(Model.)

D. S. ROBILLIARD.

LOW PRESSURE BOILER.

No. 305,848. Patented Sept. 30, 1884.

Fig. 1.

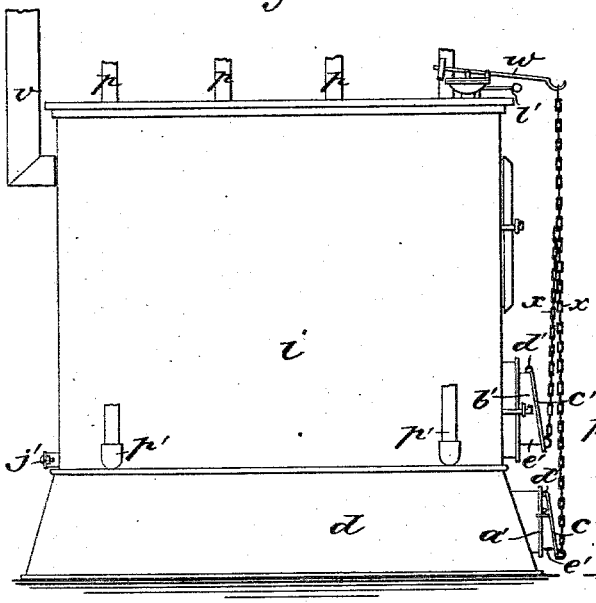


Fig. 2.

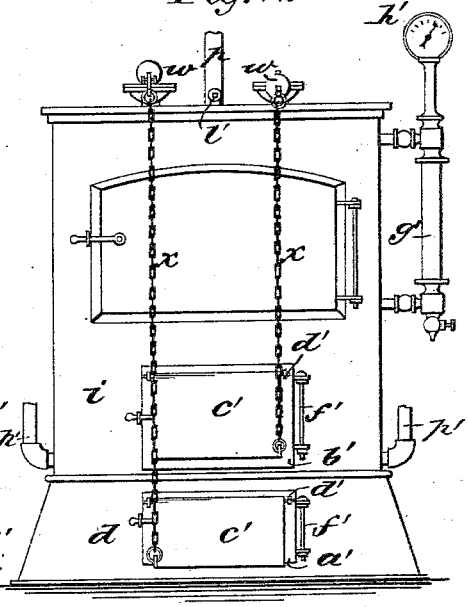


Fig. 3.

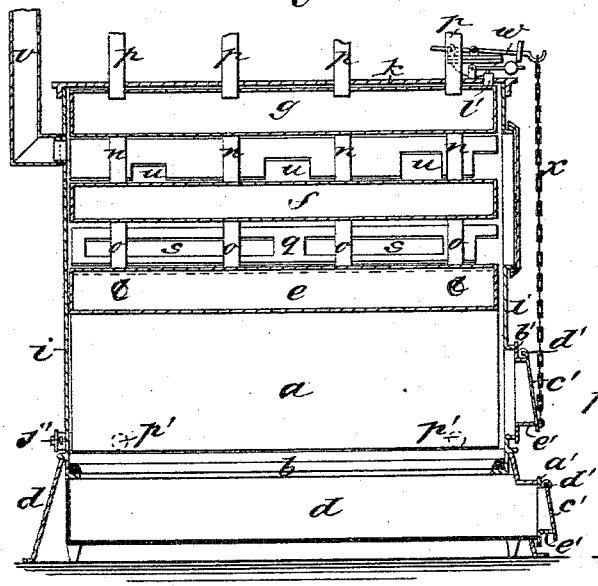
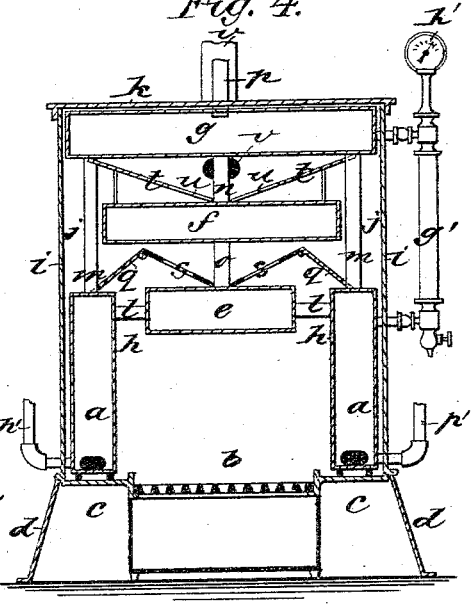


Fig. 4.



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DANIEL SEBIRE ROBILLIARD, OF QUEBEC, QUEBEC, CANADA.

LOW-PRESSURE BOILER.

SPECIFICATION forming part of Letters Patent No. 305,848, dated September 30, 1884.

Application filed April 30, 1884. (Model.)

To all whom it may concern:

Be it known that I, DANIEL S. ROBILLIARD, of Quebec, in the Province of Quebec, Dominion of Canada, have invented a new and Improved Low-Pressure Boiler, of which the following is a full, clear, and exact description.

My invention consists of improvements in the construction of boilers for low-pressure steam, and hot water for heating purposes, designed for simplicity and cheapness of construction and for economizing fuel, as hereinafter fully described.

Reference is to be had to the accompanying drawings, forming part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1 is a side elevation of my improved boiler. Fig. 2 is a front elevation. Fig. 3 is a longitudinal sectional elevation, and Fig. 4 is a transverse sectional elevation.

I make the water-holding part of the boiler to consist of a series of hermetically-closed parallel side sections of either cast metal or boiler-plate, and of different dimensions, according to their position in the boiler, and arrange and connect said sections together by setting up two sections, *a*, edgewise along the sides of the fire-grate *b* on the top plates, *c*, of a suitable supporting-base, *d*, and arranging three (more or less) sections, *e f g*, horizontally over the fire-space, and one above another, with spaces between them about equal to the thickness of the sections. The lower section, *e*, is sufficiently narrow to leave flue-spaces *h* between its edges and the sides of sections *a* between which said section *e* is located. The intermediate section, *f*, is located above the sections *a e*, and is wider than section *e*, but is arranged with relation to the sides *i* of the jacket by which the whole is inclosed to provide flue-spaces *j* along its edges; but the top section, *g*, is the full width of the inclosing-jacket, and is located directly under the cover *k* of said case. Sections *a* are connected to section *e* by, say, two horizontal circulating-tubes, *l*, to each, and they are also connected by four vertical tubes, *m*, each to the top section, *g*, to which latter the intermediate section, *f*, is also connected by four tubes, *n*, along the center, and section *e* is similarly connected by four tubes, *o*, to section *f*. The steam or hot water flows away through the pipes *p*, connecting with the top of section *g*, and returns to the sections *a* by the pipes *p'*. The flue-spaces *h* are covered by Λ-shaped flue-plates *q*, that deflect the heat onto the top of sections *a*, to cause it to impinge effectually thereon before ascending through the passages *s* of plates *q*, which direct the heat against the center of section *f* effectually. The heat-currents divide under the center of section *f*, and are caused to impinge the bottom more intimately in passing over the angles of the flue-plates *q*, from which they pass up flue-spaces *j*, around the edges of section *f*, to the deflecting flue-plates *t*, which turn them down on the top of section *f*, from which they pass through the openings *u* of plates *t* into the space under and against the bottom of the top section, *g*, from which they pass away into the smoke-pipe *v*, after impinging directly on the bottom of section *g*, and thus effectually giving up the heat, so as to materially economize the fuel.

For effecting automatic regulation of the fire by the use of thermostatic levers *w* and chains *x* to control the draft, I propose to construct the ash-pit door *a'* and the fire-box door *b'* each with a valve, *c'*, hinged to said doors at *d'*, and fitted to close on sloping seats *e'*, so that they will be opened by the lift of the levers *w* when raised by the heat, and will close on said sloping seats by gravity when the heat subsides and the levers fall.

The doors *a'* and *b'* are hinged in the ordinary manner at *f'*, to be swung open laterally by hand.

The boiler will have the usual glass water-gage *g'*, pressure-gage *h'*, and safety-valve *t'*.

The inclosing-jacket *i k* may be made of cast metal or rolled plates, as preferred, and will be connected at the joints by lugs *j'* and bolts or screws, as preferred.

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

1. The combination, in a boiler for steam or hot water, of two vertical water-sections, *a*, forming the sides of the fuel-box, also three (more or less) longitudinal water-sections, *e f g*, arranged over the fire-space within an inclosing-jacket, *i k*, and also circulating-tubes *l*, *m*, *o*, and *n*, connecting said sections, the top section, *g*, having the steam-pipes *p*, and sections *a* having the return-pipes *p'*, substantially as described.

2. The combination of the vertical and horizontal water-sections *a*, *e*, and *f*, and the flue-plates *q*, said section *e* being arranged between the sections *a* and flues *h*, and section *f* arranged over the flue-plates *q*, having passages *s*, arranged to cause the heat-currents to impinge on the middle of the bottom of said section *f*, substantially as described.

3. The combination of flue-plates *t* with the horizontal water-sections *f g*, having flues *j*, and the smoke-pipe *v*, said plates *t* being arranged to project the heat downward on the upper side of section *f* and upward against the bottom of section *g*, substantially as described.

4. The combination of the vertical and horizontal water-sections *a*, *e*, *f*, and *g*, circulating-tubes *l*, *m*, *o*, and *n*, flue-plates *q* and *t*, and an inclosing-jacket, *i k*, substantially as described.

5. The combination of the base *d*, having top plates, *c*, and the case *i k*, with the vertical and horizontal water-sections *a*, *e*, *f*, and *g*, circulating-tubes *l*, *m*, *o*, and *n*, and flue-plates *q* and *t*, said water-sections being arranged with flues *h* and *j*, substantially as described.

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