Specification of William Hopkinson and John Dewhurst : consuming smoke.

Contributors

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Dewhurst, John.

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A.D. 1858, 1st *May.* N° 979.

SPECIFICATION

OF

WILLIAM HOPKINSON
AND
JOHN DEWHURST.

CONSUMING SMOKE.

LONDON:
PRINTED BY GEORGE E. EYRE AND WILLIAM SPOTTISWOODE,
PRINTERS TO THE QUEEN'S MOST EXCELLENT MAJESTY:
PUBLISHED AT THE GREAT SEAL PATENT OFFICE,
25, SOUTHAMPTON BUILDINGS, HOLBORN.
Price 1s. 10d. 1858.

A.D. 1858, 1st *May.* N° 979.

Consuming Smoke.

LETTERS PATENT to William Hopkinson and John Dewhurst, both of the Mayfield Print Works, Manchester, in the County of Lancaster, Engineers, for the Invention of "IMPROVEMENTS IN APPARATUS FOR CONSUMING SMOKE."

Sealed the 10th September 1858, and dated the 1st May 1858.

PROVISIONAL SPECIFICATION left by the said William Hopkinson and John Dewhurst at the Office of the Commissioners of Patents, with their Petition, on the 1st May 1858.

We, WILLIAM HOPKINSON and JOHN DEWHURST, both of the Mayfield Print Works, Manchester, in the County of Lancaster, Engineers, do hereby declare the nature of the Invention for "IMPROVEMENTS IN APPARATUS FOR CONSUMING SMOKE," to be as follows :—

This Invention has for its object improvements in apparatus for consuming smoke. For these purposes the furnace is divided in the middle in a direction from back to front, but the partition does not come completely to the front, a space being left for the passage of the smoke and products to pass from one compartment of the fire-place or furnace over the well-ignited fuel in the other compartment. At the back end of the furnace or in the bridge there are two slides or dampers, each capable of closing one of the compartments, into which the fire-place or furnace is divided. These slides or dampers are each actuated by a bell crank, to one end of which the damper or slide is attached by a connecting rod, and to the other end of such bell crank a rod is attached. Previous to feeding either compartment with coal, the slide or damper of that

compartment is raised so as to close the outlet at the back end of the furnace, by which all the products will pass to the front end of the compartment, and then over the well-ignited fire in the other compartment, and so on alternately. It may be stated that it is not new to divide a furnace into two compartments for such purposes; the novelty consists in the peculiar combination of apparatus. When applying the Invention to locomotive, boiler, and such like furnaces where tubes are used, the fire-box is divided into two compartments by a suitable midfeather with passages through it, and slides or shutters are used to close the further ends of one half of the tubes; the fuel is applied alternately to the two compartments, and the smoke or products arising in one compartment of the fire-box after coaling will pass through the midfeather, and thence over the fire in the other compartment, and through the tubes of such other compartment.

SPECIFICATION in pursuance of the conditions of the Letters Patent, filed by the said William Hopkinson and John Dewhurst in the Great Seal Patent Office on the 29th October 1858.

TO ALL TO WHOM THESE PRESENTS SHALL COME, we, WILLIAM HOPKINSON and JOHN DEWHURST, both of the Mayfield Print Works, Manchester, in the County of Lancaster, Engineers," send greeting.

WHEREAS Her most Excellent Majesty Queen Victoria, by Her Letters Patent, bearing date the First day of May, in the year of our Lord One thousand eight hundred and fifty-eight, in the twenty-first year of Her reign, did, for Herself, Her heirs and successors, give and grant unto us, the said William Hopkinson and John Dewhurst, Her special licence that we, the said William Hopkinson and John Dewhurst, our executors, administrators, and assigns, or such others as we, the said William Hopkinson and John Dewhurst, our executors, administrators, and assigns, should at any time agree with, and no others, from time to time and at all times thereafter during the term therein expressed, should and lawfully might make, use, exercise, and vend, within the United Kingdom of Great Britain and Ireland, the Channel Islands, and Isle of Man, an Invention for "IMPROVEMENTS IN APPARATUS FOR CONSUMING SMOKE," upon the condition (amongst others) that we, the said William Hopkinson and John Dewhurst, our executors or administrators, by an instrument in writing under our or their hands and seals, or under the hand and seal of one of us or them, should particularly describe and ascertain the nature of the said Invention, and in what manner the same was to be

performed, and cause the same to be filed in the Great Seal Patent Office within six calendar months next and immediately after the date of the said Letters Patent.

NOW KNOW YE, that we, the said William Hopkinson and John Dewhurst, do hereby declare the nature of the said Invention, and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement thereof, that is to say:—

This Invention has for its object improvements in apparatus for consuming smoke. For these purposes the furnace is divided in the middle in a direction from back to front, but the partition does not come completely to the front, a space being left for the passage of the smoke and products to pass from one compartment of the fire-place or furnace over the well-ignited fuel in the other compartment. At the back end of the furnace, or in the bridge, there are two slides or dampers, each capable of closing one of the compartments into which the fire-place or furnace is divided. These slides or dampers are each actuated by a bell crank, to one end of which the damper or slide is attached by a connecting rod, and to the other end of such bell crank a rod is attached previous to feeding either compartment with coal; the slide or damper of the compartment is raised so as to close the outlet at the back end of the furnace, by which all the products will pass to the front end of the compartment, and then over the well-ignited fire in the other compartment, and so on alternately. It may be stated, that it is not new to divide a furnace into two compartments for such purposes; the novelty consists in the peculiar combination of apparatus. When applying the Invention to locomotive, boiler, and such like furnaces where tubes are used, the fire-box is divided into two compartments by a suitable midfeather with passages through it, and slides or shutters are used to close the further ends of one half of the tubes, the fuel is applied alternately to the two compartments, and the smoke or products arising in one compartment of the fire-box after coaling will pass through the midfeather, and thence over the fire in the other compartment, and through the tubes of such other compartment.

And in order that our said Invention may be most fully understood and readily carried into effect, we will proceed to describe the Drawings hereunto annexed.

Description of the Drawings.

Figure 1, Sheet 1, is a transverse section, and Figure 2 is a longitudinal section, of apparatus for consuming smoke arranged according to our Invention and applied to a cylindrical boiler. *a* is the boiler; *b*, the brickwork in which

it is set; *c*, the furnace; *d*, the partition of fire-brick, by which the furnace is divided in the middle in the direction from back to front; *e* is the fire door; *f* is the space between the end of the partition *d* and the fire door *e*; *g*, *g*, are two slides or dampers, each capable of closing one of the compartments into which the furnace is divided; these slides or dampers are capable of sliding up and down in a metal frame built into the bridge; they are actuated by means of rods *h*, *h*, which are jointed to arms *i*, *i*, on the axes *j*, *j*, and these axes also carry other levers *k*, *k*, connected to the slides or dampers by the rods *l*, *l*; *m*, *m*, are counterpoise weights on the levers *k*, *k*, so as to balance the slides or dampers. In working the apparatus the fire on one side of the partition is fed when the fire on the other side of the partition is bright, and immediately before feeding the slide or damper at the end of the compartment to be fed is raised, the smoke and products generated pass in part round the end of the partition by the space *f*, and in part through the apertures $l^{\times}$, $l^{\times}$, in the partition; sometimes in place of making apertures $l^{\times}$, $l^{\times}$, through the partition *d*, we increase the dimensions of the spaces *f*. Where the furnace is wide we sometimes dispense with the space *f* altogether; if there are two doors in the frame, we bring the partition completely to the front and put in a few more apertures, but the arrangement shewn in the Drawing is that which we prefer.

Figure 3 is a transverse section, and Figure 4 is a longitudinal section, of similar apparatus applied to the form of boiler known as the Butterley boiler; the description already given of Figures 1 and 2 is also applicable to these Figures.

Figure 1, Sheet 2, is a transverse, Figure 2 is a longitudinal section, Figure 3 is a front view, Figure 4 is a plan in section of apparatus arranged according to our Invention and applied to a two-flued boiler. This arrangement differs in its details from those before described; *a*, a^1, are the two flues, in one end of each of which a furnace is constructed in the usual manner. In each of the flues beyond the bridge a damper *b* is fitted, turning on an axis b^1, and having an arm *c* fixed to it; this arm is attached to a rod *d*, passing through an opening formed for it under the bridge; the rod *d* is jointed at d^1, and passes to the front of the furnace, and by means of it the damper can be opened and closed at pleasure. When the damper is closed as it is before feeding the furnace, and until the fire has burnt bright as before explained, the smoke and products pass by the passages *e*, *e*, into the other furnace, and over the ignited fuel contained in it.

Figure 5 is a transverse section; Figure 6 is a longitudinal section; Figure 7 is an end view; and Figure 8 is a plan in section of a single flued

boiler with apparatus applied to it arranged according to our Invention. The construction of the apparatus is so similar to that shewn at Figures 1, 2, 3, and 4, Sheet 1, as to be readily understood from the description of those Figures already given, and the parts are marked with corresponding letters. The main difference consists in that the partition *d* in place of being of fire brick is of wrought iron and hollow, it forming part of the water space of the boiler.

Figure 1, Sheet 3, is a side view partly in section of a locomotive boiler having apparatus combined with it arranged according to our Invention; Figure 2 is a transverse section taken at the line A, A, Figure 1; Figure 3 is a plan in section; and Figure 4 is another transverse section of the same. In this arrangement the fire box is divided into two parts by a midfeather *a*, with a number of openings through it, and in the smoke box are two dampers *b*, b^1, for closing the end of the tubes, each damper corresponding with the tubes which communicate with one division of the fire box; the dampers are mounted on axes, and are worked by external rods *c*, *c*.

Figure 5, Sheet 3, is a front view partly in section; Figure 6 is a longitudinal section; and Figure 7 is a portion of a plan in section of a marine boiler with apparatus applied to it arranged according to our Invention. The construction of the several parts is so clearly shown by the detail Drawings, Figure 8, 9, 10, and 11, and the general arrangement is so similar to others before referred to, that a detailed description is unnecessary.

In witness whereof, we, the said William Hopkinson and John Dewhurst, have hereunto set our hands and seals, this Twenty-seventh day of August, in the year of our Lord One thousand eight hundred and fifty-eight.

WILLIAM HOPKINSON. (L.S.)
JOHN DEWHURST. (L.S.)

Witness,
J. W. WESTON,
of the City of Manchester,
in the County of Lancaster,
Attorney-at-Law.

LONDON:
Printed by GEORGE EDWARD EYRE and WILLIAM SPOTTISWOODE,
Printers to the Queen's most Excellent Majesty. 1858.

A.D. 1858. MAY 1. N° 979.
HOPKINSON & DEWHURST'S SPECIFICATION.

(3 SHEETS)
SHEET 1.

FIG. 1.

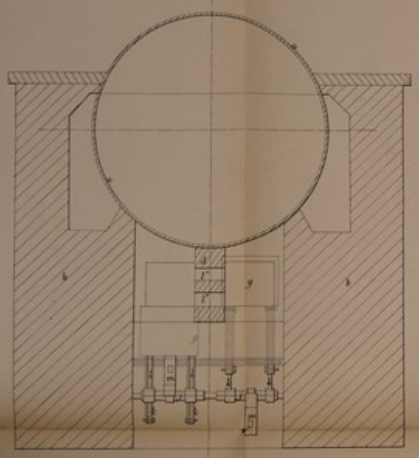
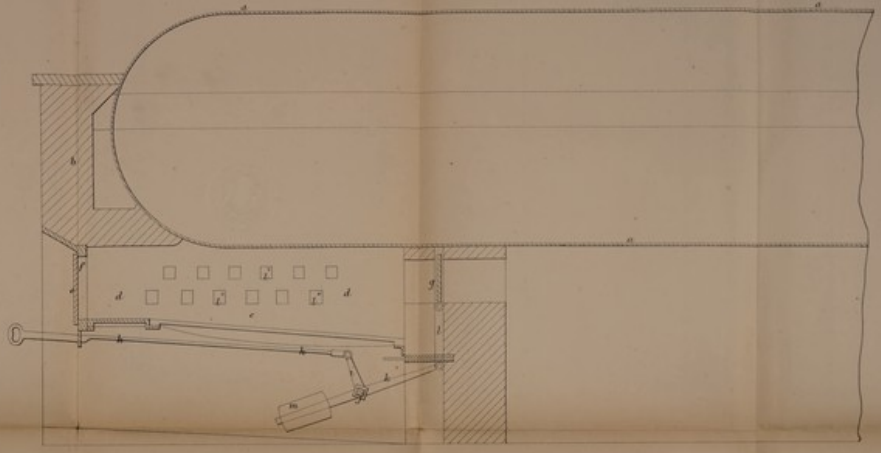


FIG. 2.



Scale. 0 1 2 3 4 5 6 7 8 9 10 11 12 of feet

FIG. 3.

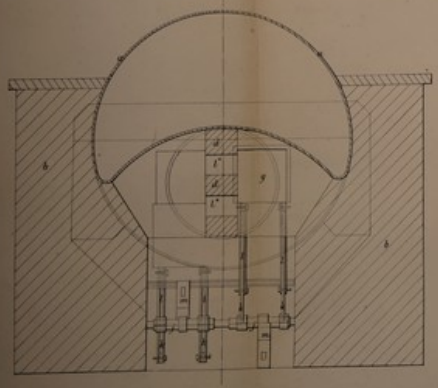
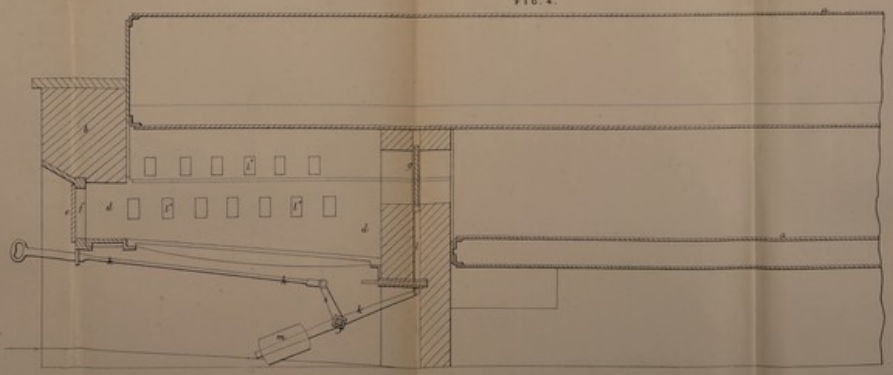


FIG. 4.



The filled drawing is not colored.

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Printers to the Queen's most Excellent Majesty. 1858.

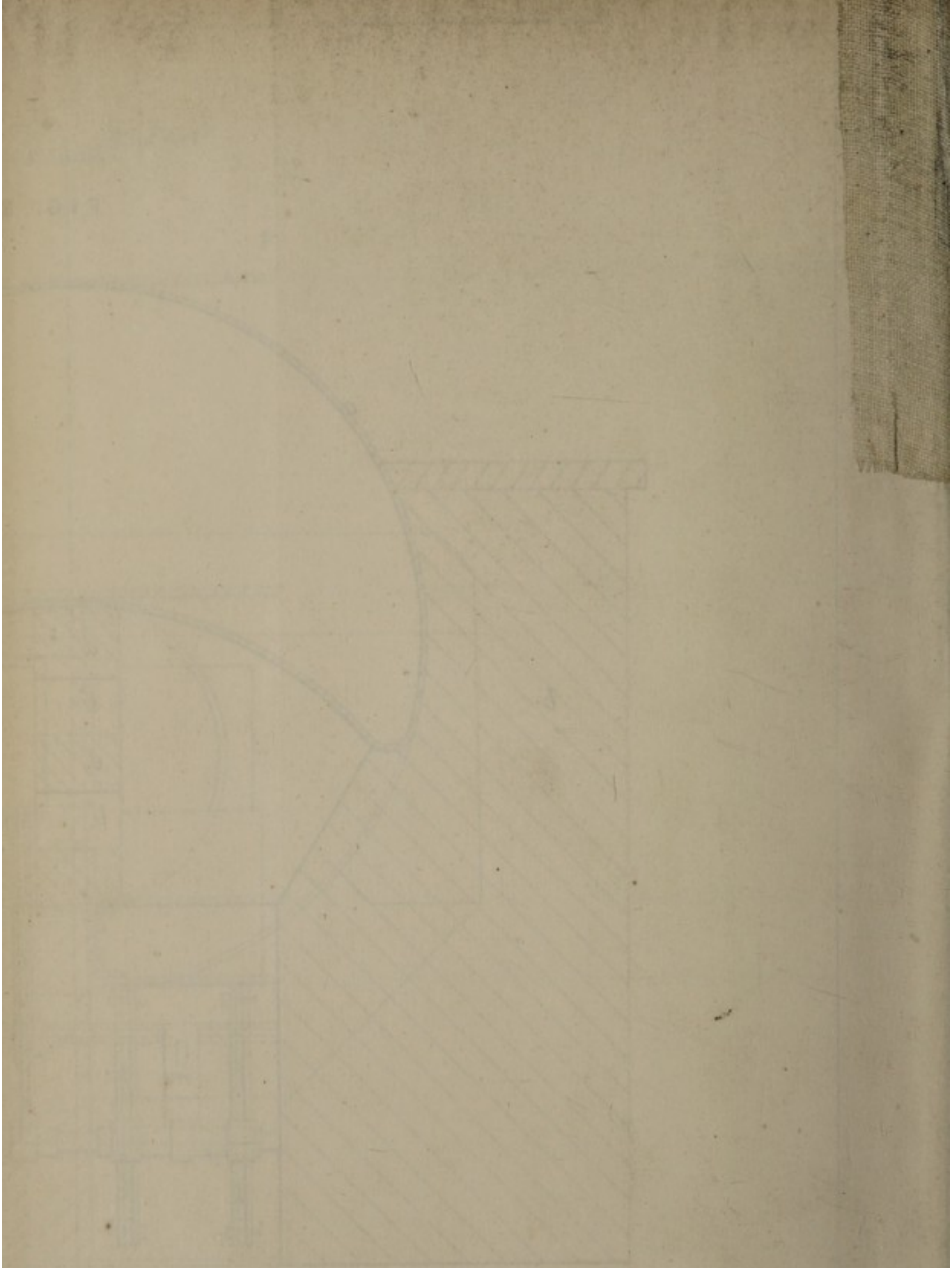


FIG. 1.

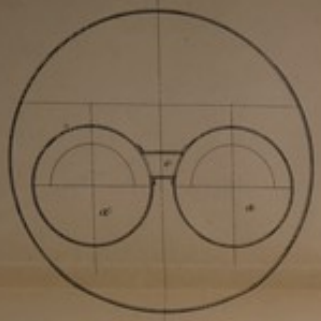


FIG. 2.

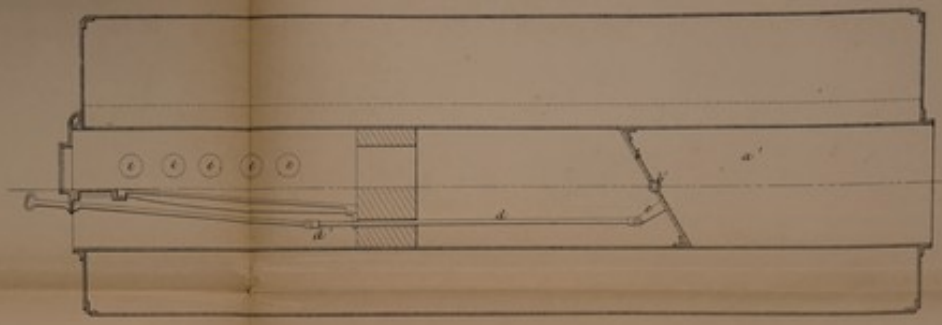


FIG. 3.

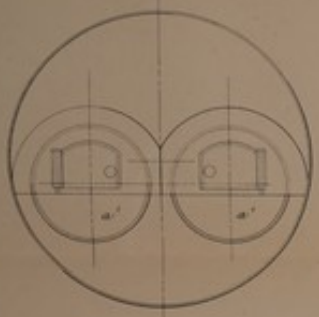


FIG. 4.

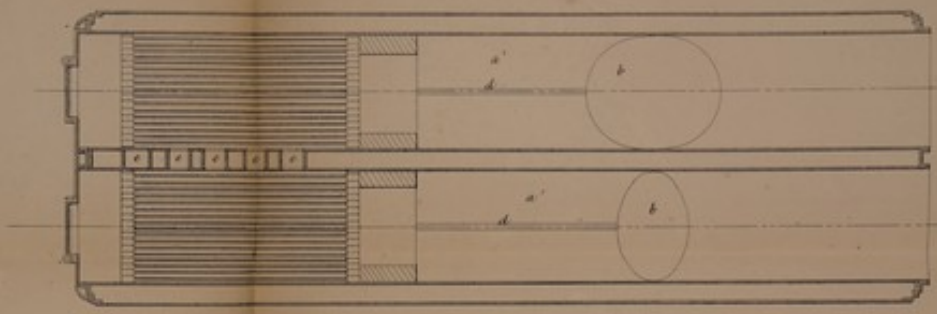


FIG. 5.

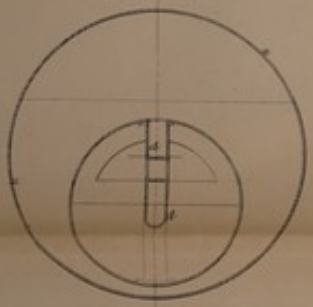


FIG. 6.

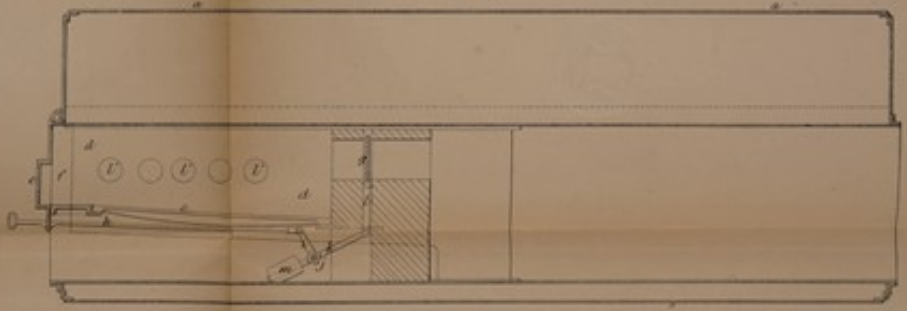


FIG. 7.

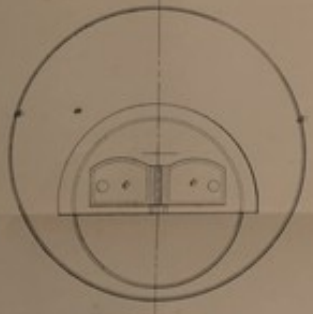
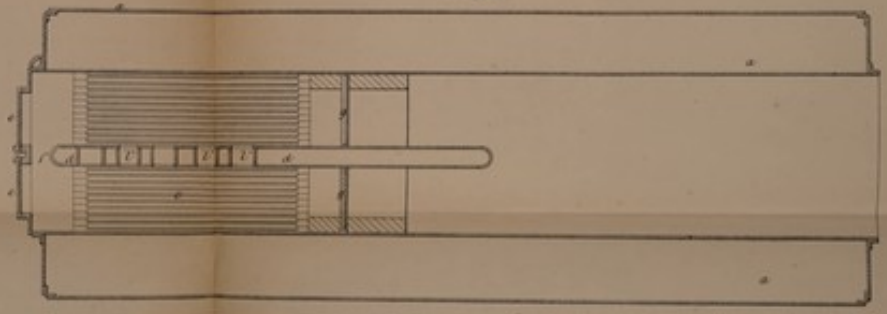


FIG. 8.



Scale 0 feet 1 2 3 4 5 6 7 8 9 10 11 12 13 14 of Feet

The filed drawing is not colored.

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Printers to the Queen's most Excellent Majesty. 1858.

FIG. 1.

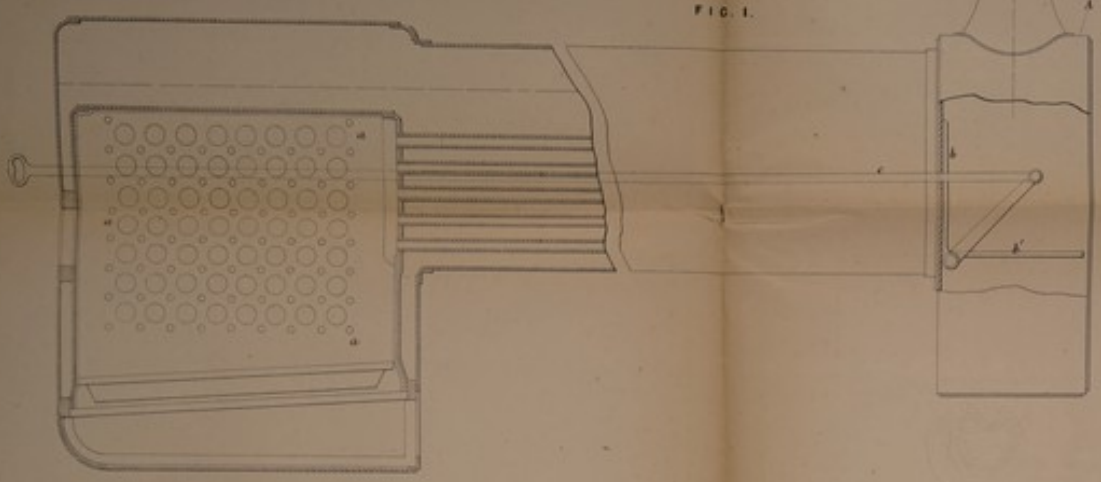

FIG. 2.

FIG. 3.

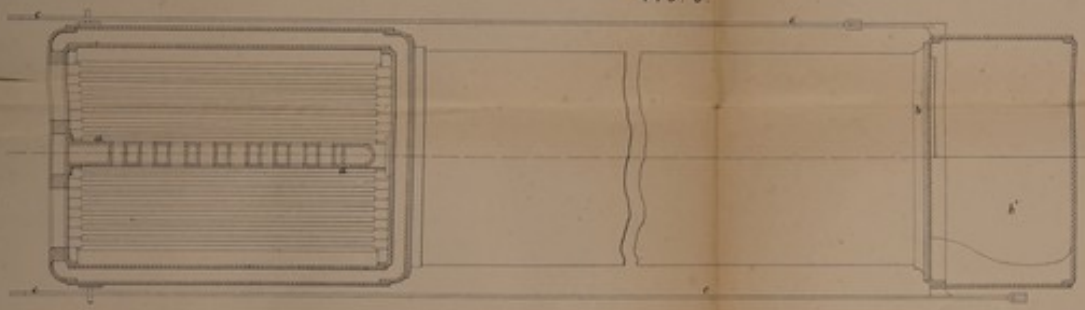

FIG. 4.

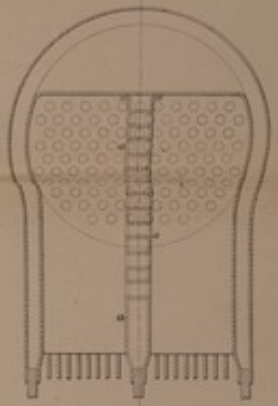

FIG. 5.

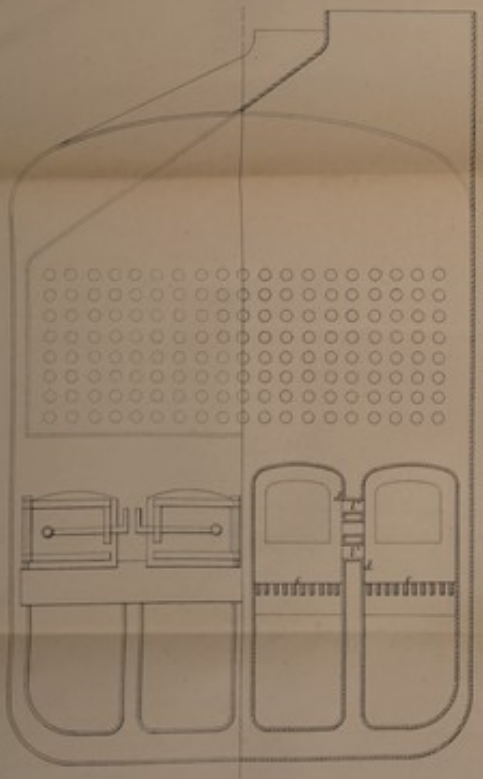

FIG. 6.

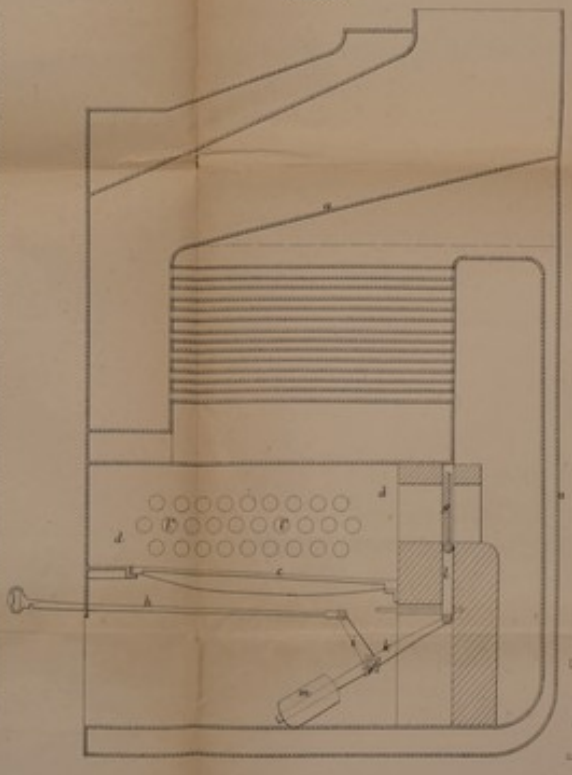

FIG. 7.

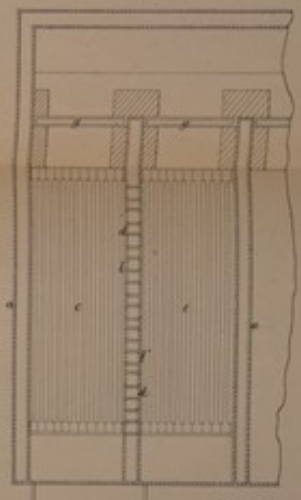

FIG. 8.

FIG. 9.

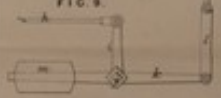

FIG. 10.

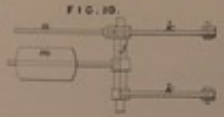

FIG. 11.

Scale 0 1 2 3 4 5 6 7 8 9 10 11 12 Feet

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