

(No Model.)

2 Sheets—Sheet 1.

H. D. RICE.

SECTIONAL STEAM BOILER.

No. 390,312.

Patented Oct. 2, 1888.

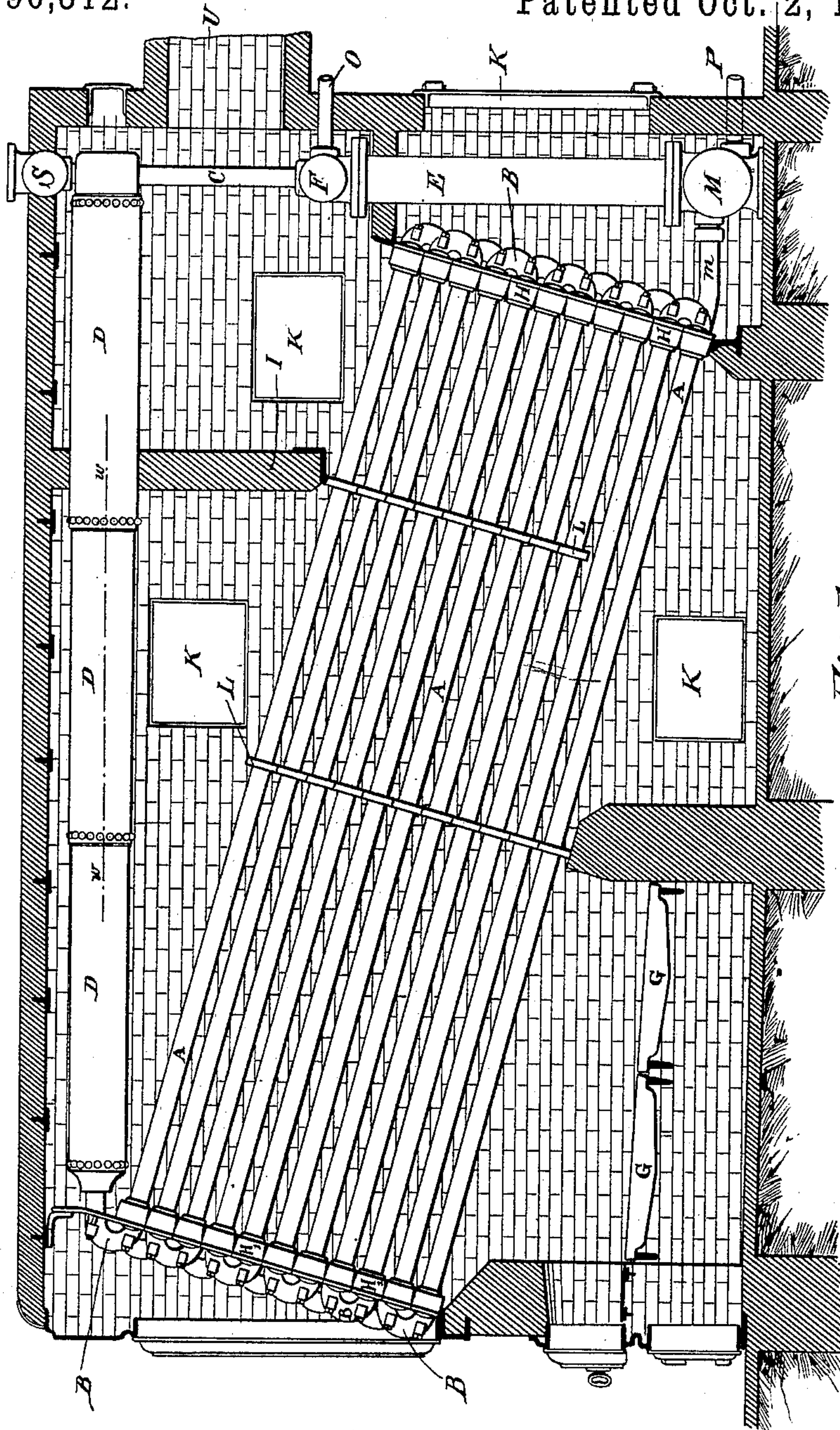


Fig. 1

Witnesses:

Wm. L. Rice
Abraham Abendroth

Inventor:

Harvey D. Rice

(No Model.)

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Fig. 2

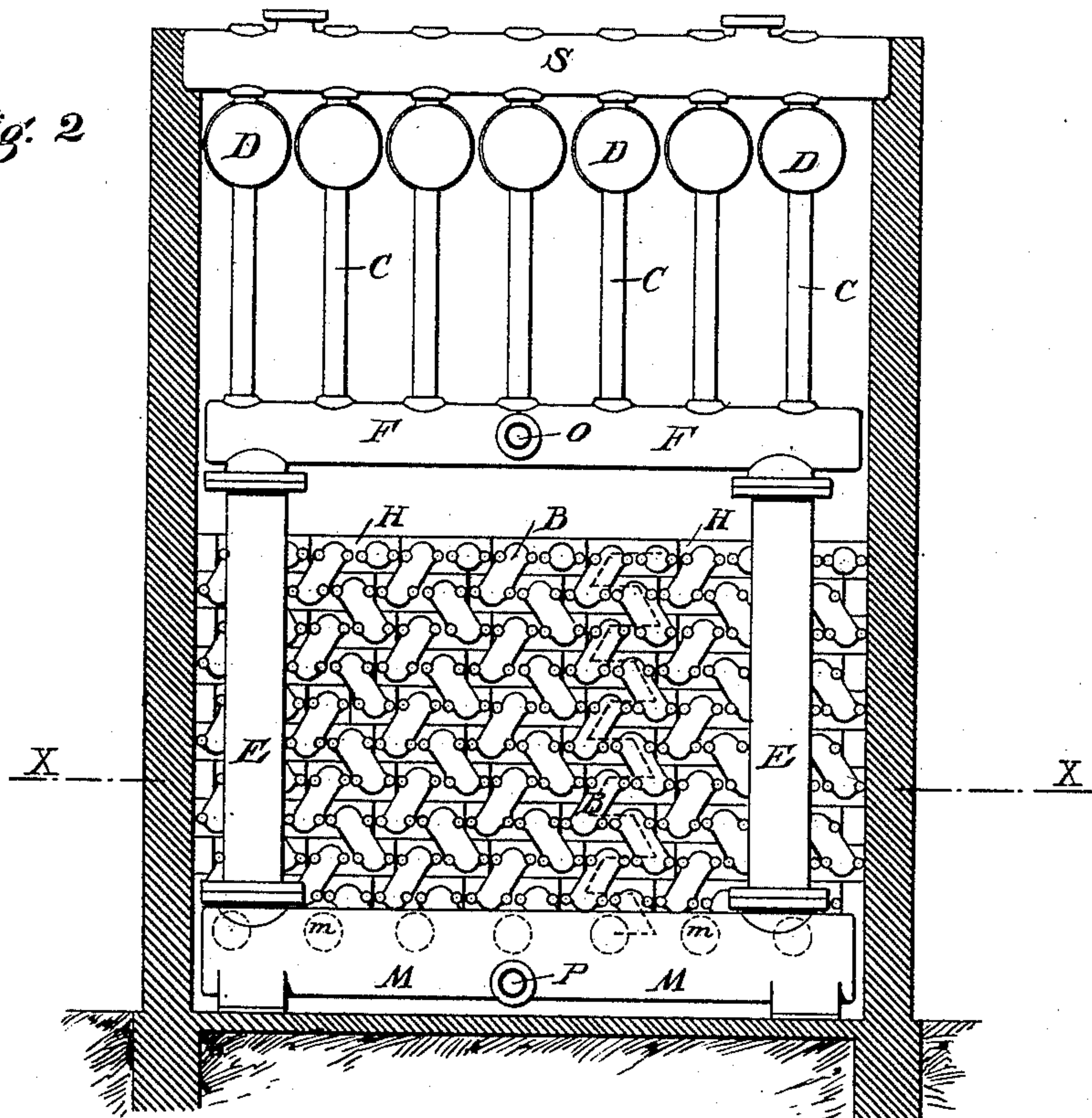
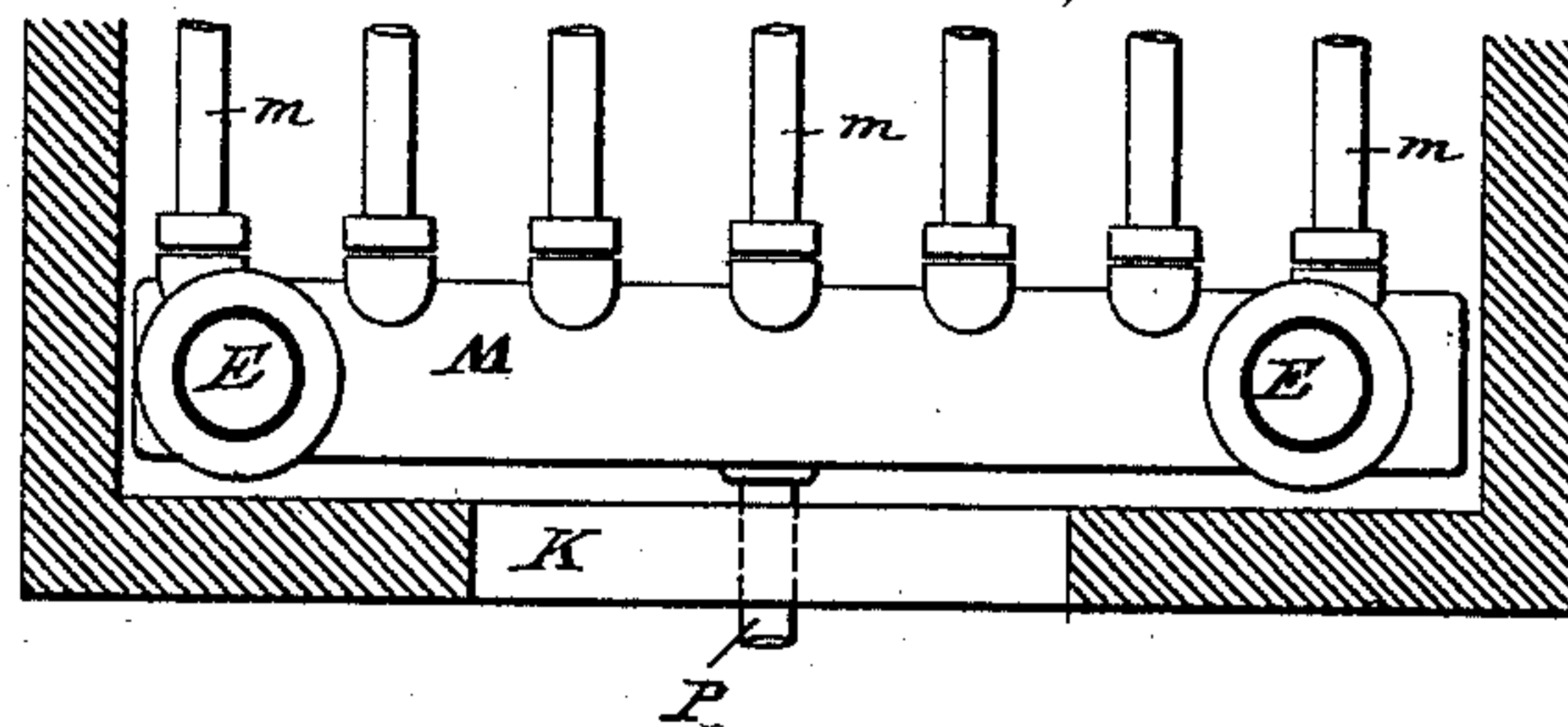


Fig. 3



Witnesses:

Wm. H. Leitch
Edward Abendroth

Inventor:

Harry D. Rice

UNITED STATES PATENT OFFICE.

HARVEY D. RICE, OF BROOKLYN, ASSIGNOR TO THE ABENDROTH & ROOT MANUFACTURING COMPANY, OF NEW YORK, N. Y.

SECTIONAL STEAM-BOILER.

SPECIFICATION forming part of Letters Patent No. 390,312, dated October 2, 1888.

Application filed July 14, 1888. Serial No. 279,958. (No model.)

To all whom it may concern:

Be it known that I, HARVEY D. RICE, a citizen of the United States, and a resident of the city of Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Sectional Steam-Boilers, of which the following is a complete description, reference being had to the accompanying drawings, forming part of this specification.

My invention relates to that class of boilers known as "sectional safety-boilers"—i. e., which are composed of an aggregation of small elements or sections, and more particularly to that variety of sectional boilers known as "water tube boilers," in which the elements or sections are in the shape or composed of tubes suitably connected to each other; and the object of my invention is to improve the distribution of the feed-water to the several elements or sections of such boilers, and also to make improved provisions for the precipitation into the mud-drum of the impurities in the feed-water, thereby lessening the liability of injury to the heating-surfaces.

In the accompanying drawings, Figure 1 shows a side elevation of my improved "water-tube" sectional boiler with the side wall removed. Fig. 2 shows a rear elevation of the boiler with the rear wall removed, and Fig. 3 is a horizontal sectional view on line X X of a portion of the rear end of the boiler.

Corresponding letters of reference designate corresponding parts in the several views.

A are the water-tubes, which are set at an angle, the pitch being downward toward the rear end of the boiler. The front ends of the tubes A are connected either in sets or all together, and so are the back ends. In the boiler shown in the drawings the tubes are expanded in pairs into hollow fittings or headers H at the rear and H' at the front. These headers are set in horizontal rows, there being seven headers (or fourteen tubes) in each horizontal row. Vertically the headers are slightly staggered, so as to cause the tubes to be evenly staggered and thereby present the greatest possible surface to the flame. The headers are connected at front and back by means of bends B, so arranged that they connect each header with the one just above it, and thereby

seven sections are formed in the size of boiler I have shown, each section taking in one header on each horizontal row.

The dotted zigzag line in Fig. 2 indicates the direction of the water-way through the headers and bends of one section, the connections being identical at the front end of the tubes.

While I have shown and described here a peculiar arrangement of tubes, headers, and connecting-bends, and a given number of sections—viz., seven—I wish to state that my invention is not limited in its application either to this form or number of sections or headers, but that I contemplate to apply it in the same manner and for the same purposes and with the same results to boilers with a different form of header, or with a header common to a greater number of tubes, or to all the tubes in a section, or even to all the tubes in the boiler.

The upper front header of each section in my boiler is connected with the front end of a horizontal drum, D, the rear end of which is connected by means of a vertical pipe, C, which I term the "downtake," with a horizontal feed-drum, F. Below this drum F and below as well as in the rear of the lower tubes A is a mud-drum, M, also horizontal, connected with the feed-drum F by means of two vertical pipes, E, the cross-sections of which should much more than aggregate the aggregate cross-section of the downtakes C. The mud-drum M is also connected with the lower rear header of each section by means of the pipes m, one of which is provided to each section.

w w indicate the water line.

S is a horizontal pipe or drum connected to the drums D and carrying off the steam therefrom.

The grate is shown at G, and suitable septum-walls are provided, (in the shape of a brick partition at I and partitions formed of contiguous collars on the tubes at L L,) to guide the gases from the grate G to the uptake U. The side walls of the fire-chamber are formed of brick-work, while the end walls are formed by the headers all fitted against each other.

K are cleaning-doors in the side walls. O is the feed-pipe, and P is the blow-off pipe, the former being attached to the middle of the feed-drum F, while the latter is attached to the middle and near the bottom of the mud-drum M.

The circulation in my boiler takes place toward the front in the tubes A, toward the rear in the drums D, and downward from the rear of the drums D to the back ends of the tubes A.

It will be noted in the drawings that the downward connection from the rear ends of the drums D to the rear ends of the tubes A is made at the rear ends of the lower tubes, the object of this being to bring the supply of water directly to such lower tubes, wherein, from their close proximity to the fire, the circulation is most active. The course of the water to the upper rows of tubes is therefore upward through the rear headers. The mud-drum M is so connected that all water descending from the drums D must pass through it before it can enter the tubes A. I make the mud-drum M and the pipes E as large as practicable so as to retain the flow therein, and I connect the pipes *m* (which lead to the tubes A) at the top of the mud-drum M, all of which features of my design tend to insure easier precipitation of the impurities into the mud-drum M.

My invention consists in the use of a separate feed-drum, F, forming part of the downward-connecting system through which the water travels from the rear ends of the drums D to the rear ends of the tubes A, passing as it does so through the drum M. The function of the drum F is to avoid chilling the mud-drum M and stirring up the matter settled therein which is caused by attaching the feed to said drum.

Another advantage is gained from the fact that the water fed into the drum F becomes heated by mingling therein with the water descending through the downtakes C, and is

therefore under more favorable conditions for parting with its impurities in the mud-drum M.

I could use instead of the two pipes E as many corresponding pipes as there are sections in the boiler. The use of two, however, gives freer access to the rear headers for purposes of erection or repair.

I wish to state, also, that my invention does not contemplate the use of one separate drum D to each section as a necessary feature. A common drum might be provided to connect all the sections.

While therefore I do not wish to be construed as limiting the scope of my invention to the specific form and arrangement of boiler shown, what I do claim as my invention, and desire to secure by Letters Patent, is—

1. In a sectional steam-boiler of the type above described, the downward connection from the rear of the drums D to the rear ends of the tubes A by means of and through the downtakes C, horizontal feed-drum F, pipes E, horizontal mud-drum M, and pipes *m*, as and for the purposes specified.

2. In a sectional steam-boiler of the type above described, the combination, with the water-tubes A, having suitable headers and connections to each other, and to the drums D of the latter, the downtakes C, the feed-drum F, the stand-pipes E, the mud-drum M, and the pipes *m*, leading to the lower rear end of each section of tubes, all as and for the objects set forth.

In witness whereof I have hereunto set my hand this 13th day of July, 1888.

HARVEY D. RICE.

In presence of—

W. H. LERCH,

A. HOWARD ABENDROTH.