(No Model.)

J. SHACKLETON.

HEATER.

No. 456,004. Patented July 14, 1891.

Fig. 1.

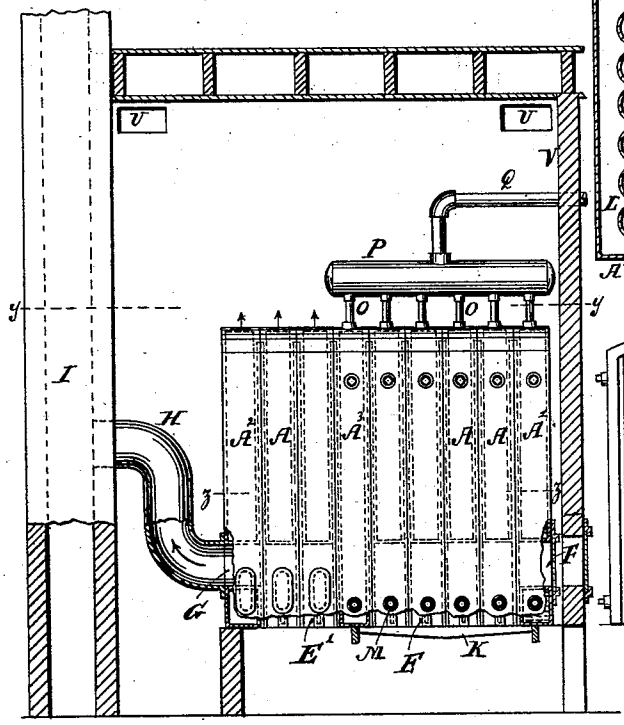


Fig. 5.

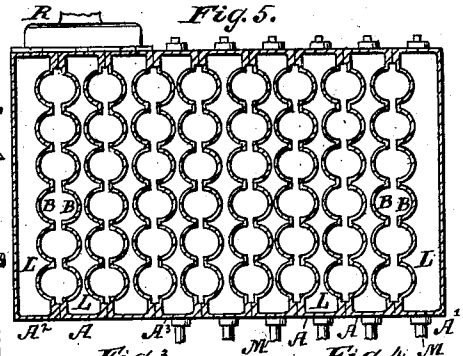


Fig. 3.

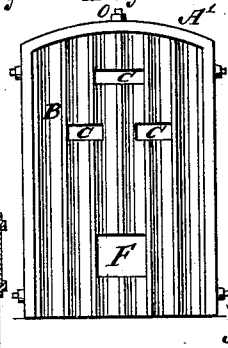


Fig. 4.

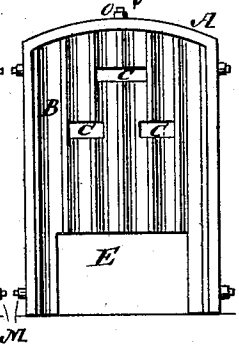


Fig. 6.

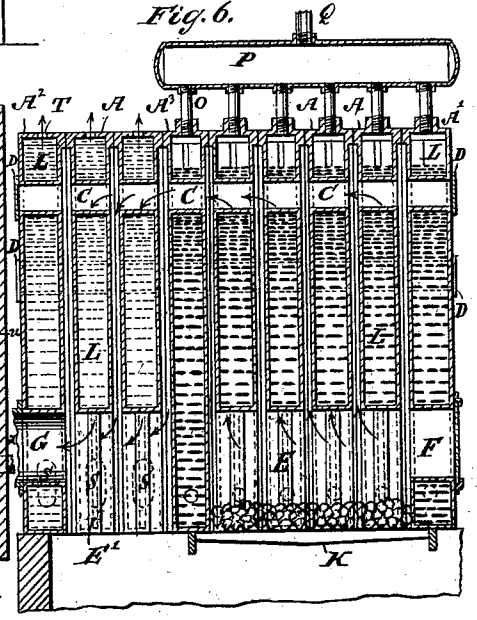


Fig. 2.

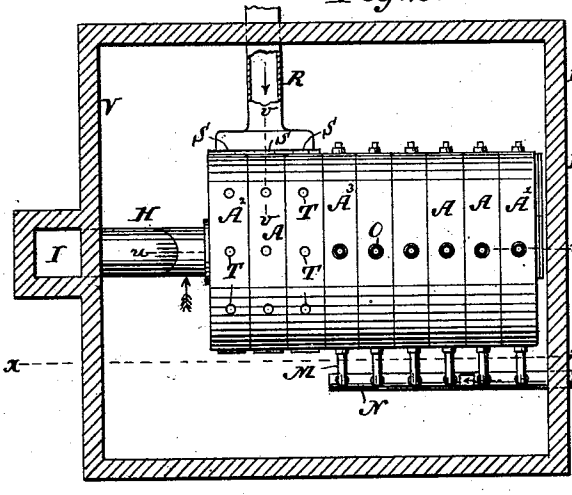
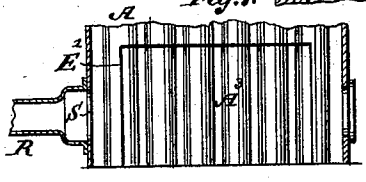


Fig. 7.



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William Miller

INVENTOR:

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ATTORNEYS

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UNITED STATES PATENT OFFICE.

JOSEPH SHACKLETON, OF NEW YORK, N. Y., ASSIGNOR TO THE RICHARDSON & BOYNTON COMPANY, OF SAME PLACE.

HEATER.

SPECIFICATION forming part of Letters Patent No. 456,004, dated July 14, 1891.

Application filed February 12, 1891. Serial No. 381,215. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH SHACKLETON, a citizen of the United States, residing at New York, in the county and State of New York, have invented new and useful Improvements in Heaters, of which the following is a specification.

This invention relates to an improvement in heaters; and the invention consists in the details of construction set forth in the following specification and claims and illustrated in the accompanying drawings, in which—

Figure 1 is a side elevation of a heater, partly sectioned along *x x*, Fig. 2. Fig. 2 is a section along *y y*, Fig. 1. Fig. 3 is a detail view of an end section of the heater. Fig. 4 is a detail view of an inner section. Fig. 5 is a section along *z z*, Fig. 1. Fig. 6 is a section along *u u*, Fig. 2. Fig. 7 is a section along *v v*, Fig. 2.

The heater is shown composed of a number of sections A with end sections A′ A^2 and a partitioning or dividing section A^3. The sections have indentations or corrugations B, corresponding with one another when the sections are put together, so as to form vertical flues B B, Fig. 5. The sections also have perforations C, forming transverse flues when the sections are together, as seen in Fig. 6. The end sections have covers D to close the lateral flues at their ends.

The inner sections have cut-out portions E, which, in the case of those sections sitting over the grate K, form a fire-space, to which access is had through the door or opening F through the end section A′. The space marked E′ in the sections situated between the intermediate section A^3 and the end section A^2 leads through the opening or perforation G in the end section A^2 to the flue H and thence to chimney I. The products of combustion rise from the grate or fire-place through the flues B in those sections lying between sections A′ A^3, pass through the flues C, and descend through the flues B in the sections lying between sections A^3 A^2, so as to enter space E′, leading to the chimney. The heater-sections are formed hollow, so as to have chambers L. The chambers of the sections A′ and A^3, with their intermediate sections, are made to contain water, which enters through the feed-pipes M, having a supply-pipe N. The heated water or steam passes from the water-sections through pipes O into a drum or receiver P, and can be led off through a pipe Q to any part of a building. The set of rear sections from A^3, exclusive, to A^2, inclusive, are hot-air sections for upward passage of air therethrough into the furnace structure or casing V, which surrounds the heater and enables the hot air to be carried off to the point or points desired. The lower end portions of the rear sections A A^2 are each provided with an opening S, and an air-trunk R, having communication with the external atmosphere through the furnace structure V, is common to all the air-openings S for the purpose of delivering air into the chambers L of the hot-air sections having the openings S. The upper ends of the hot-air sections are each provided with a hot-air-discharge orifice T, and the furnace-structure is provided with openings U at its top portion for leading off the hot air to the points desired.

It is of course understood that the partitioning-section A^3 is extended completely downward to compel the products of combustion to rise up from grate K and pass through the lateral flue or flues C in order to descend through the sections from A^3 to A^2 to the space E′. As the flues B are vertical, no soot or dirt can accumulate therein, the weight of the soot or dirt causing it to fall down said vertical flues.

As the sections can be readily removed and replaced, repairs to the heater can be easily and cheaply made. The openings M O and S T form circulating-openings for allowing the water and air to circulate.

What I claim as new, and desire to secure by Letters Patent, is—

1. A sectional heater consisting of a series of upright hollow sections provided with transverse flues and formed on their adjoining surfaces with vertical indentations having continuous, perpendicular, unbroken surfaces to avoid soot accumulation, the front sections being cut away to form a fire-space, and one of the sections extending downward and closing the rear of the fire-space, substantially as described.

2. A combined water and air heater consist-

ing of a series of upright hollow sections provided with transverse flues and formed on their adjoining surfaces with vertical indentations having continuous, perpendicular, unbroken surfaces to avoid soot accumulation, the front sections being cut away to form a fire-space, one of the sections extending downward as a partition and closing the rear of the fire-space, and the sections in rear of the partition-section having air-inlet openings at their lower ends and hot-air-discharge openings at their upper ends, and an air-trunk common to all the air-inlet openings to deliver air thereinto for its upward passage through the rear sections and its discharge at the top thereof, substantially as described.

3. A heater consisting of a furnace structure having at its top portion a hot-air-delivery opening, a series of upright hollow sections provided with transverse flues and formed on their adjoining surfaces with vertical indentations to provide perpendicular flues, the front sections being cut away to form a fire-space, one of the sections extending downward as a partition and closing the rear of the fire-space, and the set of sections in rear of the partition-section having air-inlet openings at their lower ends and hot-air-discharge orifices at their upper ends, and an air-trunk extending through the furnace structure and common to all the air-inlet openings at the lower ends of the rear sections to deliver air thereinto for its upward passage through said sections and its discharge at the top thereof into the furnace structure, substantially as described.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

JOSEPH SHACKLETON.

Witnesses:
J. VAN SANTVOORD,
E. F. KASTENHUBER.