M. R CLAPP.

Boiler for Steam Fire-Engine.

No. 204,885. **Patented June 18, 1878.**

Fig: 1

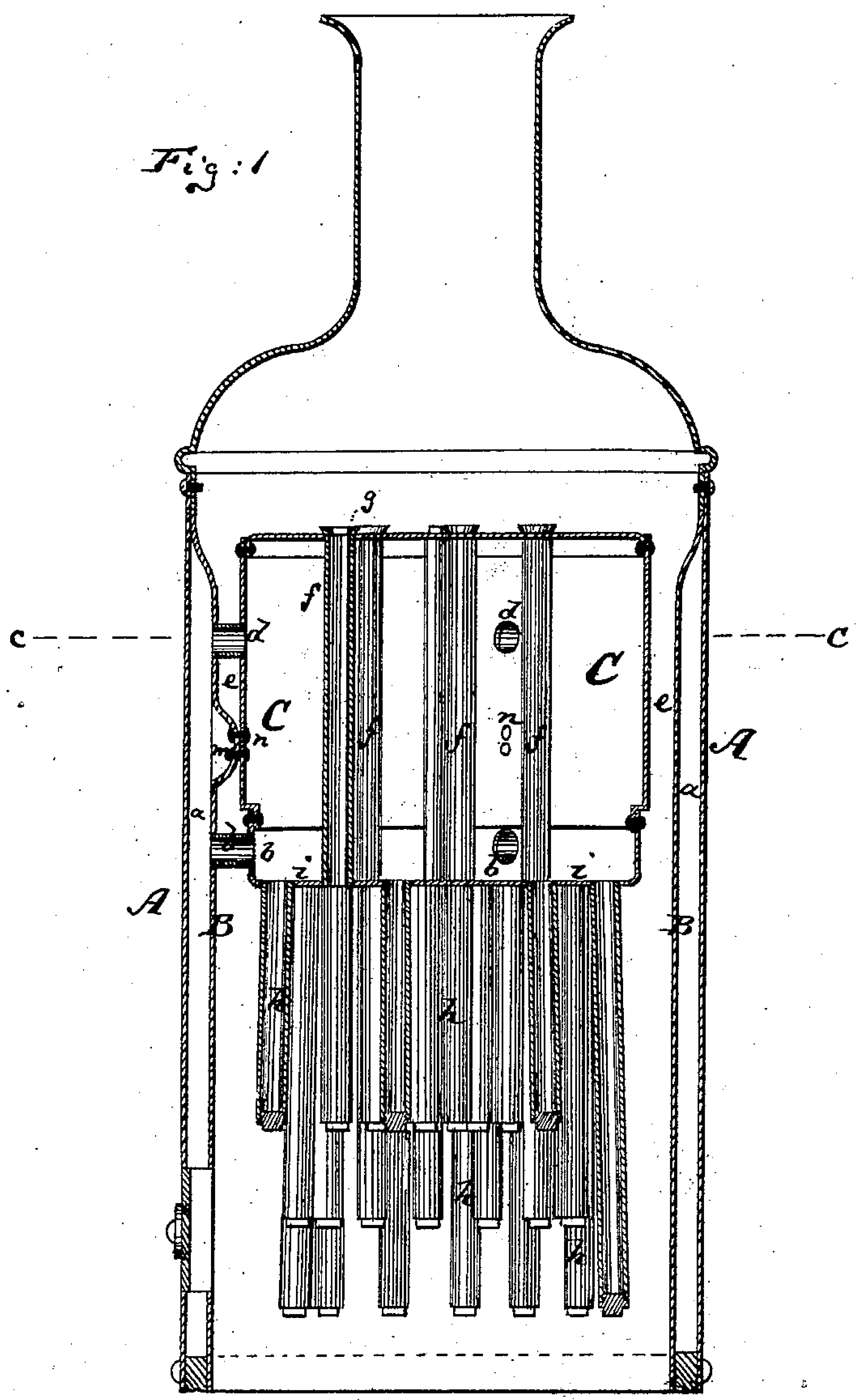
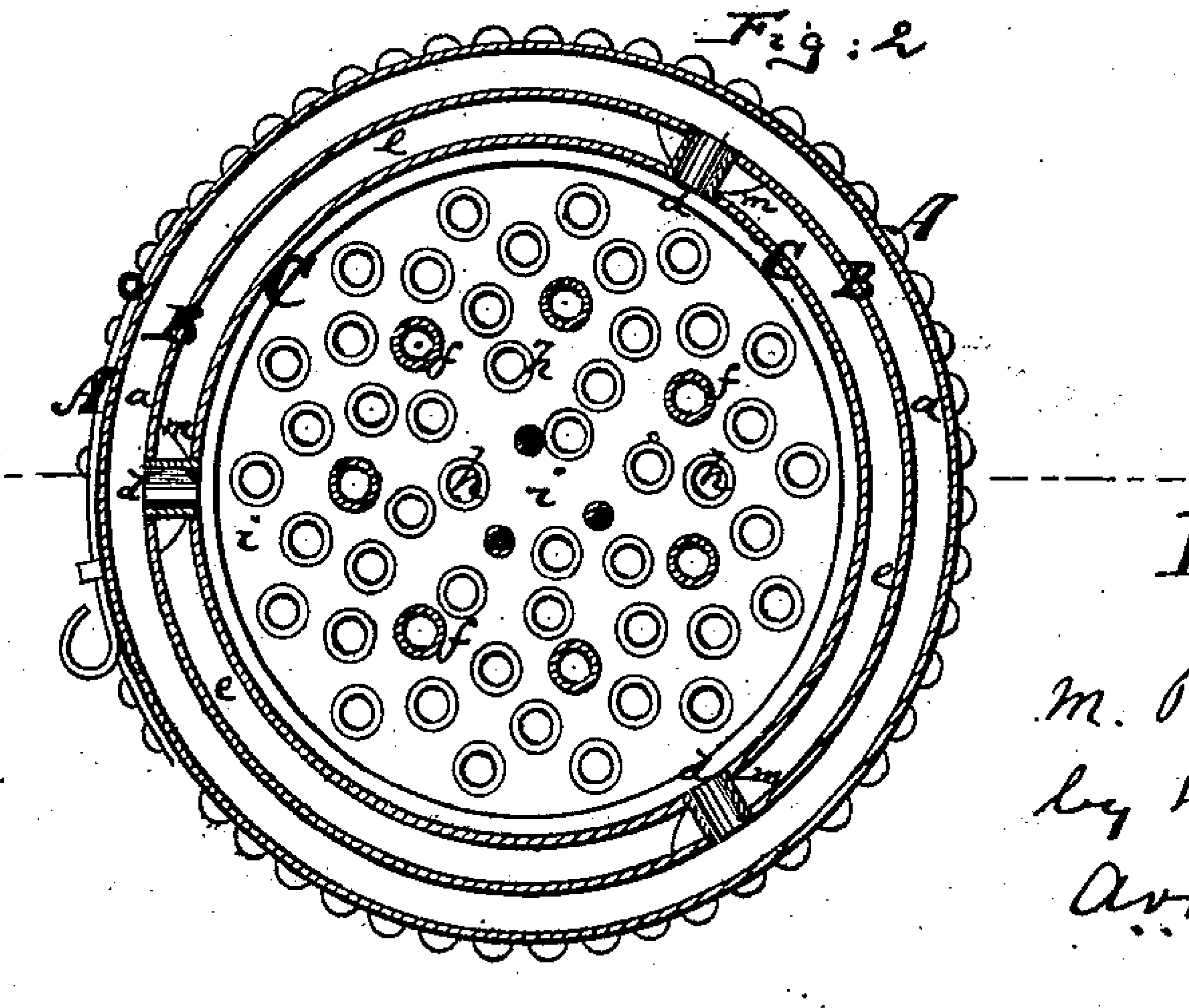


Fig: 2



Witnesses

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UNITED STATES PATENT OFFICE.

MIRTILLOW R. CLAPP, OF HUDSON, NEW YORK.

IMPROVEMENT IN BOILERS FOR STEAM FIRE-ENGINES.

Specification forming part of Letters Patent No. **204,885**, dated June 18, 1878; application filed May 11, 1878.

To all whom it may concern:

Be it known that I, MIRTILLOW R. CLAPP, of Hudson, in the county of Columbia and State of New York, have invented an Improved Boiler for Steam Fire-Engines, of which the following is a specification:

Figure 1 is a vertical central section of my improved boiler for steam fire-engines. Fig. 2 is a horizontal section of the same on the line *c c*, Fig. 1.

Similar letters of reference indicate corresponding parts in all the figures.

This invention relates to steam-boilers of the kind used in steam fire-engines, which boilers are more exposed to the danger of corrosion at certain particular places than other boilers, and which are required to be so constructed that steam may be very rapidly created therein. The fire-engines are in actual use only during very limited periods, and yet they must be kept ready for immediate use during all the long periods of rest. During this time the water in the boiler stands at a certain height, substantially invariable, and at the water-line; therefore, the boilers are very liable to corrosion.

Now, my invention consists, first, in the use of a water-drum placed into an annular upright boiler and made to communicate with the water-space of the boiler proper at a line which will allow a very limited quantity of water to protect the bottom of said drum, so that steam may be rapidly raised in the latter, as hereinafter more fully described.

The invention also consists in other details of improvement, hereinafter pointed out.

In the accompanying drawing, the letter A indicates the outer shell of a cylindrical upright steam-boiler, which, however, may also, if desired, be of other suitable form. B is the inner wall of this boiler. Between the walls A and B an annular water and steam chamber, *a*, is formed. C is a water and steam drum, of less diameter than the inner wall B, and is placed into the boiler above the fire-chamber thereof, and put in communication with the space *a* by one or more lower water-pipes, *b*, and one or more upper steam-pipes, *d*, as shown in Fig. 1. Between the outer periphery of the drum C and the wall B there is an annular smoke-passage, *e*, as shown.

Smoke-flues *f* may, if desired, be made to extend vertically through the drum C, as indicated, said flues being opened at both ends for permitting the escape of the products of combustion; but instead of said flues *f f* upright bolts may be used to hold the top and bottom plates of the drum at the proper distance apart. The tubes, however, are preferable, and, when used, should be made of copper, their upper ends projecting above the drum, as shown, said upper ends being expanded to receive iron rings *g*, whereby they are held expanded and securely locked to the upper part of the drum. These flues, when made of copper, will not be injuriously affected by the water in the drum.

From the bottom *i* of the drum project downwardly a series of water-tubes, *h h*, which expose a large heating-surface to the fire, and which I do not claim to have invented. The pipe *b*, which establishes water communication between the interior of the drum and the annular chamber *a*, is at but a short distance above the bottom *i* of the drum, as clearly shown in Fig. 1.

When the engine is at rest, I propose to have in the drum C just about enough water as to fill it to the pipe *b*, thus leaving a thin sheet of water on the bottom *i* of the drum, sufficient, however, to protect said bottom against the injurious effects of fire. As soon as the fire is started ebullition of the water will cause it to rise in the drum and to more or less escape into the space *a*, in which space it is unnecessary to have the water at the commencement of the fire at the same height as in the drum. Thus the volume of water in the drum will still more be reduced within the drum by escape through the pipe *b* into the space *a*, and a very small fire will consequently suffice to create steam rapidly within the drum sufficient for the purpose of starting the engine.

I prefer to have a series of pipes, *b b*, leading into the drum C, and also a series of steam-pipes, *d d*, at the upper part thereof, as I have found that water will not be level within the drum if there is but a single outlet for water or steam.

For further strengthening the drum and insuring its safe position within the boiler, I bulge the wall B inward at certain parts, so as

to cause it to reach the drum, as shown at *m* in Fig. 1. These bulging portions *m m* are, by bolts *n n*, secured to the drum, and serve to fasten the same properly in place and to hold it during the operation of the boiler; but instead of having these bulges *m m* on the inner wall B they may be on the drum and extend against the inner wall with substantially the same effect.

I claim—

1. In a steam fire-engine boiler, the combination of the drum C, carrying the water-tubes *h*, with the connecting-pipes *b* and *d*, and water and steam reservoir *a*, all arranged so that a smoke-space, *e*, is left between the drum and the wall B of the space *a*, substantially as herein shown and described.

2. In a steam-boiler for fire-engines, the water and steam drum C, combined by the pipe or pipes *b* with the water-chamber *a*, said parts being so arranged that a thin sheet of water may be on the bottom of the drum, while at the same time the water is at less height in the chamber *a*, substantially as specified.

3. The combination, in a boiler, of the outer shell A, the inner wall B, with the drum C, the inner wall bulging at *m m* to extend across the smoke-passage *e*, substantially as shown and described.

MIRTILLOW R. CLAPP.

Witnesses:
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