

Nov. 19, 1929.

T. R. WOLLASTON

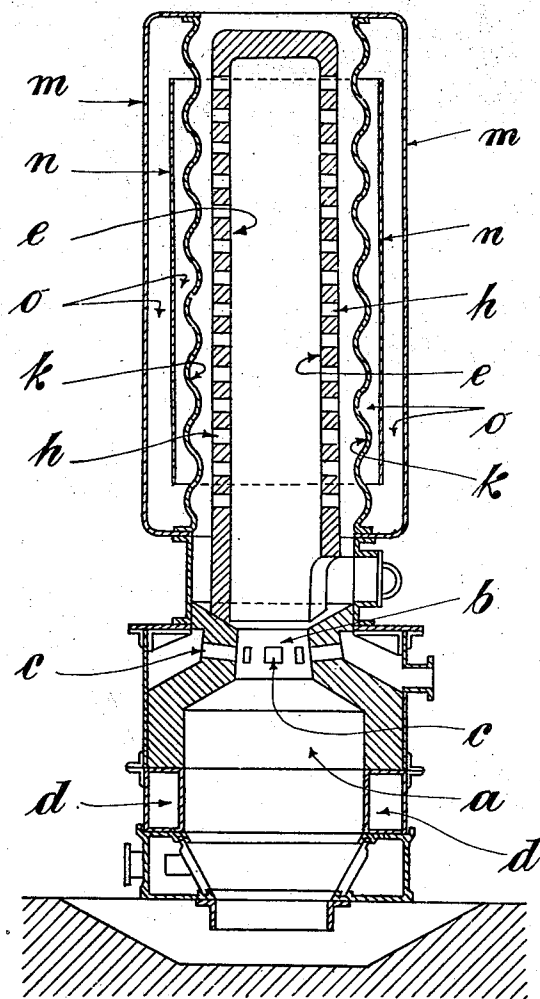
1,735,945

BOILER AND THE LIKE

Filed July 16, 1928

3 Sheets-Sheet 1

Fig. 1.



Inventor :-

Thomas Roland Wollaston

By Attorney :- Arthur Gault.

Nov. 19, 1929.

T. R. WOLLASTON

1,735,945

BOILER AND THE LIKE

Filed July 16, 1928

3 Sheets-Sheet 2

Fig. 2.

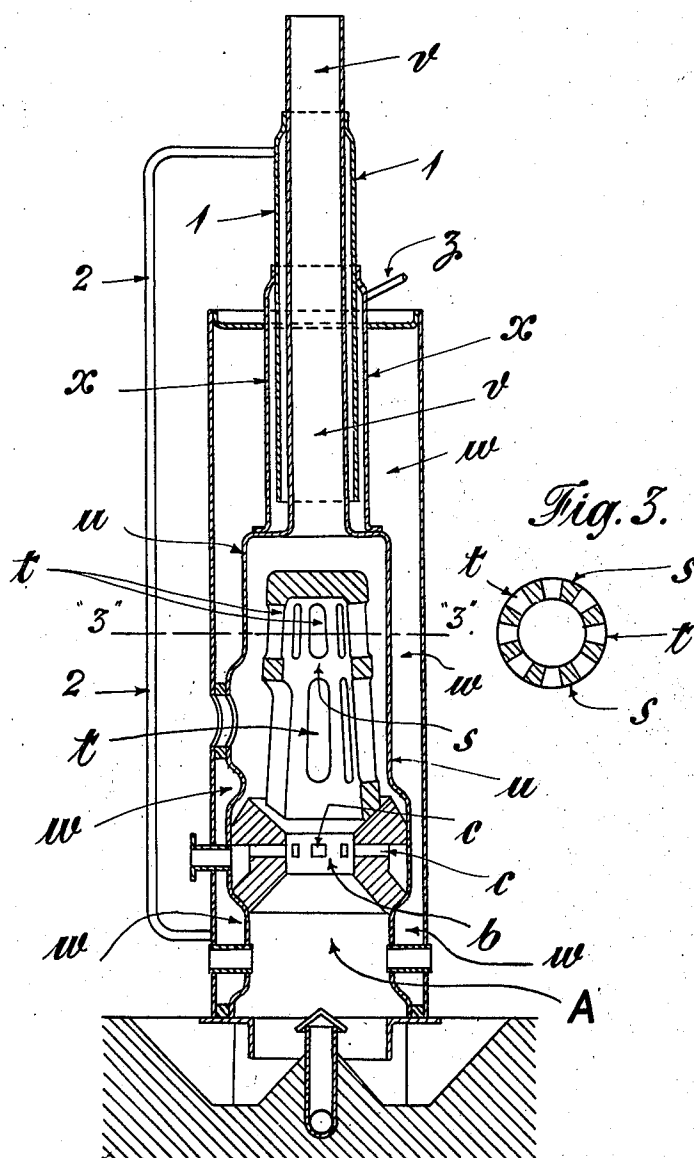


Fig. 3.

Inventor :

Thomas Roland Wollaston

By Attorney : Arthur Gould.

Nov. 19, 1929.

T. R. WOLLASTON

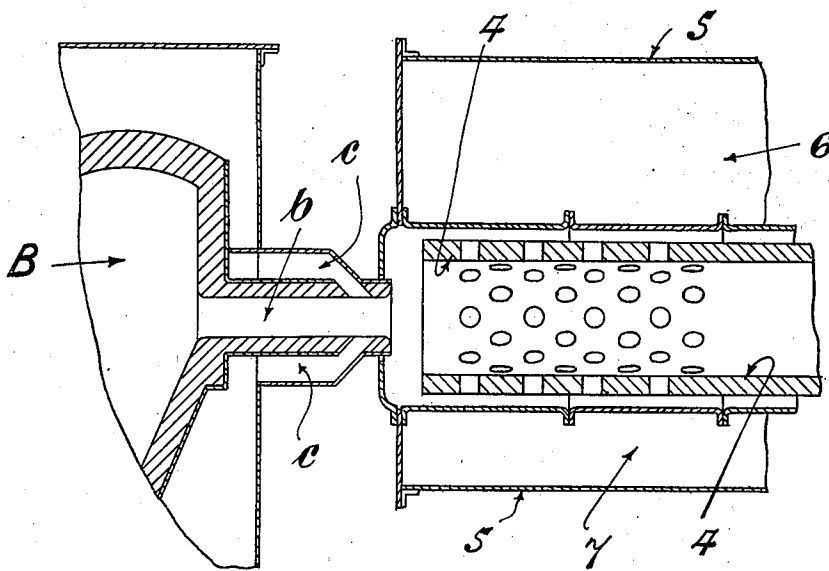
1,735,945

BOILER AND THE LIKE

Filed July 16, 1928

3 Sheets-Sheet 3

Fig. 4.



Inventor :

Thomas Roland Wollaston

By Attorney : Arthur Gadd.

UNITED STATES PATENT OFFICE

THOMAS ROLAND WOLLASTON, OF MANCHESTER, ENGLAND

BOILER AND THE LIKE

Application filed July 16, 1928, Serial No. 293,281, and in Great Britain August 5, 1927.

This invention relates to improvements in apparatus for the efficient transference of heat resulting from the combustion of various fuels, for purposes such as raising steam from water, superheating steam, raising the temperatures of fluids, evaporating or distilling liquids; or for other operations of a like character.

The object of the invention is to provide means whereby intense flame heat resulting from an efficient combustion of fuel is concentrated upon a heat storer and radiating device located and provided for becoming highly incandescent, the consequent heat so radiated therefrom for temperature raising purposes enabling the requisite amount of heating surface in the boiler or vessel concerned to be considerably less than the area of surface usually necessary, said reduction of area of heating surface bringing about economical modifications in the design and arrangement of said boiler or vessel.

A heat source very suitable for my present object is a fuel gasifier or gas producer of the type described in the specification of my British Patent No. 243092, said gasifier adapted to attain practically perfect combustion of fuel therein of varying grades, and thus is capable of providing for the present purpose a flame temperature of high degree at a pre-heated air supplied under pressure by the action of a fan or blower to a throat or burner device or devices forming the only outlet or outlets for said flames. Such outlet or outlets is or are hereinafter referred to under the generic term "gas outlet."

According to my present invention, the heat radiating means is or are mounted on arranged adjacent to the aforesaid throat, burner or burners of the type of gasifier referred to, said means beings composed of refractory substance of suitable shape and dimensions, in perforated form. Such means may be situated within the vessel or apparatus the contents of which are to receive the radiant heat named whether some portion of the original heat supplied from the gasifier is employed for direct application or not.

With reference to the accompanying drawings, illustrating forms and applications of

my invention, Fig. 1 is a sectional elevation of combined gasifier and heat-radiating means applied to a fluid-heating apparatus situated about said means.

Fig. 2 is a sectional elevation of my invention applied to a form of vertical boiler, the latter provided with means for feed-water heating purposes,

Fig. 3 is a cross section through line 3—3 of a portion of Fig. 2.

Fig. 4 is a sectional and longitudinal view showing the application of my invention to an ordinary Lancashire boiler.

Referring to Fig. 1, *a* is a gasifier of the type herein referred to, provided with a pre-heated-air supplied throat or burner device *b*, inlets for said air being indicated at *c*. It may not always be necessary for the air to be pre-heated as stated. In the example referred to said gasifier is also provided with an annular or other space *d* which may be employed as a water jacket at the position given.

The valve control of the throat *b* as described in my former patent named herein, is not required for my present purpose.

According to my present invention, heat-radiating means in the form of a tube of refractory substance, and shown at *e*, is mounted adjacent to said device *b*, the tube being freely perforated and some of the perforations being indicated at *h*. Surrounding the refractory tube *e* is a corrugated tube or annulus of metal indicated at *k*, the latter attached to an external vessel the shell of which is shown at *m*.

The annulus aforesaid provides an increased area for transference of heat by radiation, while at the same time is of a form giving strength and elasticity to the structure as a whole, as well as facilitating accessibility thereto.

The shell *m* supports a tubular or suitable device *n*, which has the effect of directing circulation of liquid to be heated in the vessel concerned, when the latter contains said liquid.

The flames due to the fired gaseous mixture at the burner device *b* pass up and impinge against the sides of the tube *e* and bring

the latter to a considerable state of incandescence, on account of the very high degree of temperature of combustion in the gasifier. The apertures *h* enable the result or

incandescence to be attained with greater rapidity, and also may allow some of the flames or heat to pass directly through the tube *e* named. The outer tube *k* also becomes heated and itself radiates heat to as well as provides convective currents in the fluid contained in the space *o*.

In Fig. 2 a gasifier for the present purpose but somewhat differently designed is shown at A, the burner device therefor being indicated at *b*. The heat-radiating means is here a construction of somewhat conical form, and provided with long slots or perforations. It is indicated at *s* and the perforations are shown at *t* both in Fig. 2 and Fig. 3.

A casing *u* in the water space of the vertical boiler surrounds the device *s*, and is provided with a chimney at *v*. The water space of the boiler is shewn at *w*, and means for pre-heating the feed water are indicated. That is to say, a casing *x* attached to *u* is capable of containing water to be pre-heated an inlet for the same being shown at *z*. An extension of the casing *x*, and partly passing within it, is indicated at *I*, the space within the latter being in communication through pipe 2 with the water space surrounding the gasifier A. In this way supply of hot water to the boiler may be attained.

In Fig. 4 a portion of a gasifier of the type employed is shown at B provided with a gas outlet *b* adjacent to or in the side of said gasifier, secondary-air inlets being indicated at *c*. The outlet *b* is also shown adjacent to a heat-radiator or refractory tube 4 mounted within the main flue of a Lancashire boiler 5 (or may be other horizontal-flue boiler) the usual steam and water space being indicated at 6, and water-space at 7.

Regarding radiator such as *e* I find the best results are obtained by keeping the size and height of the same within comparatively small limits.

The upper end of the annulus *k* is shown with an upper open end, and it will be obvious that some of the flame-heat from the producer would be employed for directly heating the contents of any vessel mounted above said open end.

The forms of heat storing and radiating devices shown are by way of example only.

I claim:—

In combination with an industrial fluid container having a flue therein, a fuel gasifier having a gas outlet, said outlet having inlets thereto for preheated high-pressure air for promoting high flame temperature, a hollow perforated radiator of refractory substance located within said flue and having an open end communicating with said outlet, whereby

heat from said radiator is employed to raise the temperature of the fluid in said container.

In testimony whereof I have affixed my signature.

THOMAS ROLAND WOLLASTON.

70

75

80

85

90

95

100

105

110

115

120

125

130