

(No Model.)

D. A. REAGAN.
STEAM BOILER SAFETY DEVICE.

No. 600,271.

Patented Mar. 8, 1898.

Fig. 1.

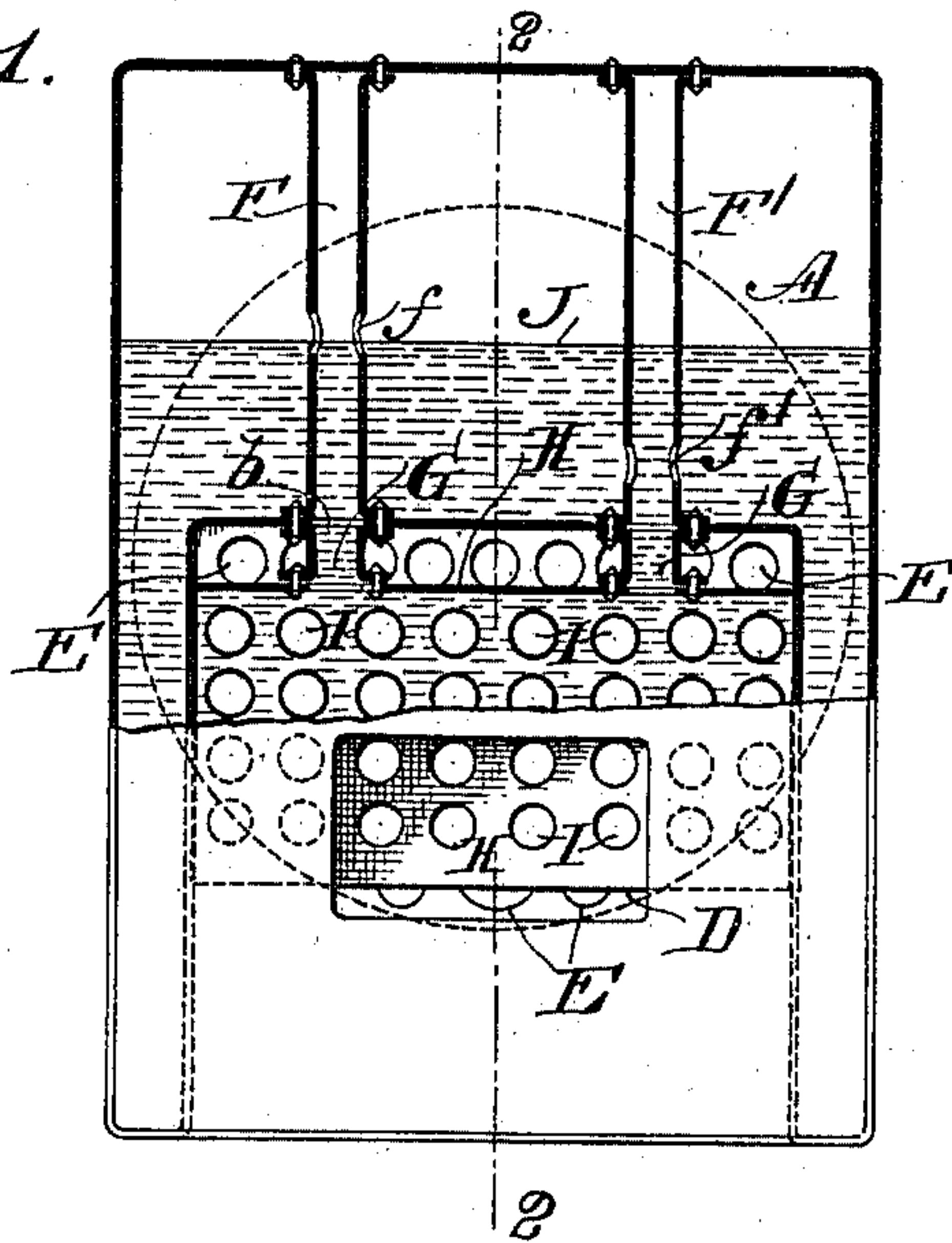
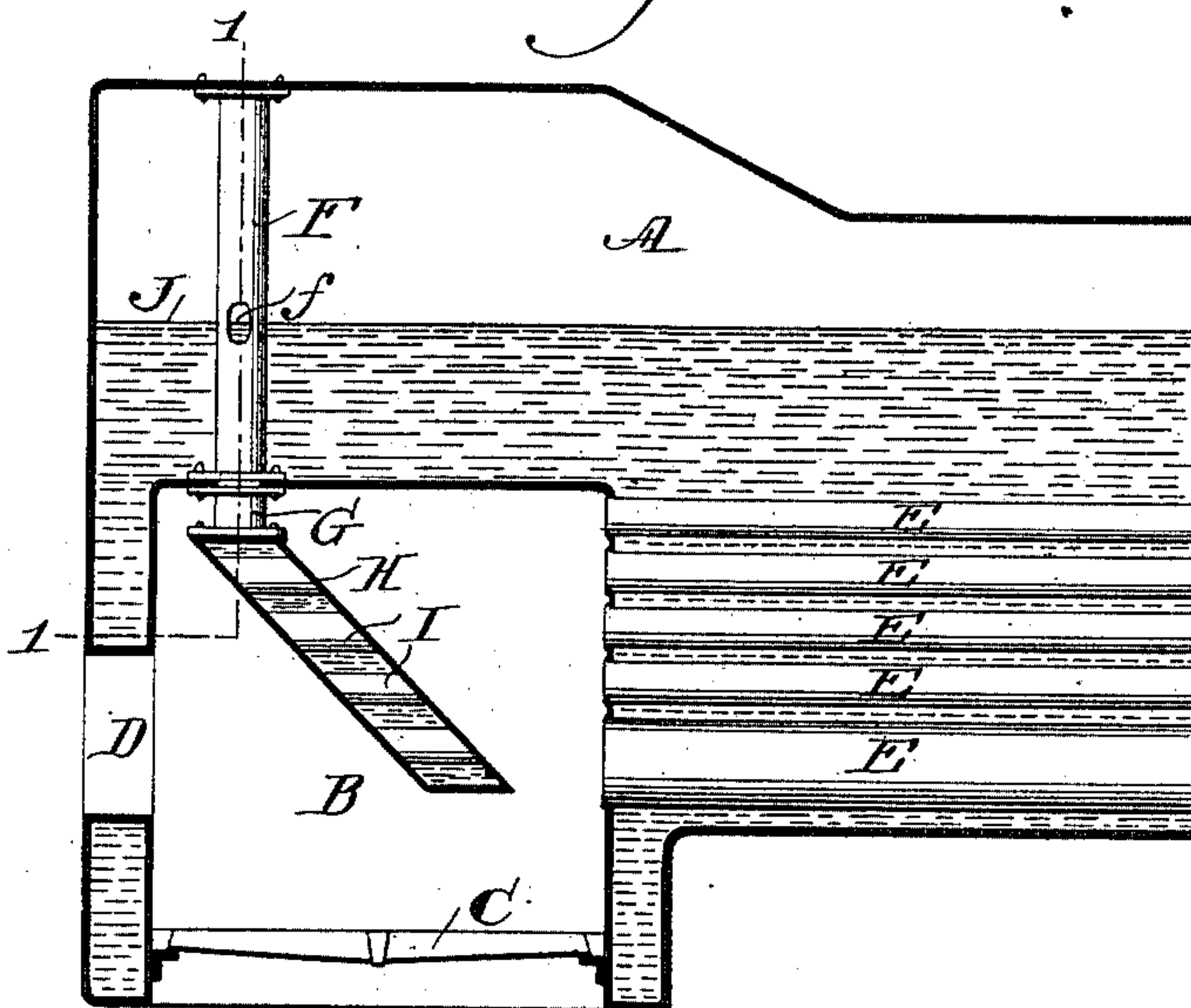


Fig. 2.



Witnesses.

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UNITED STATES PATENT OFFICE.

DOMINICK A. REAGAN, OF ALTOONA, PENNSYLVANIA, ASSIGNOR OF PART OF HIS RIGHT TO MICHAEL J. BUCK, AUGUSTUS V. DIVELY, JOHN T. BALTZELL, ALBERT P. SHARP, FERDINAND BENDHEIM, ANDREW W. CHERRY, WILLIAM T. SHOMBERG, ALBERT C. QUANDT, ALEXANDER CLAYCOMB, AND JOHN REAGAN, OF SAME PLACE, AND AUGUST WISE, OF PHILADELPHIA, PENNSYLVANIA.

STEAM-BOILER SAFETY DEVICE.

SPECIFICATION forming part of Letters Patent No. 600,271, dated March 8, 1898.

Application filed February 25, 1897. Serial No. 624,967. (No model.)

To all whom it may concern:

Be it known that I, DOMINICK A. REAGAN, a citizen of the United States of America, residing in Altoona, in the county of Blair, in the State of Pennsylvania, have invented a certain new and useful Improvement in Steam-Boiler Safety Devices, of which the following is a true and exact description, reference being had to the accompanying drawings, which form a part thereof.

My invention relates to the construction of steam-boilers, and has for its object to provide a novel device whereby in the event of the water in the boiler falling to a predetermined danger-level the steam will be discharged into the fire-box, and also to provide a novel deflecting device in the fire-box.

Heretofore devices having my first purpose in view have been planned and made to depend for their operation upon the use of fusible plugs; but practical experience has shown that plugs of fusible metal are an unreliable and unsatisfactory device, and so far as I know they are not now and have not been successfully used. I have ascertained that iron or steel placed in and subjected to the intense heat of the boiler fire-box on one side and exposed to the action, while in a highly-heated condition, of steam upon the other side will be rapidly burned or corroded and will yield to the energy of high-pressure steam in a very short time after the conditions mentioned are brought into existence; and my invention consists in great part in the use of a chamber of iron or steel unprovided with a fusible plug, said chamber being placed in the fire-box and placed also in communication with the boiler by a passage opening into the boiler at or near the danger-line determined upon. Further, I have found it of great advantage to use an iron or steel box provided with a series of fire-tubes running through it and through which the flame of the fire-box can freely pass, and in place of using, as heretofore, pipes or connections leading into the

boiler and terminating at the desired level of communication with the boiler I employ tubes firmly secured to the top of the boiler and to the top of the fire-box and opening through the top of the fire-box into the iron or steel chamber aforesaid. Through the walls of these tubes I form openings into the boiler at the desired levels, and thus at the same time provide for the proper communication between the boiler and the iron box in the fire-box and provide the boiler with strong tubular sides placed where they are of pronounced advantage. Preferably I form the box in the form of a deflecting-plate extending down from the top of the fire-box and entirely across the same, said deflecting-plate box serving the usual purposes of a fire-arch and also as a flue-protector, preventing the passage of cold air direct to the tubes when the fire-door is opened. Again, the box serves the purpose in normal operation of a water circulation and does so with great efficiency.

Reference is now had to the drawings which illustrate my invention, and in which—

Figure 1 is a front view of a boiler and fire-box equipped in accordance with my invention, said view being taken on section-line 1 1 of Fig. 2; and Fig. 2 is a longitudinal section taken on the section-line 2 2 of Fig. 1.

A is the boiler, and B the fire-box, conventional forms being shown, which may of course be modified in any desired way.

C indicates the grate-door, and D the fire-door.

E E E indicate the usual fire-tubes extending through the boiler.

F and F' are tubes firmly secured, as shown, to the top of the boiler and to the top of the fire-box, openings (indicated at *b b*) being formed through the top of the fire-box, so as to communicate with the interior of the tubes.

G and G' are tubular attachments secured on the under side of the fire-box top, so as to register with the tubes F and F', and to the bottom of these tubular attachments G is se-

cured the iron or steel box H, (preferably extending across the fire-box and inclined, as shown,) placed so as to receive the most intense action of the fire in the furnace and preferably provided, as shown, with a series of fire-tubes I so placed that there will be a natural draft through them. Through the tubes F and F', I form openings f and f' , the lowermost opening f' being at the extreme danger-level and the opening f in the tube F being preferably slightly below the normal water-level of the boiler. The difference in the level of the two openings f and f' will naturally permit a circulation of water through the box H. Obviously a single communication—as, for instance, through pipe F'—will serve to keep the box H filled with water if the communicating passage is sufficiently large; but it is highly desirable to provide for a regular circulation, as shown in the drawings.

As soon as the water-level in the boiler falls below the opening f' the water from the boiler will pass through the pipes into the box H and the water contained in said box will soon be evaporated into steam. The disappearance of water in the box H will permit it to become intensely hot under the influence of the furnace, and as the box still remains full of intensely-heated steam coming in contact with the highly-heated iron or steel a rapid corrosion of the box ensues, in consequence of which it will soon yield to the pressure of the steam, permitting the escape of steam from the boiler into the fire-box, which of course will promptly extinguish the fire in the furnace, and thus prevent explosion as well as relieving pressure in the boiler.

Having now described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In combination with a boiler and its fire-box, a water-chamber as H situated in the fire-box and formed throughout of iron or steel, fire-tubes as I extending through said chamber, and one or more conduits as F' opening into the boiler at or near the low-water

danger-line and opening also into the chamber H.

2. In combination with a boiler and its fire-box, tubes as F F' secured to the top of the boiler and the top of the fire-box as specified, openings as $f f'$ formed in said tubes one such opening as f' being at or near the low-water danger-line and the other opening as f being slightly below the normal water-line, and a chamber as H of iron or steel situated in the fire-box and communicating with the boiler through tubes F F'.

3. In combination with a boiler and its fire-box, tubes as F F' secured to the top of the boiler and the top of the fire-box as specified, openings as $f f'$ formed in said tubes one such opening as f' being at or near the low-water danger-line and the other opening as f being slightly below the normal water-line and a chamber as H of iron or steel situated in the fire-box and communicating with the boiler through tubes F F' and a series of fire-tubes extending through chamber H.

4. In combination with a boiler and its fire-box provided with fire-tubes as E, a deflector-chamber H situated in and extending across the fire-box, a series of fire-tubes I extending through the chamber H and tubes as F F' leading from the inside of the boiler to the deflector-chamber H and opening into the water-space of the boiler at different levels.

5. In combination with a boiler and its fire-box provided with fire-tubes as E, a deflector-chamber H formed of iron or steel situated in and extending across the fire-box, a series of fire-tubes I extending through the chamber H and tubes as F F' leading from the inside of the boiler to the deflector-chamber H one tube opening into the boiler at or near its low-water level and the other slightly below its normal water-level.

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Witnesses:

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