2 Sheets. Sheet 1.

O. W. Seely,

Steam-Boiler Furnace.

No. 2,153. Patented July 1, 1841.

Fig. 1.

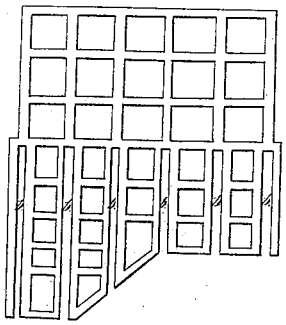


Fig. 2.

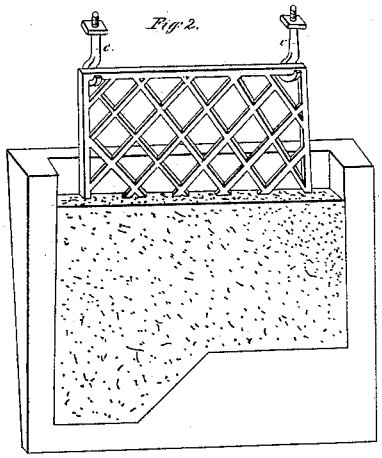
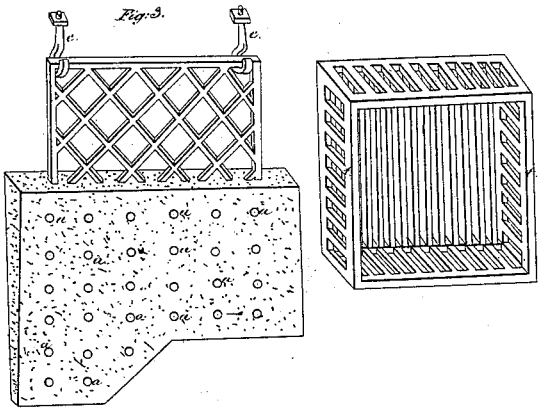


Fig. 3.



2 Sheets. Sheet 2.

O. W. Seely,

Steam-Boiler Furnace.

No. 2,153. Patented July 1, 1841.

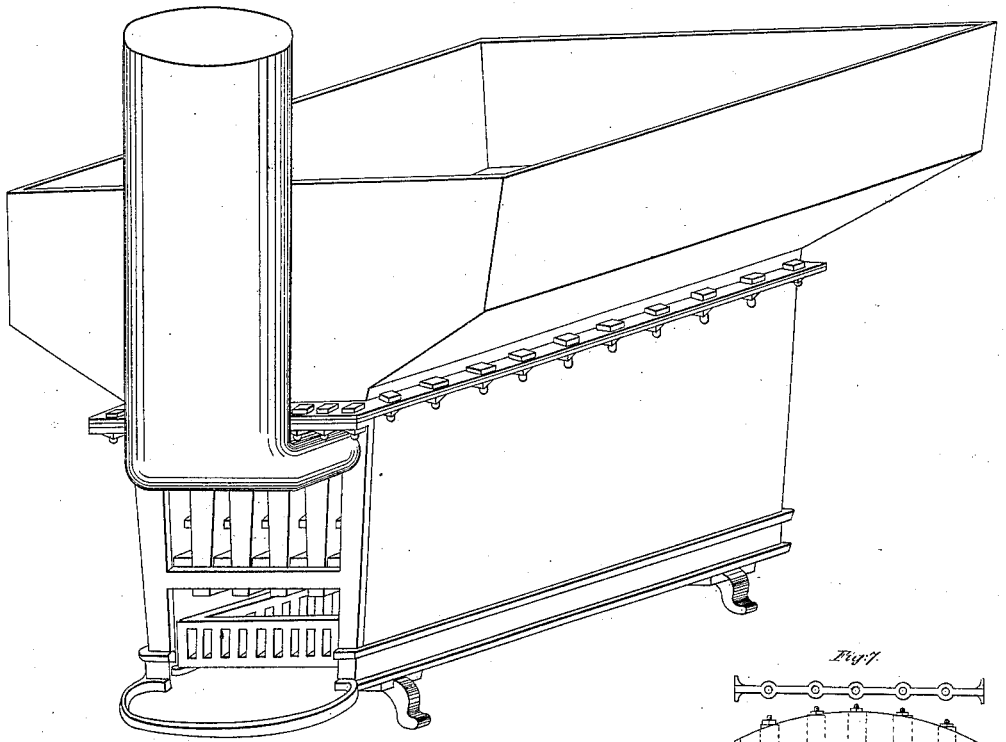


Fig: 7.

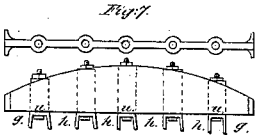


Fig: 4.

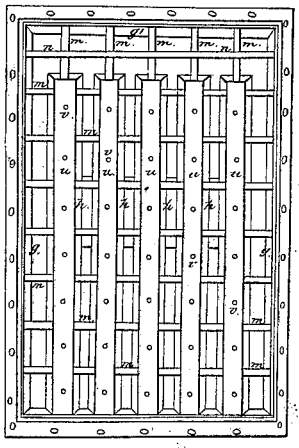


Fig: 5.

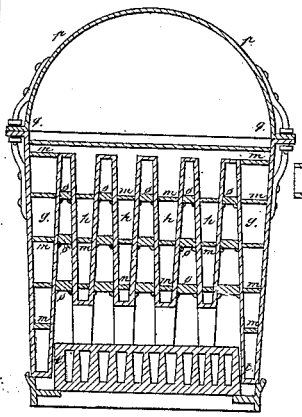
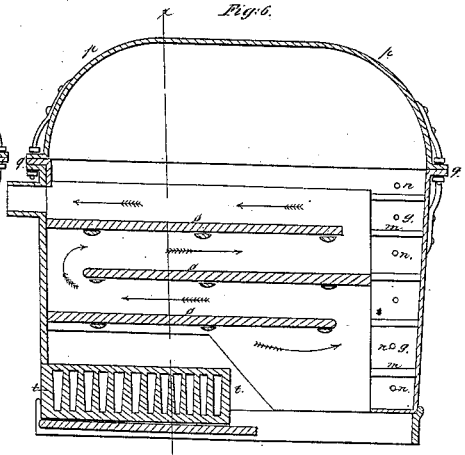
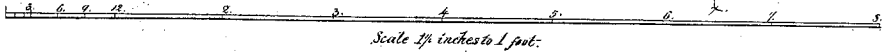


Fig: 6.





Scale 1½ inches to 1 foot.

UNITED STATES PATENT OFFICE.

ORAN W. SEELY, OF NEW YORK, N. Y.

STEAM BOILER AND EVAPORATOR.

Specification of Letters Patent No. 2,153, dated July 1, 1841.

To all whom it may concern:

Be it known that I, ORAN W. SEELY, formerly of Sodus, in the State of New York, but now of the city of New York, in the said State, have made certain Improvements in Steam Boilers and Evaporators, (for which Letters Patent of the United States were granted unto me and to Dudley Marvin, of the said city, which Letters Patent are dated of August 28, 1840;) and I do hereby declare that the following is a full and exact description of said improvements.

The main object of my improvements, is the so constructing the apparatus as to convert it into a steam boiler, or generator, which may be used for granting high pressure steam for the working of steam engines, or for any other purpose to which high steam is applicable. In converting the above named steam boiler and evaporator into a boiler, or generator, for steam engines it is not only necessary to give to the cap, or top, of the boiler, marked D, in the drawings of the patent above referred to, sufficient strength to resist the pressure of the steam to be generated, but it will be necessary also securely to stay bolt the cells which are to contain the water, and which are marked *g*, *g*, *g*, and *h*, *h*, *h*, in the drawings of the patent above named, and so designated also in those which accompany the present specification.

The body of the boiler, or the part denominated the principal casting in the patent granted to Marvin and Seely, I construct in the form and manner therein described, and when it is to be made of cast-iron, I cast it in one piece, but I, in this case, form the cores which are to occupy the mold in the part which is to constitute the cells in a particular manner, to be presently described; but sometimes I intend instead of this principal casting to make the body of my steam engine boiler of sheet-iron, or of copper, while I otherwise construct it in the same form as that which is given to the principal casting when the boiler is made of cast-iron, so that it shall operate on the same principle; the difference being only in the material employed, and in the manner of stay bolting, which in those made of sheet metal will be effected in the ordinary way, but in those made of cast-iron the stay bolts will be wholly, or in great part, cast at the same time with the principal casting, and form one piece therewith.

I will now describe the manner of forming my cores, and of employing them in the formation of the mold, preparatory to making the principal casting. The cores which when in the mold are to occupy the place of the cells, I form upon a grating of cast-iron, by which grating they are made to retain their form perfectly in the operation of drying, and may be handled with facility; these cores I suspend in the flask in such manner as to retain them in the exact position which it is desired they should occupy.

Figure 1, in the accompanying drawing is a grating of cast-iron upon which the core is to be formed.

Fig. 2, represents the upper portion of a similar grating, contained in a core mold, and with the core formed on its lower portion; in this figure, and in Fig. 3, the cross bars are drawn as running diagonally, but the part contained within the core must be formed as in Fig. 1.

Fig. 3, represents the core removed from the core mold and perforated with a number of holes. These holes *a*, *a*, *a*, are to be bored entirely through the sand of which the core is formed, and when the casting is made, the metal flowing into them will constitute stay bolts, which will extend from side to side of the respective cells. The holes should be countersunk on each side of the core, which will have the effect of strengthening the stay bolts at their point of junction with the sides of the cells. The holes *a*, *a*, *a*, must be so bored as to pass through the slots *b*, *b*, *b*, Fig. 1, in that part of the iron grating which is embedded in the sand core, as otherwise the grating could not be removed from the casting. The cores when placed in the molds, are to be suspended by hooks, *c*, *c*, and their height may be regulated by screw nuts bearing upon the pieces of timber which are attached to and cross the upper portion of the flask, for that purpose.

Fig. 4, is a top view of the principal casting, or body of the boiler; *g*, *g'*, being the outer, and *h*, *h*, the intermediate cells, which are in all respects similar to those described in the patent granted to Marvin and Seely, excepting in the addition of the stay bolts, the upper tier of which is seen at *m*, *m*, *m*. These bolts may be as numerous as may be

desired, and from an inch and a half to three inches in diameter. Should it be thought necessary to stay bolt from side to side along the outer back cell g', wrought-iron bolts n, n, may be used for that purpose.

Fig. 5, is a vertical section through the boiler, or generator, in the line x, x, Fig. 6; which last figure is a vertical section of it from front to back, through one of the flue spaces between the cells; in these figures, m, m, are the stay bolts, g, g, and h, h, the cells, and n, n, the long stay bolts which may be used to extend across the back cell.

The stay bolting above described will give to my boiler all the strength which is necessary to resist the lateral pressure upon the cells but it is necessary, also, to provide against the vertical pressure, which tends to rend the body of the principal casting by forcing it downward; this I effect by using a number of bridge pieces which are to extend across, and bear upon the tops of the cells, their ends resting in gains formed in the sides of the principal casting, or upon ledges cast thereon. Through these bridges, and through the plates u, u, Fig. 4, which constitute the upper part of the division between the cells, screw bolts are passed, as represented in Fig. 7, which gives a bottom and a side view of one of these bridges, and of the upper part of the divisions between the cells; v, v, v, Fig. 4, show the holes for these bolts, and any required number of said bridges may be extended across the boiler that may be deemed necessary.

In the steam boiler as patented by Marvin and Seely, the flue space between the cells was proposed to be divided by what was called division pieces, in such manner as to cause the flue to extend along under said division pieces toward the back of the boiler, and thence forward above them, to the chimney. Instead of the single division piece, there described, I now use three such division pieces, so as to carry the draft twice back, and twice forward, as shown at o, o, o, Figs. 5 and 6. In the last figure, the arrows serve to designate the course of the draft with perfect clearness, the three division pieces being used. The top p, p, of the boiler, or generator, is bolted down to the body, or main casting, by bolts passing through flanches, as shown at q, q.

Having thus fully described the nature of my improvements in the steam-boiler and evaporator, by which improvements it is adapted to the purpose of generating steam for working high pressure or other steam engines, what I claim therein, and desire to secure by Letters Patent, is—

1. The manner of forming the stay bolts in the respective cells, by means of cores sustained upon a grating of iron, constructed in the manner set forth, said cores having holes bored through them wherever stay bolts are required to cross the cells; the respective parts being arranged in the manner, and for the purpose, herein set forth.

2. I claim the sustaining of the body of the boiler by means of iron bridge pieces crossing from side to side, and bolted through the plates forming the upper part of the division between the cells, as above described. I also claim the use of such bridge pieces in the same manner, and for the same purpose, whether the body of said boiler be formed of cast-iron in one entire piece, or of sheet metal by riveting the same together in the ordinary way.

ORAN W. SEELY.

Witnesses:
THOS. P. JONES,
F. ALGER.