

(No Model.)

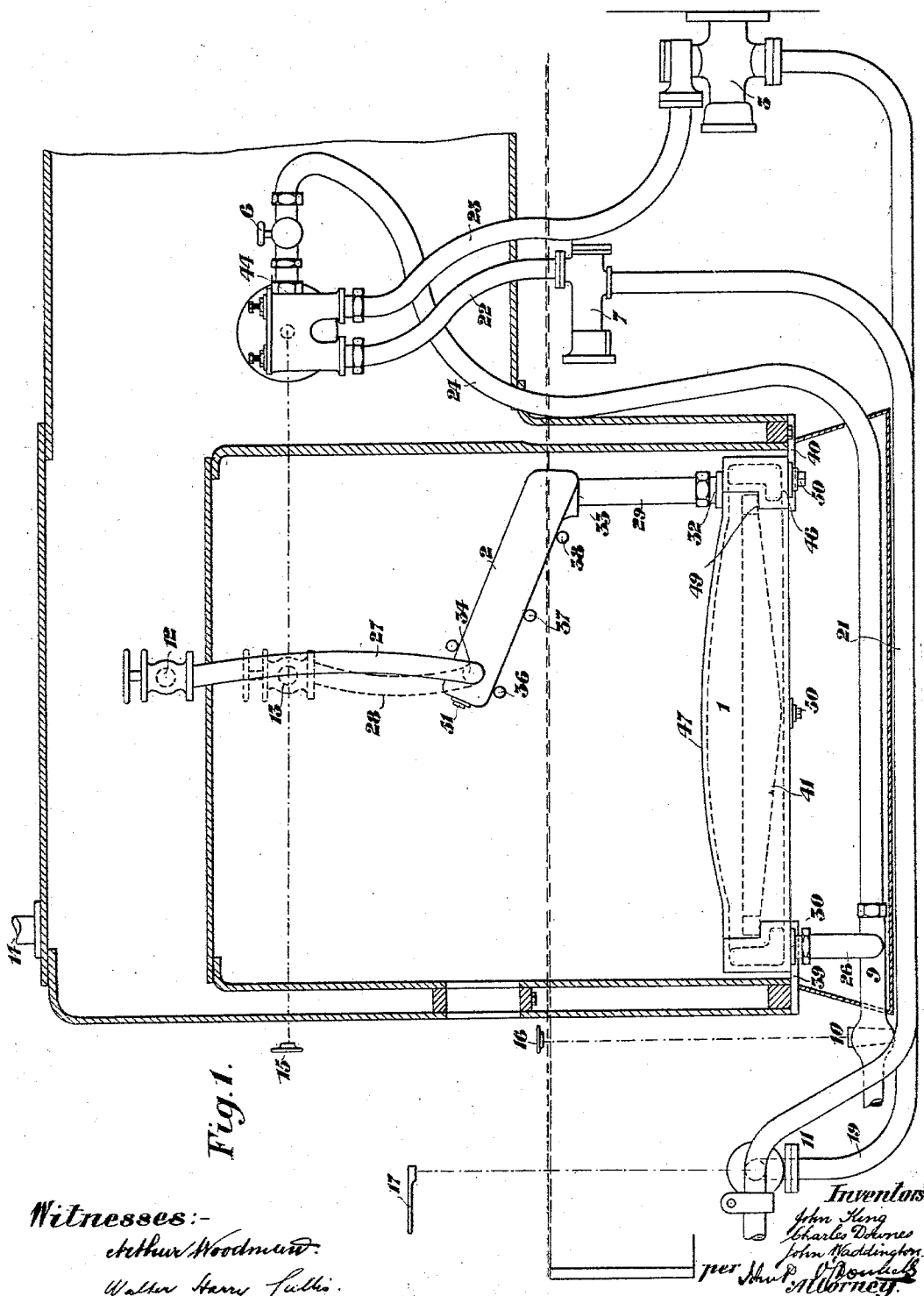
4 Sheets—Sheet 1.

J. KING, C. DOWNES & J. WADDINGTON.

FIRE BAR SUPPORT AND DEFLECTOR.

No. 569,646.

Patented Oct. 20, 1896.



(No Model.)

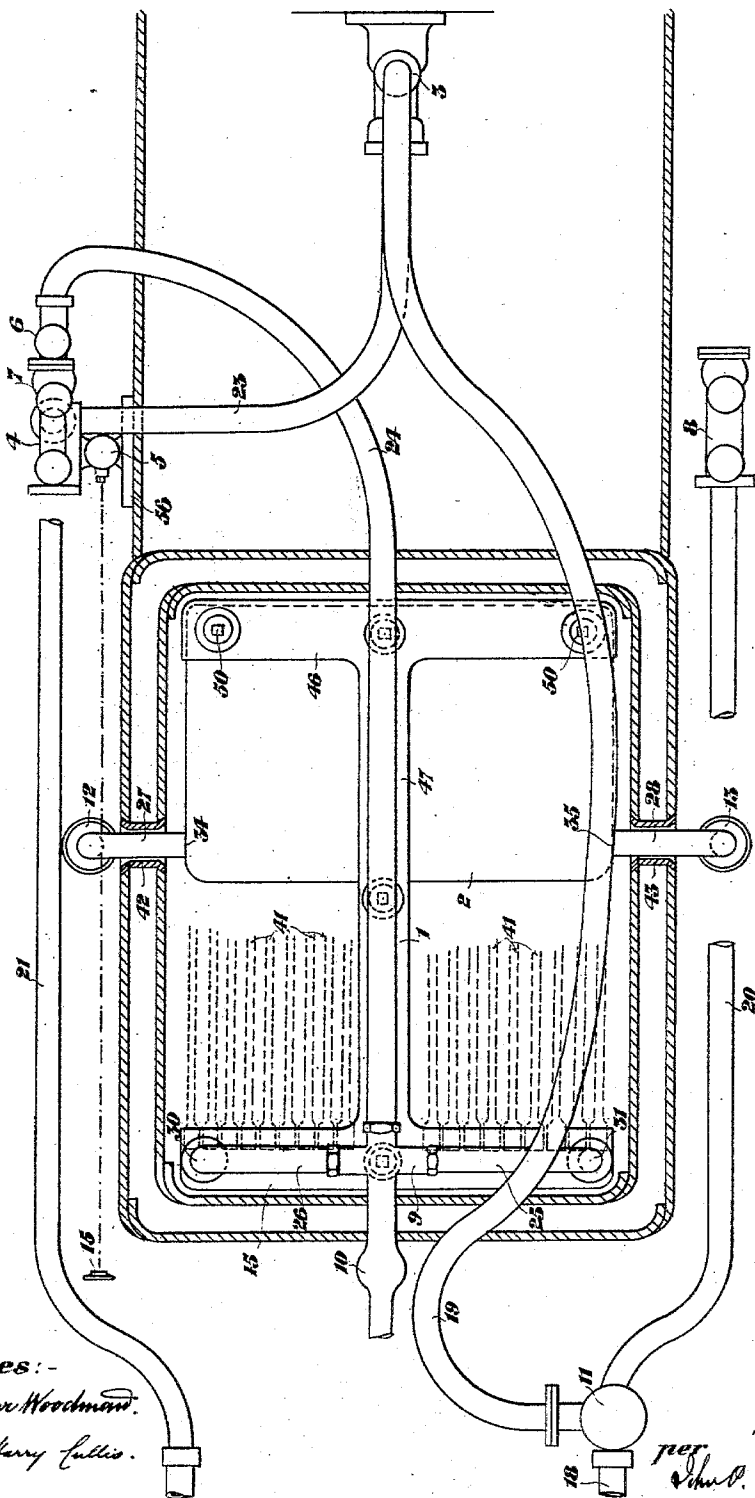
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Fig. 2.



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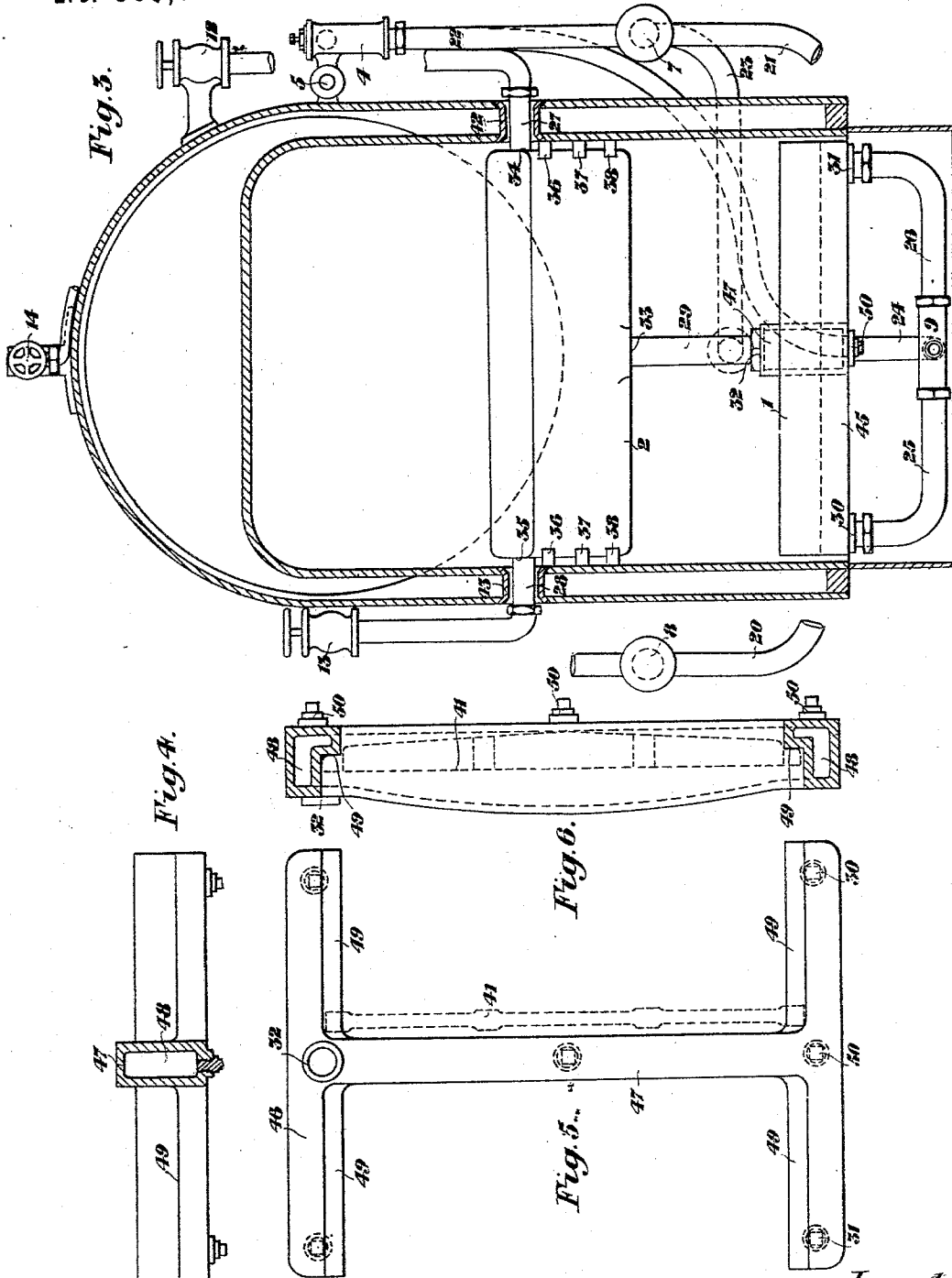
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4 Sheets—Sheet 3.

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4 Sheets—Sheet 4.

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Fig. 7.

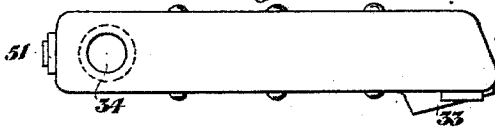


Fig. 8.

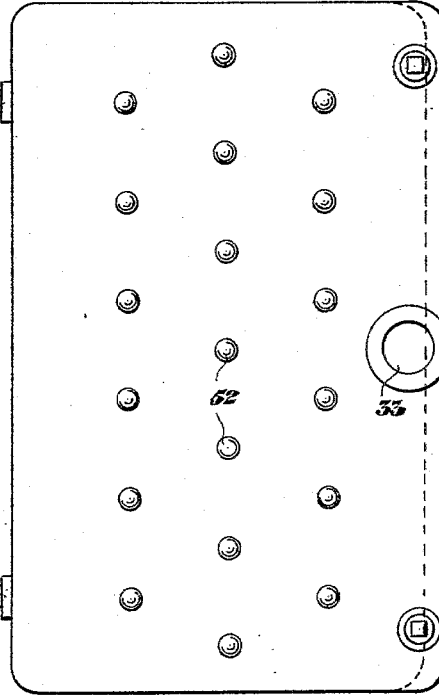
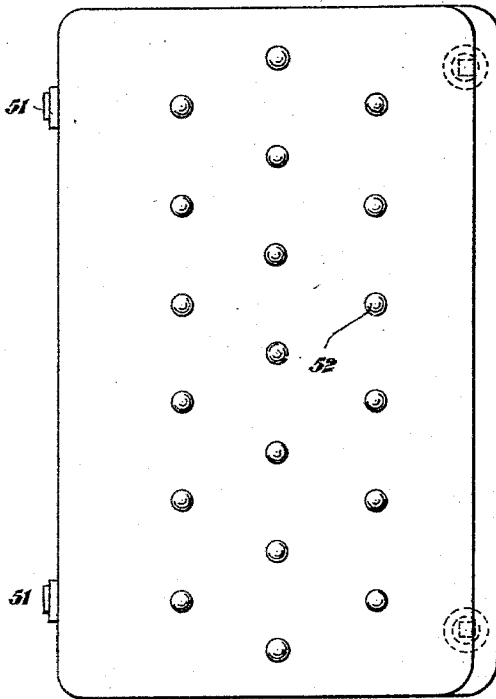
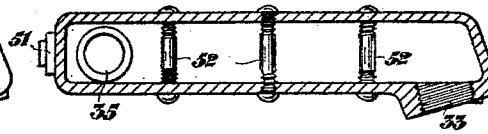


Fig. 9.

Fig. 10.

Fig. 11.

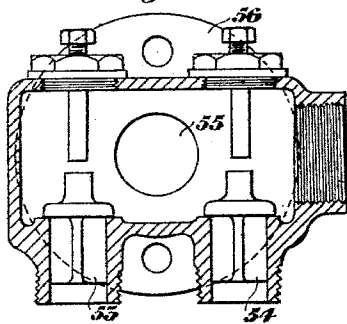


Fig. 12.

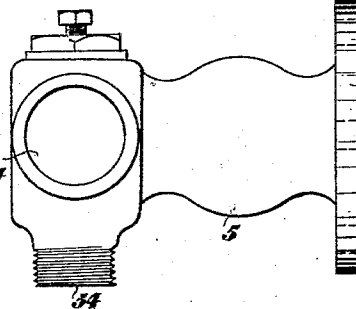
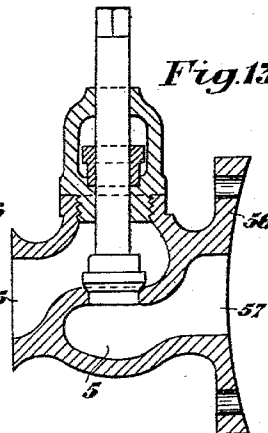


Fig. 13.



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# UNITED STATES PATENT OFFICE.

JOHN KING, CHARLES DOWNES, AND JOHN WADDINGTON, OF BUENOS  
AYRES, ARGENTINE REPUBLIC.

## FIRE-BAR SUPPORT AND DEFLECTOR.

SPECIFICATION forming part of Letters Patent No. 569,646, dated October 20, 1896.

Application filed May 28, 1896. Serial No. 593,468. (No model.) Patented in Argentine Republic November 6, 1895, No. 403.

*To all whom it may concern:*

Be it known that we, JOHN KING, CHARLES DOWNES, and JOHN WADDINGTON, citizens of the Argentine Republic, residing at Buenos Ayres, in the Argentine Republic, have invented certain new and useful Improvements in Steam-Boilers, (for which we have received Letters Patent in the Argentine Republic, No. 403, dated November 6, 1895,) of which the following is a specification.

This invention relates to the fire-bar support and deflector of the boiler; and it consists in the novel construction and combination of the parts hereinafter fully described and claimed.

Figure 1 shows, as an example, a locomotive-boiler fitted with the hollow water-space fire-bar carrier and hollow water-space deflector.

Fig. 2 is an underneath view of Fig. 1.

Fig. 3 is a cross-section of Fig. 1.

Figs. 4, 5, and 6 show details of the water-space fire-bar carrier, which is made in the shape of the letter H, as shown on plan, Fig. 5, and is hollow throughout. In Fig. 5, 45 is the end next the fire-hole door, 46 is the end next to the tube-plate, and 47 is the connecting-piece between 45 and 46. The water enters at 30 31, travels along 45 into 47, and from there into 46, and out at 32 on top of carrier, where it enters pipe 29, Fig. 3, which is the pipe connecting the carrier and deflector, as will be more clearly seen on reference to Fig. 1. Fig. 6 shows the two ends 45 and 46 in section, 48 being the water-space. The bars marked 41 are shown in position, sitting on the seat 49. In Fig. 4 the connecting-pipe 47 is shown in section with water-space through it marked 48. On the bottom of the carrier are washout-plugs 50, Figs. 5 and 6, and the connecting-piece 47 is arched (see dotted lines, Fig. 6) to give strength.

Figs. 7, 8, 9, and 10 illustrate details of the deflector, showing the form in which it is constructed. It consists of a hollow metal case adequately stayed to withstand steam-pressure. On the end section, Fig. 8, and on the reverse plan, Fig. 10, 33 is where the connecting-pipe 29, Fig. 1, is screwed into the deflector. In Figs. 7 and 8, 34 and 35 are where pipes 27 and 28, Fig. 1, are screwed into the

deflector, and 52, Fig. 8, are stays. In Figs. 7, 8, 9, and 10, 51 are washout-plugs.

Figs. 11, 12, and 13 illustrate details of twin clack and circulation valve combined, 55 marked 4 and 5 in Figs. 1 and 2. In Fig. 11, which is a front sectional elevation, the clack-valve for injector 7, Fig. 3, is marked 53. The clack-valve for pump 3, Figs. 1 and 2, is marked 54. The outlet to circulation 60 and feed pipe 24 is marked 44, and the outlet to circulation-valve 5, Fig. 3, is marked 55. In Fig. 12, which is a side elevation, 44 is the outlet to the circulation and feed pipe 24, Figs. 1 and 2, and 54 is the inlet from pump 65 3, Figs. 1 and 2. 5 is the circulation-valve. 56 is the flange for connecting to boiler. In Fig. 13, which is a sectional plan of the valve, 55 is the inlet from the clack-box and 57 is the outlet to the boiler.

The same numbers refer to the same parts in the several figures of the drawings.

1 is the hollow water-space fire-bar carrier.

2 is the hollow water-space deflector.

3 is the pump.

4 is the double clack for pump and injector.

5 is the circulation-valve between clack 4 and boiler.

6 is the stop-valve; 7, the injector for carrier and deflector; 8, the supplementary injector for direct feed to boiler, and 9 a four-way piece connecting the feed or circulation pipe 24 to the carrier 1.

10 is a blow-down cock, and 11 a two-way cock for the passage of water from the tender (shown at the extreme left in Figs. 1 and 2) to the pump 3 or injector 8.

12 is a steam-escape and scum-cock combined, and 13 is a valve regulating circulation between the deflector 2 and the boiler.

14, Fig. 1, is the injector steam-cock, and 15 a handle on the foot-plate for working the circulation-valve 5, Fig. 2.

16, Fig. 1, is a handle on the foot-plate for working the blow-down cock 10, and 17 is a handle on the foot-plate for working the two-way cock 11.

18, Fig. 2, is the feed-pipe from the tender to the two-way cock 11, and 19 is the feed-pipe from the two-way cock 11 to pump 3.

20 is the feed-pipe from two-way cock 11 to

injector 8, and 21 the feed-pipe from the tender to injector 7.

22 is the pipe from injector 7 to clack 4, 23 pipe from pump 3 to clack 4, and 24 feed 5 and circulation pipe from clack 4 to carrier 1.

25 and 26 are pipes from the four-way piece 9 to the carrier 1.

27 is a pipe leading from the deflector 2 to the boiler through valve 12, and 28 a pipe 10 leading from the deflector to the boiler through valve 13.

29 is a pipe connecting the carrier 1 and deflector 2, screwed into the latter at 33, Fig. 1, and screwed to the former by a coupling- 15 nut at 32.

30 31 are the points where the pipes 25 and 26 are connected with the carrier 1, and 32 is where the pipe 29 is connected to the carrier. 33 is where pipe 29 is connected to the de- 20 flector 2, 34 is where the pipe 27 enters said deflector, and 35 where the pipe 28 enters the same.

36, 37, and 38 are hollow studs screwed into the fire-box supporting the deflector 2. 39 25 and 40 are plates bolted to foundation-ring of fire-box supporting carrier 1.

41 are the fire-bars.

Pipes 27 and 28 are carried by means of expanded tubes 42 43 through the walls of 30 the fire-box and outside the shell.

The working of our invention is as follows: When the pump is supplying water to the boiler, the water enters from the tender by pipe 18 and passes through two-way cock 11 35 to the pump 3 by pipe 19, then passes into pipe 23 through clack 4 into feed and circulation pipe 24 at 44, from whence it passes through four-way piece 9 into bottom of carrier 1 at 30 31, leaving same at 32 and passing 40 into deflector 2 at 33 through pipe 29, then passing into pipes 27 and 28 at 34 and 35 and finally entering the boiler at valves 12 and 13. During the time the pump 3 is working the cock 5 is closed to boiler. When 45 the injector 7, carrying water to carrier and deflector, is working, the water is drawn from the tender through pipe 21 and passed into pipe 22 to clack 4, from whence it passes into pipe 24 at 44, after which it follows the same 50 course as described when the pump is work-

ing. During the time injector 7 is working circulation-valve 5 is closed to boiler. If necessary, pump 3 and injector 7 can be worked simultaneously. When required, the feed-water from pump 3 or injector 7 can be 55 passed direct into the boiler by opening valve 5 and closing stop-valve 6 on pipe 24, leading to carrier 1.

In using the carrier and deflector as a means of generating steam only it is neces- 60 sary to open valve 5 to boiler, so giving the water a complete circulation through the carrier and deflector, the water following the same course as previously described when pump and injector are working. 65

In the event of having to work the supplementary injector 8 the two-way cock 11 is closed to pump 3 and opened to injector 8, which feeds the boiler through the ordinary 70 clack.

The carrier 1 and deflector 2 may be made of iron, steel, copper, brass, or other suitable metal and may be either cast or made of plate metal and riveted, as desired. The deflector may be made flat, as shown on the 75 drawings, or arched, according to circumstances.

Having fully described our invention, what we claim, and desire to secure by Letters Pat- 80 ent, is—

In a boiler, the combination, with a hollow deflector, a hollow fire-bar support, and a pipe connecting the said parts; of a feed-water-supply pipe connected to the fire-bar support, and a connection between the said 85 deflector and the water-space of the boiler, whereby the feed-water is passed through the said support and deflector before it enters the said water-space, substantially as set forth. 90

In testimony whereof we have hereunto affixed our signatures in the presence of two witnesses.

JOHN KING.  
CHAS. DOWNES.  
J. WADDINGTON.

Witnesses:

I. M. AIZPIRI,  
N. G. THORNTON.