

W. C. Baker,
Sectional Steam Boiler.
No 60,459. *Patented Dec. 18, 1866.*

Fig. 1.

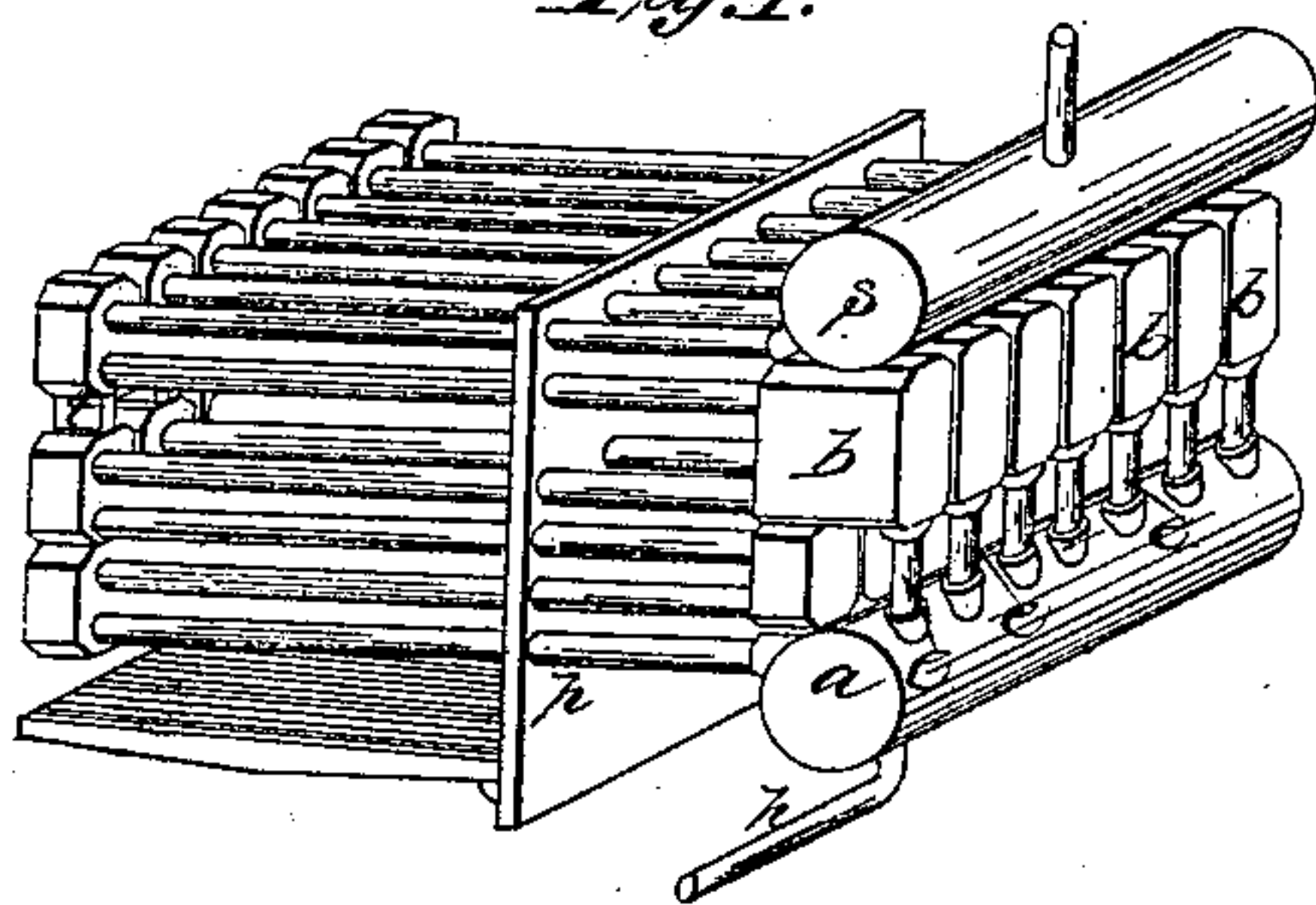


Fig. 2.

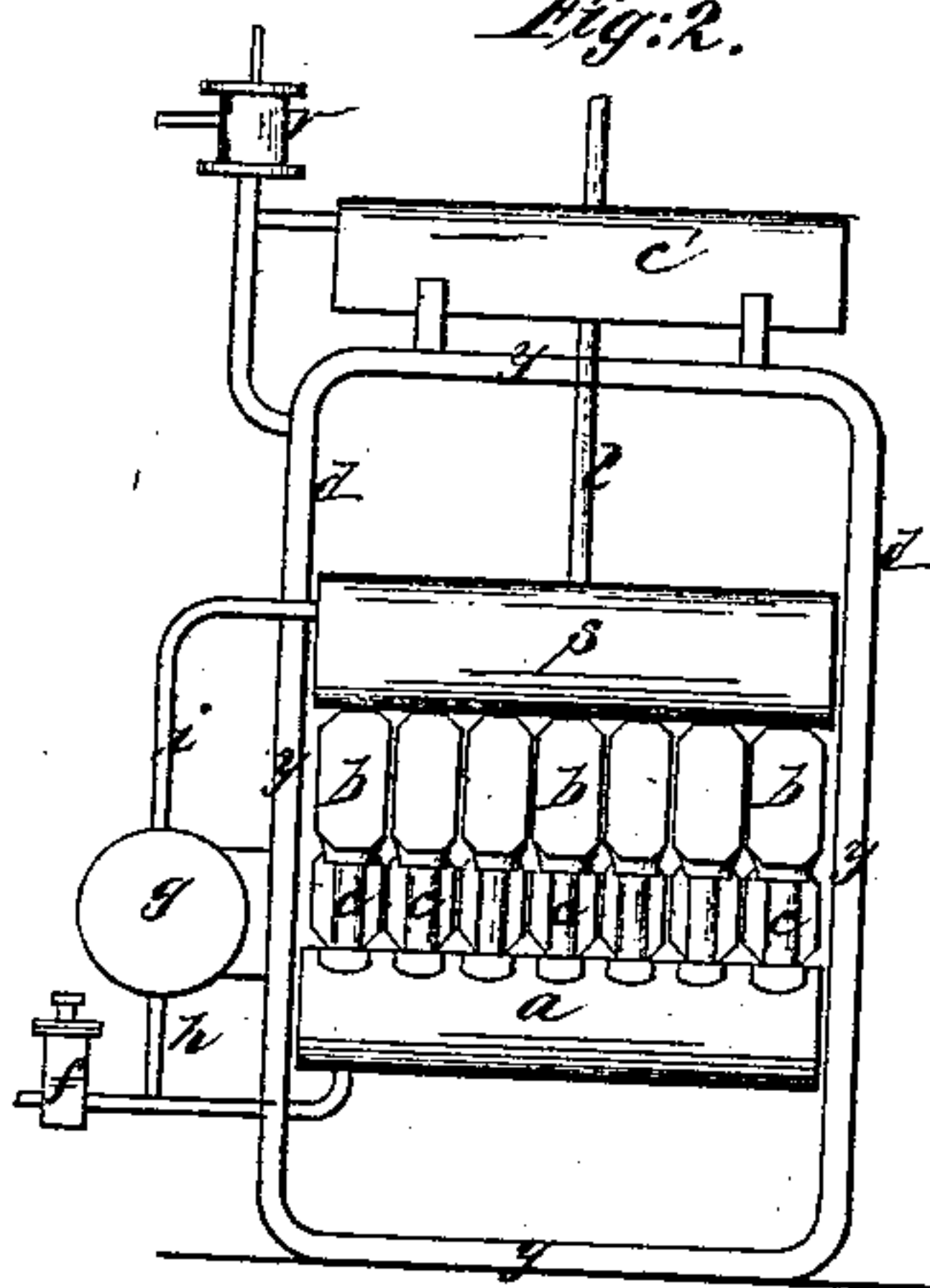
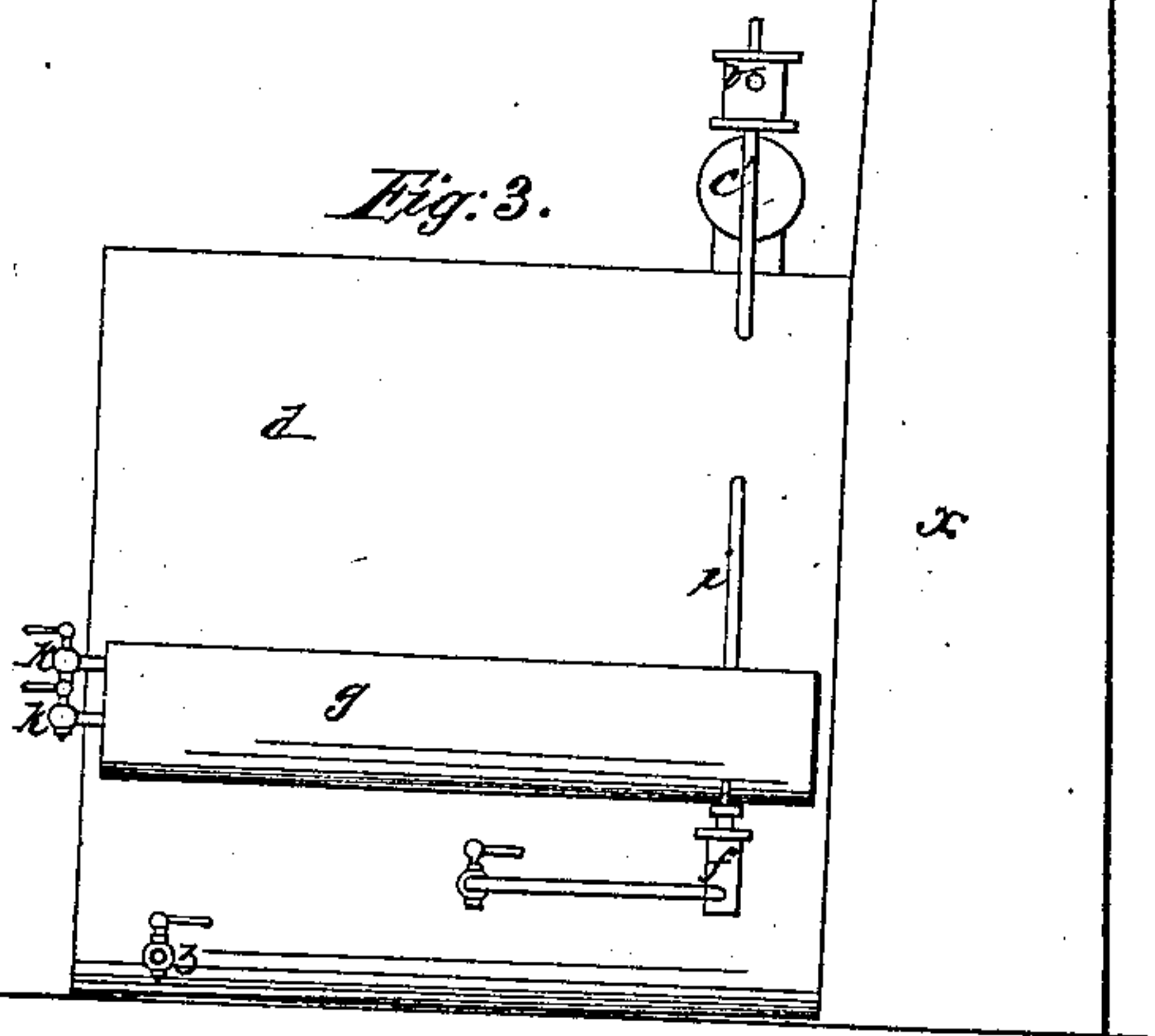


Fig. 3.



Witnesses:

Albert H. Finch
J. W. Smith

Inventor:

W. C. Baker
per J. H. Grinnon

United States Patent Office.

IMPROVEMENT IN STEAM GENERATORS.

WILLIAM C. BAKER, OF NEW YORK, N. Y.

Letters Patent No. 60,459, dated December 18, 1866.

The Schedule referred to in these Letters Patent and making part of the same.

Be it known that I, WILLIAM C. BAKER, of the city, county, and State of New York, have invented certain new and useful Improvements in Steam Boilers, formed of zigzag pipes; and I do hereby declare and ascertain my said improvements, referring to the accompanying drawing, which forms a part of my description thereof.

Figure 1 is a general view of the tubular boiler, with the case removed.

Figure 2 the case in section.

Figure 3 exterior view of the case.

My improvements are made upon the boiler heretofore patented by me, and are designed to facilitate and improve the action thereof and economize fuel, besides giving greater capacity to the boiler and rendering it more efficient, by substituting a water case for the brick one heretofore employed, which latter improvement renders the boiler useful for marine and other locomotive purposes. It is obvious that parts of this invention can be used without the rest, although I deem the boiler most efficient by the employment of all the devices, where they can be conveniently.

The construction is as follows: The boiler consists of series of straight tubes, the tubes in each series or range being placed one above another, and connected at their ends by castings, so as to form a continuous zigzag conduit from the water chamber, *a*, up to the point, *b*, where it will be seen the end casting projects somewhat beyond those below. From this casting, *b*, there is a perpendicular pipe, *c*, connecting it with the water chamber, *a*, below. The casting *b* is deeper vertically than those below or above it, to give space for the separation of water from steam therein, the water descending through the pipe *c* before named, which thus keeps up the proper circulation of water in the boiler while the steam ascends through the tubes above to the steam chamber, *s*, above, where they terminate. I have thus described one vertical range of tubes. The boiler is composed of any required number of such ranges of tubes, each range being distinct from the others, but all connecting at the bottom with the water chamber *a*, and at the top with the steam chamber *s*. The castings forming the end connections between the tubes are of rectangular form on their exterior surface, and rest one upon another, as clearly indicated in the drawing. This form of construction gives support and stability to the different parts of the structure, while it allows free play for the expansion or contraction of the several parts. It will be noticed that the first front castings of the steam coil are furnished with lugs or projections, *t*, cast on their under sides, that rest upon those below, thus raising them to the proper level of the enlarged rear castings at *b*, and making a distinctly increased space between the water coil and the steam coil that is above the water line in *b*. At about one-third the distance, more or less, from the water cylinder *a* to the front of the boiler there is a partition, *p*, which the tubes pass through, that forms a barrier to the passage of the products of combustion rearward from the fire chamber, said fire chamber occupying the whole space under the boiler tubes in front of said partition *p*, whence the heat, &c., from the burning fuel is made to ascend to the top of the enclosing chamber or case, and thence over the top of the partition down under the water chamber *a*, and off through the chimney at *x*. This portion is very important in economizing fuel, by properly distributing the heat and in giving efficiency to the boiler by so distributing it as to aid the circulation of water therein. Instead of the brick casing or chamber in which I enclosed my former boiler, I propose to substitute, especially for movable boilers, a double metal case, *d*, (see figs. 2 and 3,) having a water space, *y*, around the boiler chamber, which said metal case *d* incloses. By this arrangement I utilize all the waste heat within the fire chamber and boiler space in heating the water in the case *d*, which I use as feed water to the boiler; with which it is connected by the pipe opening into the water space *y*, and thence leading through a feed pump at *f*, to the water chamber *a*, or other convenient part of the boiler, by means of which I insure a hot-water supply thereto. To give the boiler greater capacity, I sometimes add a water chamber, *g*, thereto, outside the case *d*, (or otherwise.) As clearly seen in the drawing, it may be in any convenient form and position, but must be constructed and arranged so as to connect with the boiler by a pipe, *h*, below the water line, and a pipe, *i*, above the water line, or some equivalents thereof, so that the pressure and circulation therein shall correspond with the boiler, with which it is connected. To this chamber *g* the gauge-cock, *k*, may be affixed, as seen in the drawing. In addition to the steam chamber *s*, there may be a second one, *c'*, which is placed above and communicates with said chamber *s*, by a pipe, *l*. When the second chamber is used the steam should be taken therefrom for use through a proper pipe. I connect a safety-valve, *v*, with these steam chambers, whence a pipe leads into the metal case *d*, or there may be separate safety-valves

for each, and the escape steam from the steam chambers may be conducted by a pipe from the safety-valve thereon to the water-jacket or space before named in *d*. This water space *y* I intend to employ sometimes as a substitute for a water tank. *z* is a blow-off cock attached to the case *d*, to blow off therefrom when necessary.

Having thus fully described my improvements, what I claim therein, and for which I desire to secure Letters Patent, is—

1. The partition *p*, dividing the front from the rear of the boiler, when combined with a tubular boiler, constructed as herein set forth, and directing the heat in its course between the tubes, as and for the purposes described.
2. I also claim the supplemental water chamber *g*, combined with the circulating tubular boiler, as specified.
3. I also claim the additional steam chamber *c'*, connecting with the steam chamber *s*, substantially as and for the purposes set forth above.
4. I also claim the connections or bends, which bear against and support each other vertically and laterally, by which the tubes are supported, as and for the purposes described.

WM. C. BAKER.

Witnesses:

J. J. GREENOUGH,
MOSES M. ROBINSON.