

R. Coad,

Sheet 1 of 4 Sheets.

Feeding Boiler Furnaces,

Nº 6,446.

Patented May 8, 1849.

Fig. 3.

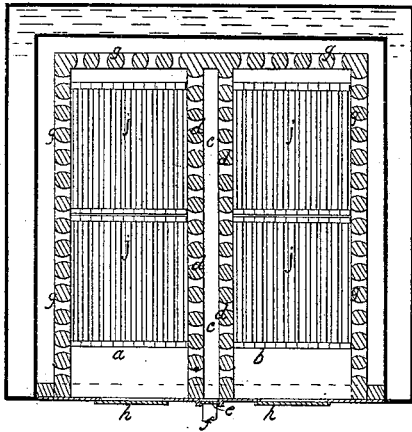


Fig. 4.

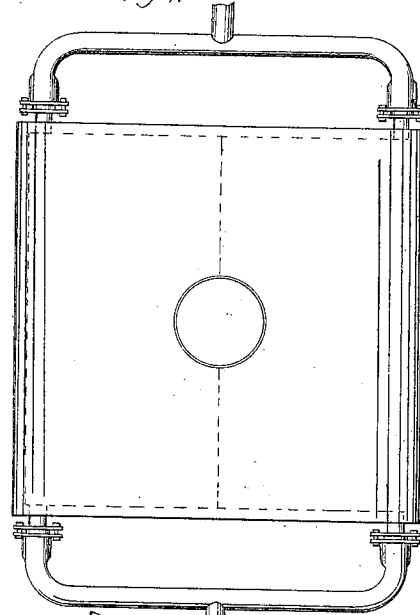


Fig. 1.

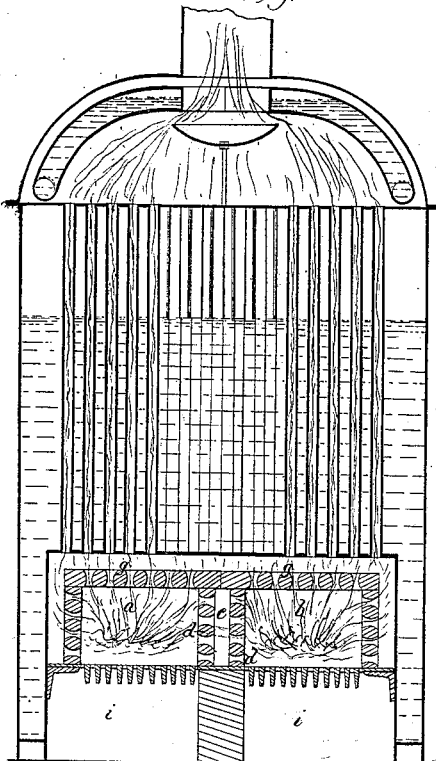
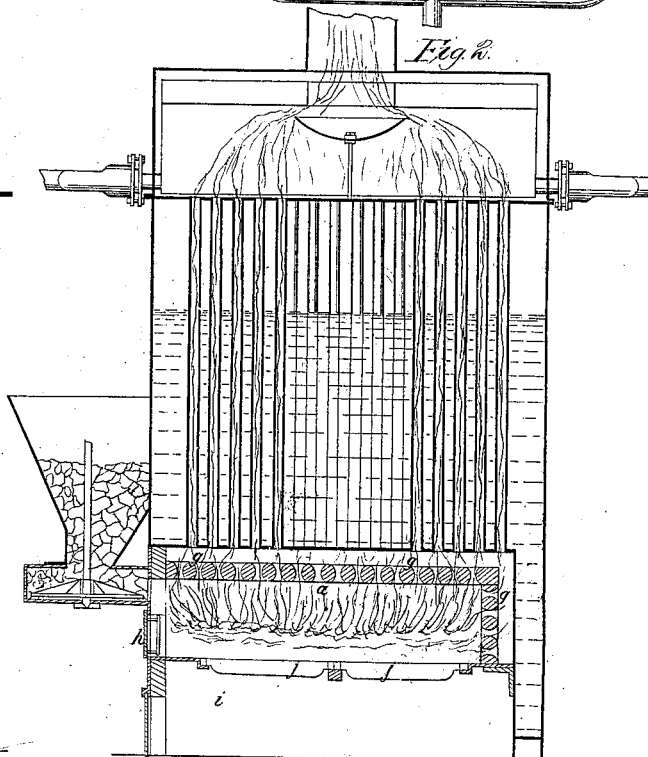


Fig. 2.



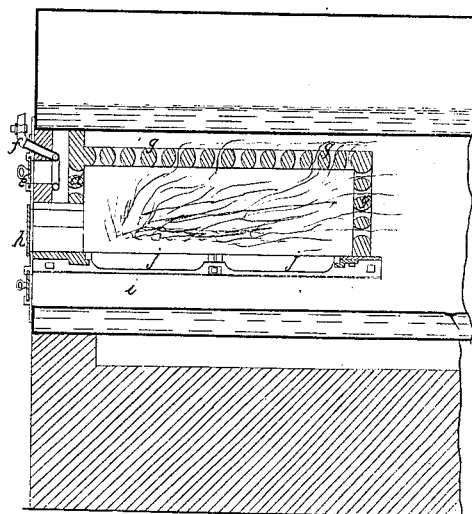
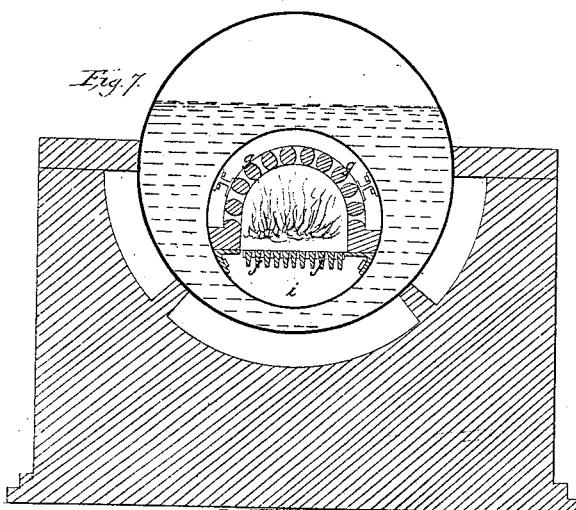
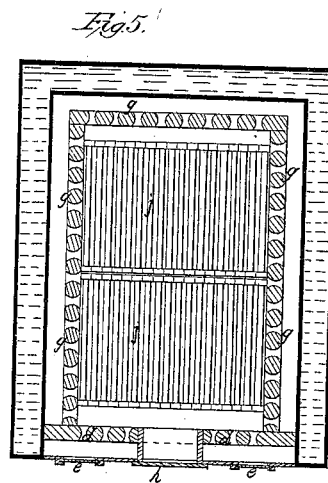
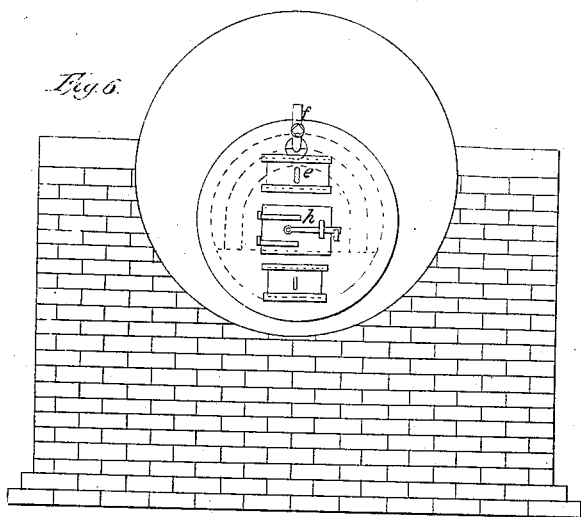
R. Coad,

Sheet 2 of 4 Sheets.

Feeding Boiler Furnaces,

No. 6,446,

Patented May 8, 1849.

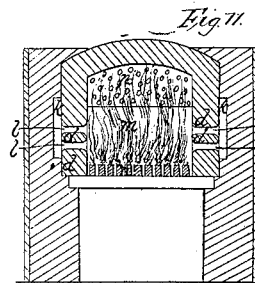
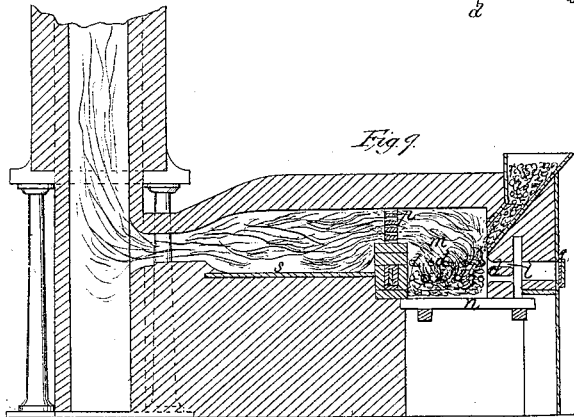
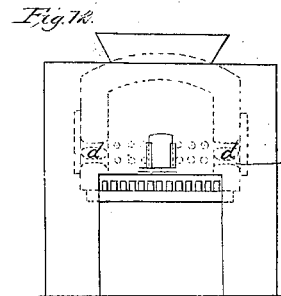
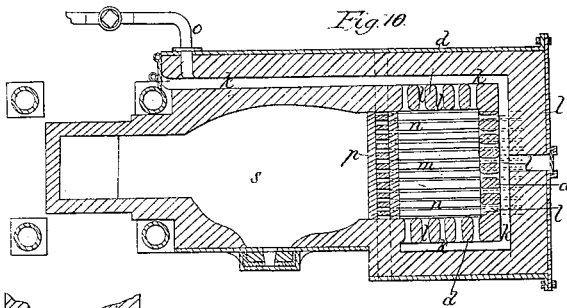
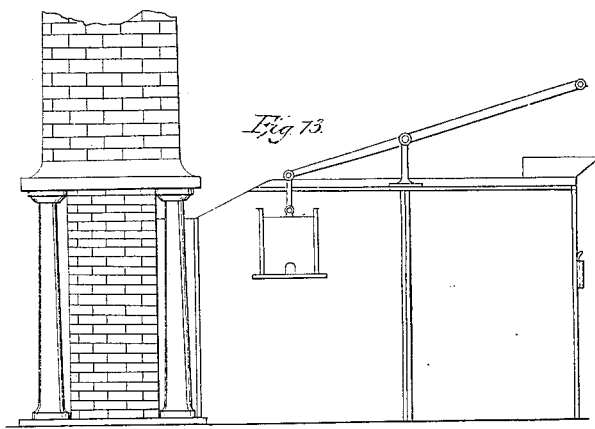


R. Coad,

Feeding Boiler Furnaces,

No. 6,446,

Patented May 8, 1849.



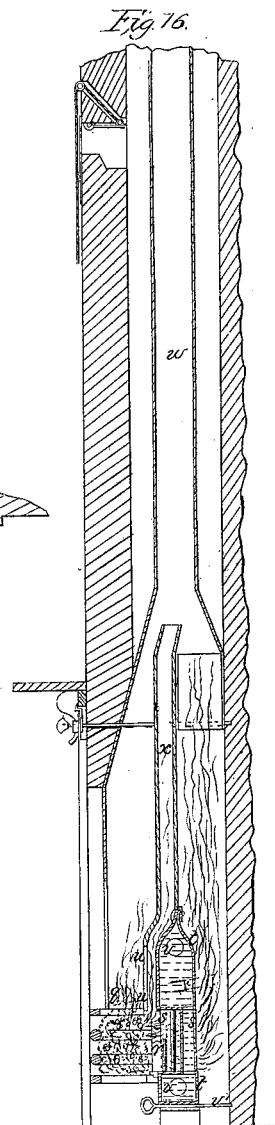
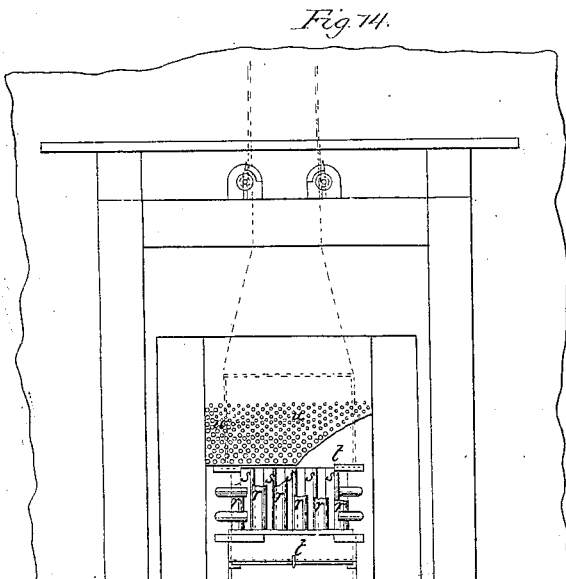
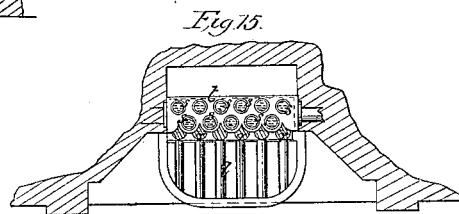
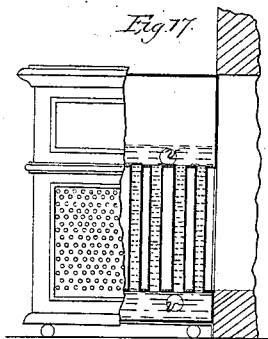
R. Coad,

Sheet 4 of 5 Sheets.

Feeding Boiler Furnaces,

N^o 6,446,

Patented May 8, 1849.



UNITED STATES PATENT OFFICE.

RICHARD COAD, OF KENNINGTON, ENGLAND, ASSIGNOR TO SAMUEL GRIFFITH FISHER,
OF MOBILE, ALABAMA.

COMBUSTION OF FUEL.

Specification of Letters Patent No. 6,446, dated May 8, 1849.

To all whom it may concern:

Be it known that I, RICHARD COAD, of Kennington, Surrey, England, a subject of the Queen of Great Britain, have invented or discovered new and useful Improvements in the Combustion of Fuel and in Applying the Heat so Obtained; and I, the said RICHARD COAD, do hereby declare that the nature of my said invention and the manner in which the same is to be performed are fully described and ascertained in and by the following statement thereof, reference being had to the drawings hereunto annexed and to the figures and letters marked thereon, that is to say—

My invention consists of improvements in the construction of furnaces for the better combustion of fuel and for applying the heat so obtained. And in order that my invention may be most fully understood and readily carried into effect I will proceed to describe the drawings hereunto annexed.

Description of the drawings: Figure 1 shows a front section of a furnace constructed according to my invention applied to a steam boiler. Fig. 2 is a side section of the same. Fig. 3 shows a plan in section of the same and Fig. 4 a plan thereof.

In each of these figures the same letters indicate similar parts.

In this arrangement there are two furnaces *a* and *b* divided by an air chamber *c* the fire brick or suitable stone *d*, *d*, which form the partitions between the air chamber *c* and the furnaces being perforated as shown for supplying the two fires with heated air above the fuel under combustion the air being supplied by an opening *e* to the air chamber *c* or by other convenient means and it will be evident that the air before it can arrive into the furnaces will have become highly heated owing to having to pass through the highly heated fire brick of the partitions *d*, *d*, and therefore the oxygen will be in a better condition to combine with the products of the fuel not already ignited and when desired steam may also be admitted into the air chamber by the pipe *f*. It will be seen that the fire is inclosed at all parts by reticulate partitions *g*, *g*, similar to those through which the air passes from the air chamber and the upper part of the furnace and these partitions and upper part of the furnaces made of perforated lump or stone fire brick will at all times be highly heated and cause

all the products of the fuel to be ignited before passing away from the furnace.

I have in the drawings shown the particular formation of the perforations of the fire brick which I prefer. I would however state that the shape of the perforations may be varied. *h*, *h*, are the fire doors. *i*, *i*, the ash pits. *j*, *j*, are the fire backs. I would remark that it has heretofore been proposed in constructing furnaces to have the sides so arranged as to admit both cold and heated air to the furnace and I mention this fact in order to state that I do not claim the same and the peculiarity of my invention consists in causing a furnace to be so arranged that the heat and flame shall pass through numerous openings through fire brick as explained so as to insure the whole of the products evolved from the fuel being ignited.

It will be seen that by having the perforated partitions at the sides of the furnaces and also at the end as well as at top, the heat passes off laterally as well as at the end and upward through the top and then acts on the boiler or other surface to be heated.

I have in the drawings shown the furnaces to be fed with feeding apparatus, such as is well known. I do not therefore make any claim thereto.

I have in the figures of the drawings above referred to shown a convenient construction of tubular steam boiler, which may be used with the furnaces above described. I do not however make any claim thereto, nor have I thought it necessary to show the several parts of such boiler, the same being well understood. It is not necessary in each case that two furnaces should be combined together as shown in the figures of the drawings above described, as single furnaces may be made according to my invention.

Figure 5 shows a plan in section of a single furnace constructed according to my invention, the air chamber being in front as shown and there are reticulate partitions of fire brick lump or suitable stone through which the heat and flame passes on either side as well as at the end and top which parts are to be constructed as described in respect to the like parts in the previous figures, except that the fire brick top will require to be arched instead of flat as in the former instance.

Fig. 6 shows a front view, Fig. 7 a transverse section, and Fig. 8 a longitudinal sec-

tion of an arrangement of furnace for those constructions of steam boilers where the fire place is within the boiler. The boiler shown in these figures is cylindrical but this may be varied. This arrangement of furnace so far as its reticulate character is concerned is similar to the ones previously described; it differs only in shape. The same letters of reference are used to indicate similar parts and the description above given will apply to the present figures.

Though I have thus far described my improvement in the combustion of fuel and in applying the heat so obtained, with reference to one only of the purposes for which heat is required, viz, the generation of steam, yet as the application of heat when once generated may be made to any object requiring to be heated, so, I do not limit myself to any particular object or material to be heated, or to any particular state or form of such material. Thus if instead of applying the heat of my furnace to the surface of a steam boiler I have occasion to heat the surface of a gas retort I shall construct the inclosing arches or reticulate partitions on the same principles as those seen in Figs. 1, 2, 3, 5, 7, or 8.

Should the object be the heating of pipes conveying currents of air or water the great principle of my invention will still be to interpose between the fire and the objects to be heated a fire brick partition perforated with numerous holes of suitable form and dimensions to permit a circulation through them of the products of combustion and of air admitted above the fire. When the heating or the melting of iron is the application to be made of the heat I shall use my furnace constructed in all essential points on the same principle as if the object were the generation of steam. In doing this I do not wish to be understood to claim as my invention any particular form of reverberatory or other furnace. The fire brick wall contained within an air chamber and having numerous perforations on the sides and a reticulated partition beyond or back of the fire and also over the top when necessary, for the purpose of permitting air to pass above the grate, through a highly heated fire brick and there to come in contact with the fuel also in a highly heated state and accompany the volatile combustible fuel through the reticulate partition are the principal features of my improvement. This modification of my invention is seen in Figs. 9, 10, 11 and 12 where *h* is the air chamber corresponding to that seen at *c*, Fig. 1, *d*, *d*, &c. are the fire brick walls corresponding to those with the same letter of reference in Fig. 1, and *l*, *l*, are the holes through which air gains admittance from the air chamber above as already described, and *P* is the reticulated brick partition between the fire *m*,

and the material to be heated at *s*. In using my furnace for steam boilers or for any other purpose, I either allow the air to flow from the air chamber by the mere draft of the chimney or shall force it by mechanical means through suitable pipes and channels as *o*, Fig. 10.

When the application of heat is to be made to pipes for circulating hot water the same principles are observed and the firebrick partition between the fire and the surfaces of the tubes to be heated, may be perforated with holes as already described or may have narrow slots between the several pillars of fire-clay *r*, *r*, *r*, Figs. 14, 15, 16, and 17, through which the flame will reach the tubes *s*, *s*, *s*. In this case the fire may be entirely inclosed within the fire-brick casing as in Figs. 1, 2, and 3, or as a modification, it may be open in front, in which case the perforated brick partition for the air to pass through will be partly above the mass of fuel as seen at *u*, *u*, Figs. 14, and 16. The principle of combining gas-passages through fire brick partitions with air passage through similar materials, whereby the volatile portions of the fuel and the air by which they are to be supplied are both heated to a high temperature before they come in contact with the surfaces or objects to be heated is alike applicable not only to the several purposes cited as illustrations or modifications of my improvement, but to many others which I do not think it necessary specifically to point out as they are generally understood.

I do not intend to claim as my invention any particular form of steam boiler, reverberatory furnace, or water or air heating system of tubes, and I would have it understood that I do not confine myself to the details herein described so long as the peculiar character of my invention be retained. Nor do I claim the mere admission of air heated or cold above the fire bars, as I am aware that this has already been done; but

What I do claim is—

The mode of constructing furnaces whereby numerous streams of air are caused to pass above the fire bars through perforated fire brick lump or suitable stone at the sides top and front of such furnaces, in combination with the arrangement for making the products of combustion pass through and beyond reticulate partitions of the same materials, before they come in contact with the surfaces or objects intended to be heated, in the manner and for the purposes substantially as herein set forth.

RICHARD COAD.

Witnesses:

JOSEPH MARQUETTE,
WILLIAM EWING.