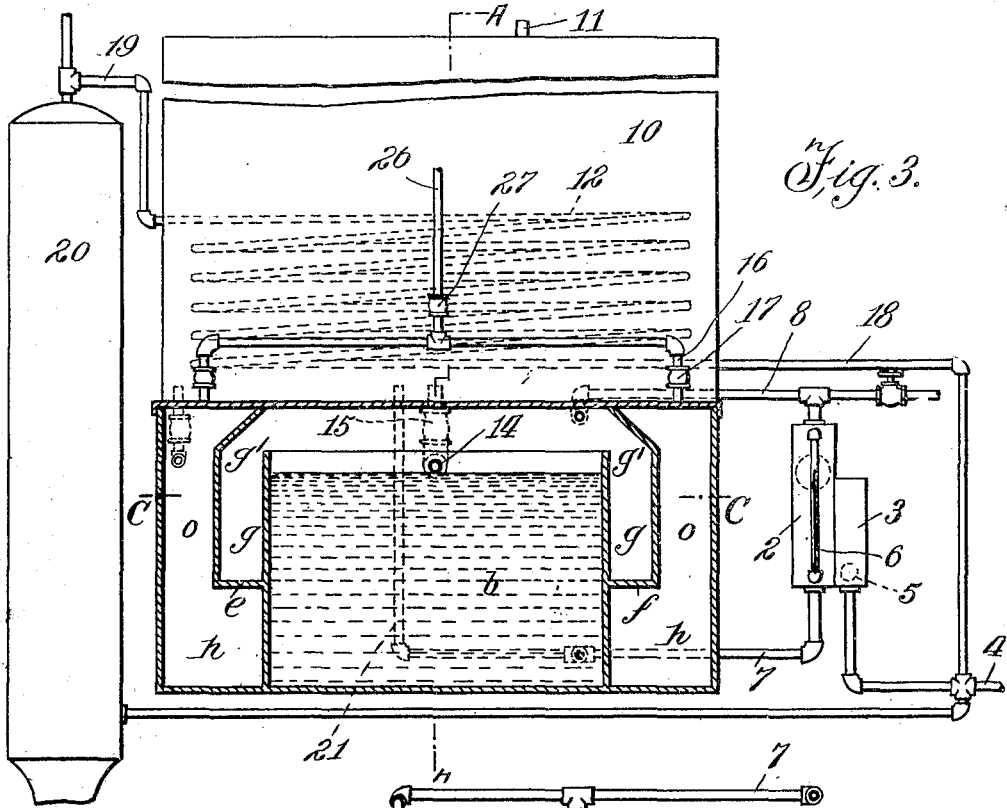


Fig. 3.

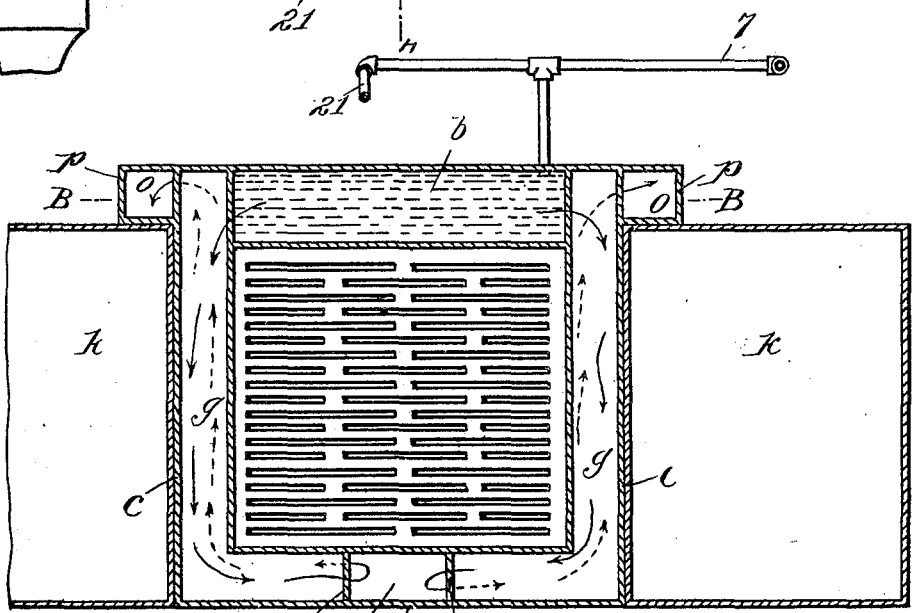


Fig. 4.

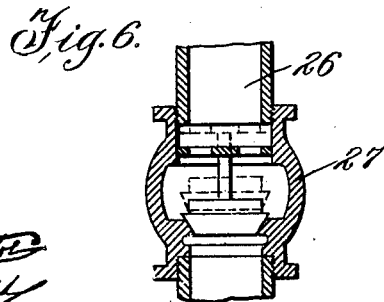
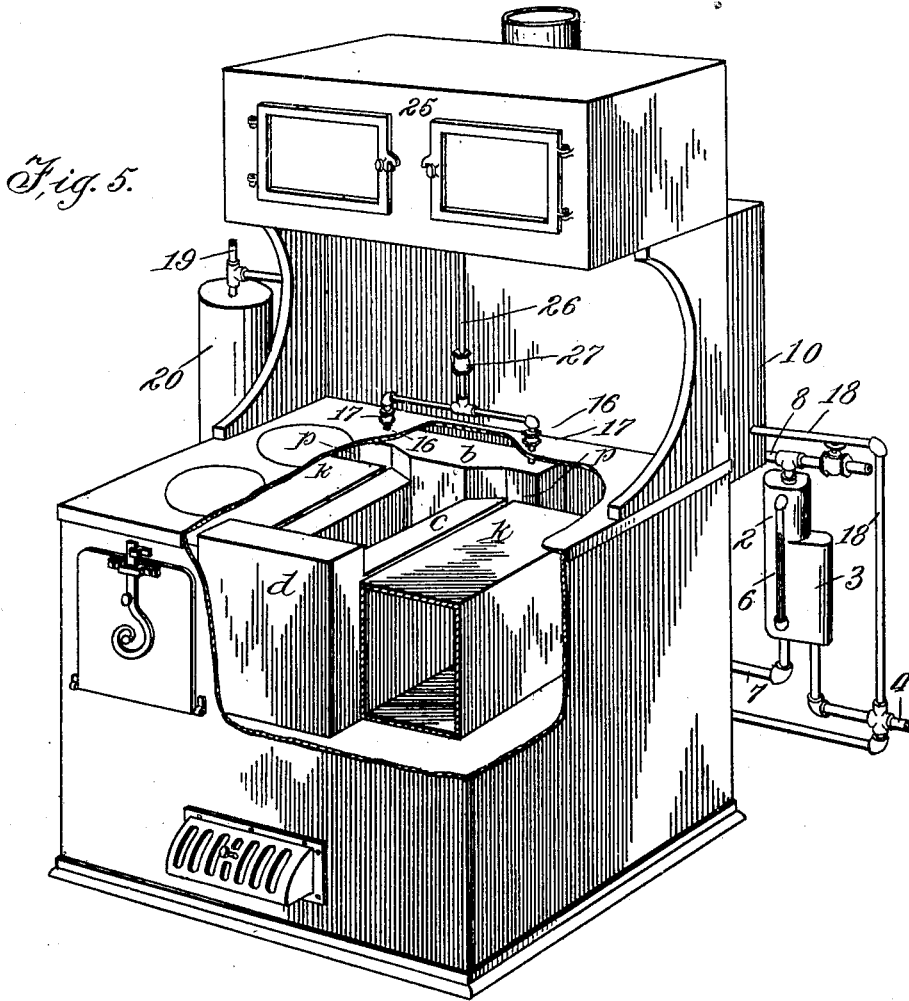
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 APPLICATION FILED DEC. 26, 1906.

920,181.

Patented May 4, 1909.
 3 SHEETS—SHEET 3.



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UNITED STATES PATENT OFFICE.

GEORGE ROGER PROWSE, OF MONTREAL, QUEBEC, CANADA.

APPARATUS FOR GENERATING AND SUPERHEATING STEAM.

No. 920,181.

Specification of Letters Patent.

Patented May 4, 1909.

Application filed December 26, 1906. Serial No. 349,568.

To all whom it may concern:

Be it known that I, GEORGE ROGER PROWSE, of the city of Montreal, Province of Quebec, Canada, have invented certain
5 new and useful Improvements in Apparatus for Generating and Superheating Steam; and I do hereby declare that the following is a full, clear, and exact description of the same.

10 My invention relates particularly to apparatus for use in supplying steam or hot water or both for household use either in cooking or heating, and it has for its object to provide an apparatus whereby a high tempera-
15 ture is secured without pressure.

The invention may be said briefly to consist of an apparatus comprising a water receptacle kept supplied by an automatic water supplying device, a steam chamber below the level of the top of the water receptacle and into which hot water is fed from the said water receptacle by priming during ebullition, a steam superheating chamber below the level of the first steam chamber
20 and adapted to receive the priming from the said first steam chamber, and one or more discharge ducts. The water receptacle has an automatic valve controlled communication between it and a hot-water tank, and
25 the discharge chamber has pipes through which the superheated steam is fed for cooking, heating or other purposes, and a pipe preferably constantly open to the atmosphere.

35 For full comprehension, however, of my invention reference must be had to the accompanying drawings, forming a part of this specification, in which similar reference characters indicate the same parts and
40 wherein:—

Figure 1 is a side elevation of the fire box of a cooking stove, provided with my invention; Fig. 2 is a longitudinal sectional view thereof taken on line A A Fig. 3; Fig. 3 is a
45 transverse sectional view taken on line B B Fig. 4; Fig. 4 is a horizontal sectional view taken on line C C Fig. 3; Fig. 5 is a perspective view of a range provided with my invention and Fig. 6 is a detail sectional
50 view of a check-valve such as used in my apparatus.

Although I have illustrated and will now describe my invention applied to cooking stoves I do not confine myself thereto as the
55 broad conception of my invention is applicable to any apparatus required to provide

steam and hot water and, particularly superheated steam at atmospheric pressure.

In the present embodiment of my invention the water receptacle consists of a comparatively flat vertically disposed section *b* preferably forming the rear of the fire box and a pair of similar side sections *c*, *c* and front section *d*. The side sections and all but the middle portion of the front are divided by a pair of horizontal partitions *e*, *f*,
60 into main converting chambers *g*, and a superheating chamber *h* extending continuously around the device from one side of the water receptacle to the other, the main converting chambers *g* have their rear ends overlapping the ends of the water receptacle with which they communicate through ports *g'* *g'*.
65

The partitions have vertical end walls *i* to retain a quantity of water sufficient, and no more, to absorb from the fire the heat units over and above what is required for cooking in the ovens (indicated at *k*), such quantity of water being determined by the height of these walls *i* which retain the water (due to the priming above mentioned) until it is entirely turned into steam. If more than the required quantity of water is primed into these chambers *g* it will in turn be fed by priming into the chamber *h* wherein an intense heat will be constantly maintained. The space *m* between the ends of the partitions *e* and *f* constitutes a port down which the steam or priming passes to the superheating chamber *h*; while the opposite ends of the latter communicate with a pair of vertical ducts *o* from which lead the pipes for conducting the superheating steam, such ducts being formed and the ends of chambers
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g accommodated by extensions *p*, *p*, of the water section *b*.

The device whereby the water receptacle is automatically kept supplied consists of a tank 2 having in communication therewith a chamber 3 with a water supplying pipe 4 connected thereto and a ball-cock 5 controlling the discharge from this pipe into the chamber. A glass water gage 6 is mounted upon the tank and the lower end of the latter is connected by a pipe 7 to the lower portion of the water receptacle *b* while its upper end is connected to a pipe 8 leading from the top of the receptacle *b* and also serving as a means for supplying steam for domestic use.

Hot water for domestic use is supplied from this apparatus by means of a tank 10

containing a coil 12. The bottom of the tank is connected by a pipe 14 leading from the upper end of the boiler *b* and controlled by a weighted check valve 15, and a second pipe 16 leads from one of the ducts *o* to the lower portion of one end of the tank, the latter pipe being controlled by a weighted check valve 17 of less weight than the valve 15. The lower end of the coil is connected by a pipe 18 to the pipe 4 and the upper end by a pipe 19 to a tank 20 from which hot water is supplied for domestic use; while a drip pipe 21 returns the water of condensation from the tank 10 to the return pipe 7 of the boiler, and a blow off pipe 11 leads from the top of this tank and is open to the atmosphere.

When this apparatus is applied to a cooking range the latter is provided with steam cooking receptacles 25 which are fed from the pipe 16 by a branch 26 controlled by a check valve 27 of less weight than check valve 17, and when there is any indication of pressure in the pipes 16 the valve 27 will be lifted, while if even with such relief, the pressure rises, the valve 17 will be lifted and if the pressure still rises the valve 15 will be lifted and the pressure be effectively reduced.

Operation: The operation of my improved apparatus is as follows:—When the fire is burning the temperature of the walls of the chambers *g* and *h* is raised to an intense heat and the water in the water receptacle *b* is constantly in a state of ebullition and this receptacle is kept sufficiently full to enable the priming due to ebullition to fall intermittently into the pans presented by the lower portions of the chambers *g*, the water being retained in these pans until it is converted into steam or boils over into the chamber *h*. The walls of these chambers *g* and of the chamber *h*, adjacent to the fire and forming the bottom of the chambers *g* become highly heated, and then the priming from the boiler, when it strikes these hot plates, is instantaneously flashed into live steam. When these chambers *g* are fully charged with steam the continued action causes live steam to flow downwardly through the port *m* into the chamber *h* where it is superheated and finally delivered from the ducts *o* at a temperature of 450% (more or less according to the quality of the fire). The water in the receptacle *b* is kept at a level dependent upon whether a comparatively large or small quantity of water, or steam only, is required to be fed to the chambers 9. This is regulated at the supplying device. The source of heat (the fire in this case) is protected by subjecting a comparatively small quantity of water thereto this water being converted into steam which as above pointed out is superheated to a very high temperature, and this superheated steam may be utilized for any desired purpose.

Danger of damage to the walls of the apparatus by the intense heat of the fire is reduced to a minimum by the steam with which the chambers *g* and *h* are charged such steam absorbing the heat from the walls and keeping the temperature thereof comparatively low.

It may be mentioned here that the steam may be used as a drying medium by connecting the steam and return pipes 16 and 18 respectively to opposite ends of the coil and locating the latter in a drying room, or in a tank from which water is circulated for heating purposes.

While I have described and illustrated flashing means I do not herein claim the same *per se*, as such forms the subject matter of a separate application, filed February 14, 1908, under Serial No. 415,919 and constituting a divisional part hereof.

What I claim is as follows:—

1. The combination with a heating apparatus, of a boiler adapted to emit the primings due to ebullition, means receiving the said primings and flashing the same into steam, and a chamber in communication with such flashing means for the purpose of enabling the steam to be collected and the latent heat thereof utilized.

2. The combination with a heating apparatus, of a boiler adapted to emit the primings due to ebullition, means receiving the said primings and flashing the same into steam, a chamber contiguous to the said boiler, a pipe connecting such boiler to the chamber, and means whereby the latent heat of the steam collected within the chamber is utilized.

3. The combination with heating apparatus of a boiler and means maintaining a required water level within the latter, of means for flashing steam from the primings emitted from the boiler, such means being below the level of and in communication with the said boiler, a chamber, a pipe connecting the boiler to the chamber, and means whereby the latent heat of the steam is caused to act within the chamber.

4. The combination with a cooking apparatus of a heat generator, a boiler absorbing heat from the generator and having a mouth at its upper end; means maintaining a required level of water within the boiler; a steam generating chamber communicating with and below the level of the said mouth; means retaining the water in the said chamber to facilitate its conversion into steam, a superheating chamber below the level of and communicating with the said generating chamber, and means whereby the superheated steam is utilized for cooking purposes.

5. The combination with the frame of a cooking apparatus of a heat generator; a boiler forming one wall of such generator and having a mouth at its upper end; means

maintaining a required level of water in the boiler; a steam generating chamber communicating with the mouth of the boiler and encircling the upper portion of the heat generator; a steam superheating chamber encircling the lower portion of such heat generator and communicating with the steam generating chamber; a steam cooking chamber; and means effecting a communication between the superheating chamber and the said steam cooking chamber.

6. The combination with the frame of a cooking apparatus of a heat generator, a boiler forming one wall of such generator and having a mouth at its upper end; means maintaining a required level of water in the boiler; a steam generating chamber communicating with the mouth of the boiler and

encircling the upper portion of the heat generator; a steam superheating chamber encircling the lower portion of such heat generator and communicating with the steam generating chamber; a steam cooking chamber; means effecting a communication between the superheating chamber and the said steam cooking chamber; a water heating chamber; and valve controlled means effecting a communication between the upper end of the boiler and such water heating chamber.

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

GEORGE ROGER PROWSE.

Witnesses:

WILLIAM P. McFEAT,
FRED. J. SEARS.