

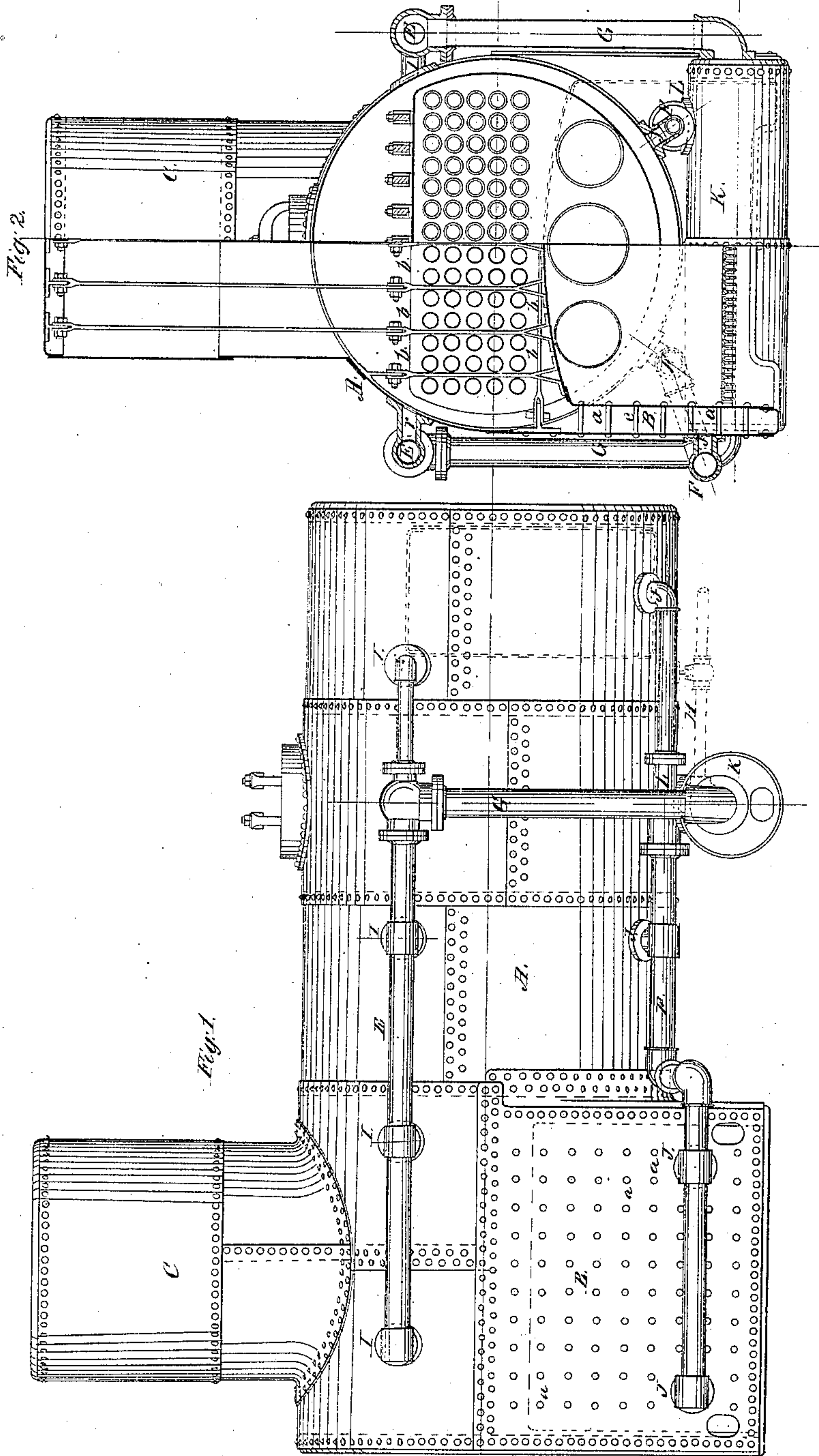
C. Mason,

Sheet 1 of 3 Sheets.

Steam-Boiler Water-Circulator,

No 86,429,

Patented Feb. 2, 1869.



Witnesses:

L. L. Bond  
C. A. West

Inventor:

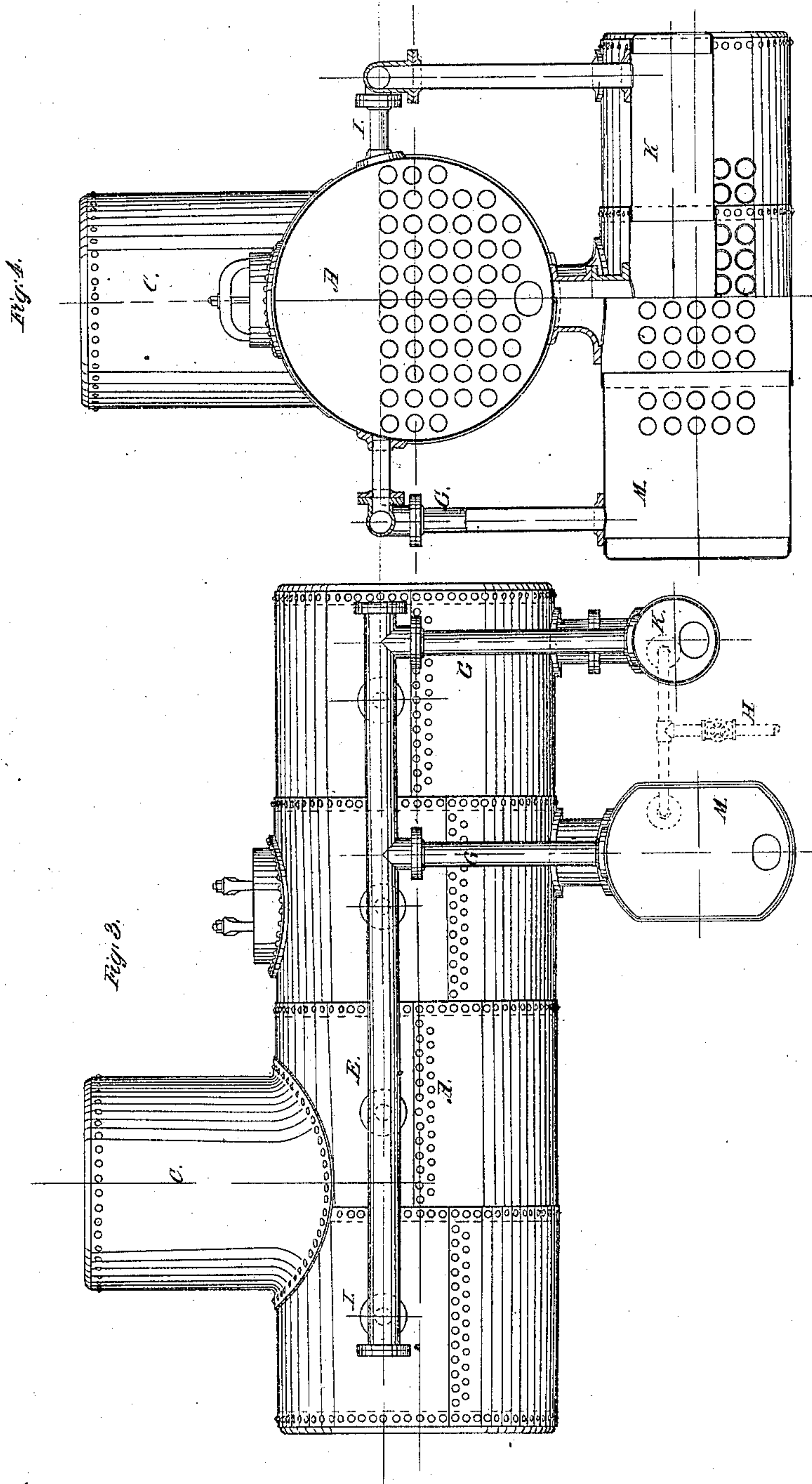
Carl F. Mason

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Carlisle Mason



# United States Patent Office.

CARLILE MASON, OF CHICAGO, ILLINOIS.

Letters Patent No. 86,429, dated February 2, 1869.

## IMPROVED STEAM-GENERATOR.

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

To all whom it may concern:

Be it known that I, CARLILE MASON, of the city of Chicago, in the county of Cook, and State of Illinois, have invented certain new and useful Improvements in Steam-Generators; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawing, making a part of this specification, in which—

Figure 1 is a side elevation;

Figure 2, a section of the same;

Figure 3, a side elevation of a modified form of boiler; and

Figure 4, a cross-section of the same.

The nature and object of my invention consist in providing steam-generators or boilers of ordinary construction with circulation-tubes or pipes, so that a free circulation of the water in the boiler will, at all times, be assured.

These pipes are not designed to be used directly in the conversion of water into steam, as they do not come in contact with the fire or smoke-passages.

When a high degree of heat is applied to a boiler, the rapid conversion of water into steam frequently prevents the water from coming in close contact with the heated portions, so that the plates are burned and weakened, which is one cause of the explosion of boilers; and it also frequently causes the gauges to indicate a higher stage of water than in fact exists in the boiler, and thereby causes the engineer to mistake the condition of his boiler. These difficulties are remedied by the application of my improvements, as with them no portion of the boiler or heated surface can remain without being in close contact with the water, and the gauges can never mislead the engineer as to the stage of water.

To enable others skilled in the art to make and use my improvements, I will proceed to describe their construction, application, and operation.

A, B, and C represent, in fig. 1, an ordinary locomotive-boiler, provided with fire-box, flues, and tubes, in the usual manner.

To the outside of this boiler I attach the pipe E, at the water-line, by means of the sheet-pipes or openings I, of which there are enough to insure a full and free passage of the water from the boiler into the pipe.

To this horizontal pipe, E, a vertical pipe, G, is attached, which passes down and enters into a cross-pipe or cylinder, K, which is called the mud-pipe.

I usually carry these pipes, G, nearly to the middle of the mud-pipe or cylinder K, to prevent a short cut of the water, and as K is much larger than G, time is given, in the passage of the water, for the sediment to be deposited. The water then passes from the cylinder K, through the pipe or opening L, into the pipe F, through which it is distributed, and is returned into the boiler at the bottom, by the short connecting-pipes J, so that the surface-water is returned to the bottom of the

boiler, by its action, without retarding the steam in its passage to the steam-space, or being retarded by it in passing down to the heated portions of the boiler.

I have described only one side of the boiler, but I usually apply my system of tubes to each side, as shown, when only single boilers are used, but when several boilers are placed together in a battery, it will be found more convenient to use but one tube, E, and locate that inside of each boiler, and let the water pass out at one or both ends, down to the pipe F. In that case the pipe E will be placed on the water-line, as before stated, and simply perforated, and the pipes G will be at the ends instead of at the sides, as shown.

Figs. 3 and 4 show the application of the same devices to a different form of boiler—the ordinary cylindrical boiler without the encased fire-box—to which is added an extra heater, M, which takes the place of the pipe F of fig. 1, for discharging the water into the bottom of the boiler.

Fresh water is introduced through the pipe H.

The diameter of the pipes E, F, and G, as well as of the connections I and J, for a fifty-horse-power engine, will be six inches when double, and about in that proportion as the capacity of the boiler is increased or diminished. The size and capacity of the short tubes, openings, or connections I and J will, of course, depend somewhat upon the numbers used, but should always equal the capacity of the pipes E and F.

I have found, by actual use, that this arrangement for securing a circulation, works admirably, increasing the safety of the boiler, and also saving considerable fuel, as less force is required to force the steam through the water into the steam-space, and its necessity is fully demonstrated by the rapid passage of the water through the tubes and passages.

A secondary advantage is, that the surface of the water in the boiler is kept free from scum and dirt, the same being carried down into the mud-pipe.

It is evident that, by discarding the mud-pipe, this system of pipes can be wholly located within the boiler, but for convenience of attachment, access, and repairs, (among other reasons,) I prefer to put them on the outside, as shown.

Having thus fully described my invention,

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

The pipe E, located at the water-line and connected with the water in the boiler, in combination with the pipe G, and pipe F connected with an opening into the bottom of the boiler, substantially as and for the purposes specified.

CARLILE MASON.

Witnesses:

E. A. WEST,  
L. L. BOND.