

No. 840,114.

PATENTED JAN. 1, 1907.

M. DAVIS.
BOILER.

APPLICATION FILED APR. 16, 1906.

2 SHEETS—SHEET 1.

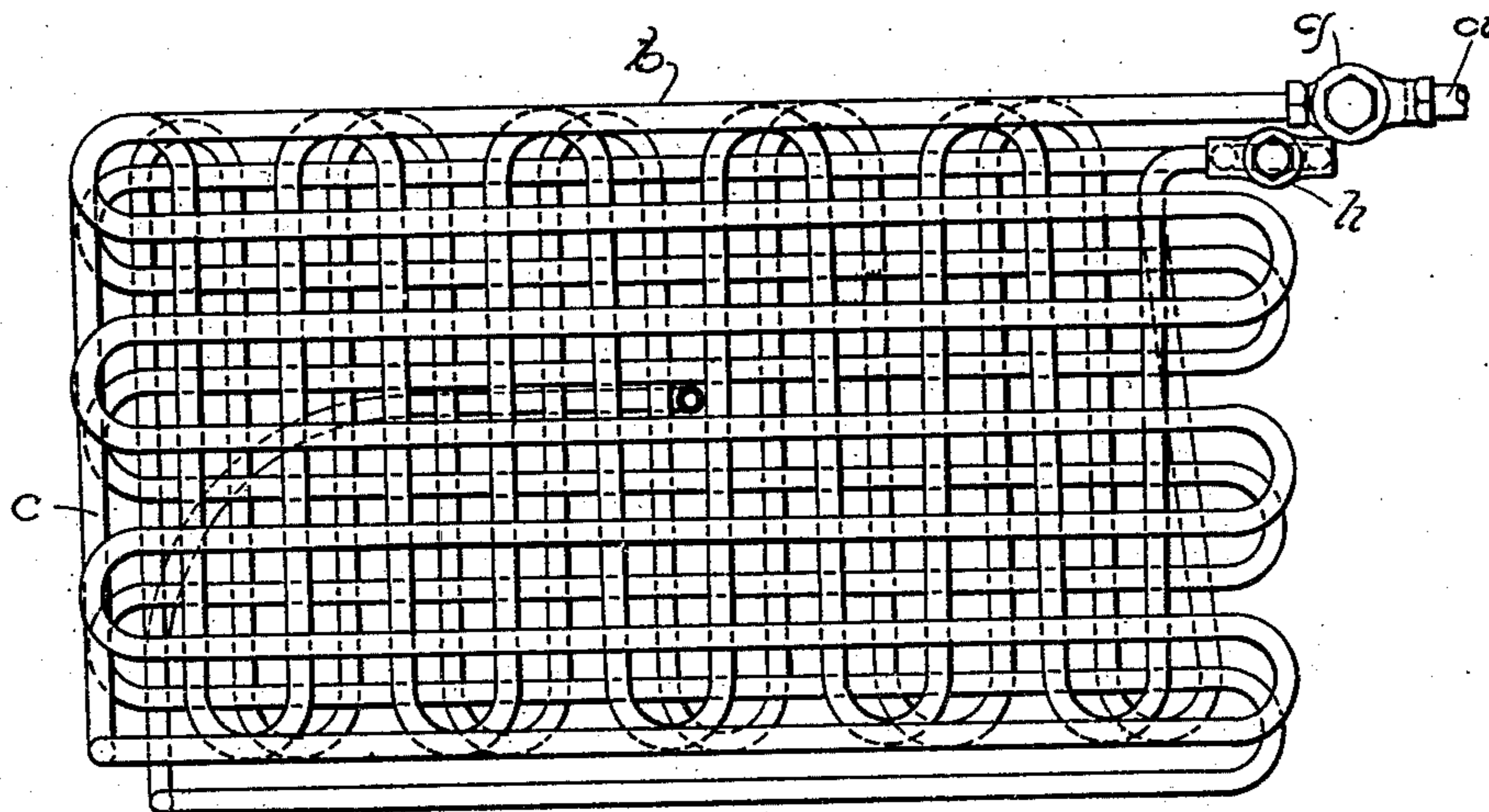
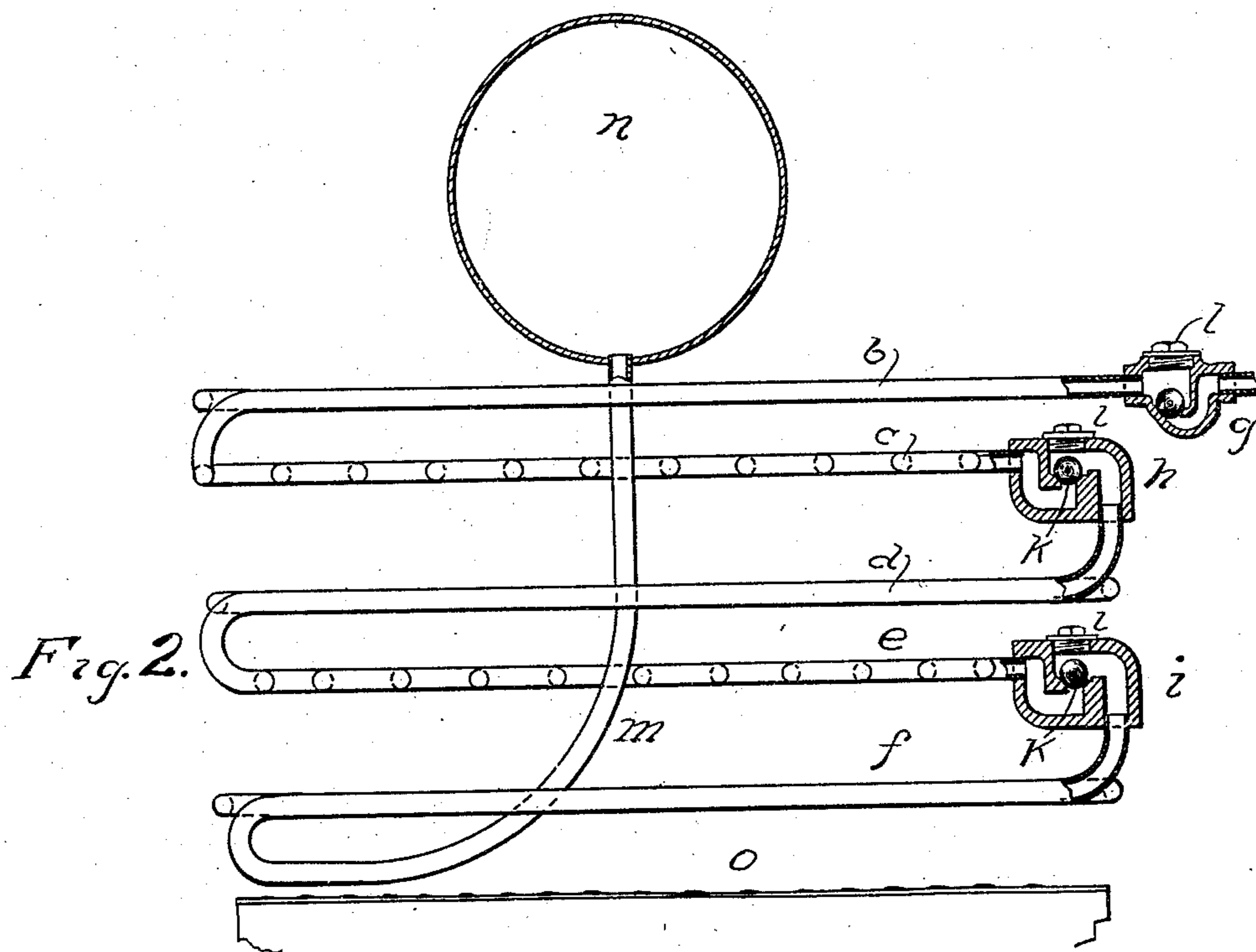


Fig. 1.



Witnesses
Andrew F. Smith
Sadie Bennett.

Inventor
Merrill Davis
By his Attorney
Justin A. Galland.

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2 SHEETS—SHEET 2.

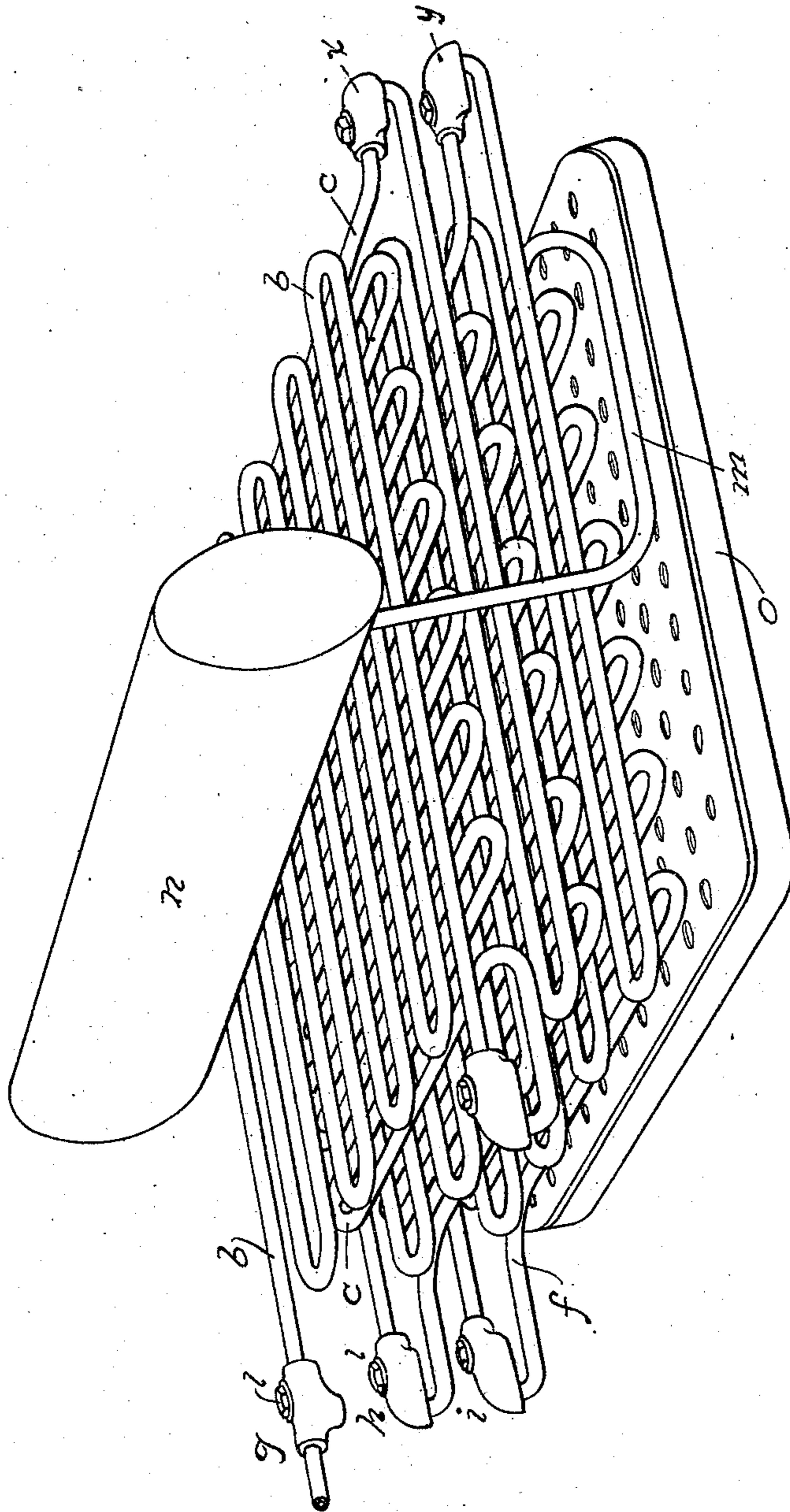


Fig. 3.

Witnesses
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UNITED STATES PATENT OFFICE.

MERRILL DAVIS, OF NEW YORK, N. Y.

BOILER.

No. 840,114.

Specification of Letters Patent.

Patented Jan. 1, 1907.

Application filed April 16, 1906. Serial No. 311,910.

To all whom it may concern:

Be it known that I, MERRILL DAVIS, a citizen of the United States, residing at No. 217 East One Hundred and Fifth street, in the city, county, and State of New York, have invented a new and useful Improvement in Flash-Boilers, of which the following is a specification.

My invention relates to that class of steam-generators commonly known as "flash-boilers," in which the water in the generator is quickly flashed or converted into steam; and the object of my invention is to furnish a simple and effective means whereby this result may be attained. To this end I provide a construction whereby the supply of water is automatically cut off when steam has been created to a pressure equal to or greater than that of the incoming water, the retrograde movement of the water being at the same time prevented at the end of each coil, thus confining the water within small compartments or pockets and causing it to be quickly and effectively converted into dry live steam before it passes to the steam-drum.

In the accompanying drawings, which illustrate my invention, Figure 1 is a view from the upper side, the steam-drum being removed. Fig. 2 is a sectional view of a series of the coils; and Fig. 3 is a perspective view of a modified form of the device, showing additional valves.

Similar letters refer to similar parts throughout the views.

I provide a continuous length of pipe formed into a series of superimposed coils, which may be interlaced or staggered, as desired, and having a water-inlet *a* in the usual manner at the top coil, which may be connected with a suitable boiler-feeding device. The several superimposed coils *b*, *c*, *d*, *e*, and *f* are each provided at their respective ends with check or gravity valves *g*, *h*, and *i*, which valves may be of any desired form; but I prefer to use the form shown in the drawings, in which is shown a ball *k*, resting on a seat of the usual form, provided with a cap *l* to permit access to the interior of the valve. At or near the end of the bottom or last coil *f* I provide a pipe *m*, leading upward to a steam-drum *n*, situated above the coils in which it terminates, or the end of said coil itself may be carried up and terminate in said drum.

I prefer to arrange the several superimposed coils in such form that they will be in vertical rows, so that one or more of the coils will be acted upon direct by the heat from below.

A fire-box or burner *o* of any desired form is provided below the lower coil *f*, by means of which the boiler and the water contained therein is heated.

The parts of my improved boiler being thus assembled in the manner indicated, the operation is as follows: Water is admitted at the inlet *a*. The pressure of the water admitted into the upper coil *b* will raise the valve *k* and permit the water to flow by force or gravity through the several coils *c*, *d*, *e*, and *f*. In its course through these coils the water is converted or flashed into steam, which will then pass through the pipe *m* to the drum *n*, where it is confined, to be utilized in the usual manner. The lower coils being nearest to the source of heat, the water in them will be flashed or converted into steam more rapidly than the water in the top coils, which are farther away from the source of heat. As soon as the steam in the lowest coil attains a pressure equal to or greater than the pressure of water in the coil next above it will close the check or gravity valve leading from the coil next above and prevent both the retrograde and the forward or downward movement of the water, thus trapping or confining the water in small compartments or pockets and holding it until the steam-pressure in the lowest coil is reduced (which will be caused by the steam being drawn out of the boiler for use) to a point less than the pressure of the water in the coil next above it. The pressure of the water in the upper coils will then open the check or gravity valves, and the water will then flow forward and down into the bottom coils, where it will be quickly converted or flashed into steam, and the pressure of steam in the bottom coil will again exceed the pressure of the water in the coils above and again close the check or gravity valve leading into the bottom coil.

I have shown in Figs. 1 and 2 valves on only one end of each of the several coils; but I do not intend to limit myself to this precise arrangement, as in some instances I find it advantageous to change the position of or omit entirely valves on certain of the coils.

Such modified form is shown in Fig. 3, the additional valves being lettered *x* and *y*.

Having now described my invention, I claim—

5 1. In a device of the character described, the combination of a pipe provided with a water-inlet, and formed in a series of coils, and having a plurality of check-valves lo-
10 cated in said pipe, and a steam-outlet, the lower coil of said pipe being adjacent to a source of heat-supply, substantially as shown and described.

2. In a device of the character described, the combination of a pipe provided with a
15 water-inlet, and formed in a series of coils, and having a plurality of gravity-valves located in said pipe, and a steam-outlet, the lower coil of said pipe being adjacent to a source of heat-supply, substantially as shown
20 and described.

3. In a device of the character described, the combination of a boiler formed of one continuous pipe, having one inlet and one out-
25 let, and provided with a plurality of check-valves, intermediate of the inlet and outlet, substantially as shown and described.

4. In a device of the character described, the combination of a boiler formed of one continuous pipe, having one inlet and one
30 outlet, and provided with a plurality of gravity-valves intermediate of the inlet and outlet, substantially as shown and described.

5. In a device of the character described, the combination of a boiler formed of one
35 continuous pipe, having one inlet and one outlet, and provided with a plurality of check-valves intermediate of the inlet and outlet, and having a section thereof adjacent

to a source of heat-supply, substantially as shown and described.

6. In a device of the character described, the combination of a boiler formed of one continuous pipe, having one inlet and one outlet and provided with a plurality of
45 gravity-valves intermediate of the inlet and outlet, and having a section thereof adjacent to a source of heat-supply, substantially as shown and described.

7. In a device of the character described, a series of superimposed coils of pipe so ar-
50 ranged that the water will flow by force or gravity from the upper coils into the coils below, and having a plurality of check-valves interposed, intermediate of the ends, to be
55 opened by the pressure of the water from above, and closed by the pressure of the steam, formed in the lower of the said coils, substantially as shown and described.

8. In a device of the character described, a series of superimposed coils of pipe, so ar-
60 ranged that the water will flow by force or gravity from the upper coils into the coils below, and having a plurality of gravity-valves interposed, intermediate of the ends, to be
65 opened by the pressure of the water from above, and closed by the pressure of the steam, formed in the lower of said coils, substantially as shown and described.

In testimony whereof I have signed my name to this specification, in the presence of
70 two subscribing witnesses, this 13th day of April, 1906.

MERRILL DAVIS.

Witnesses:

ANDREW FOULDS, Jr.,
SADIE BENNETT.