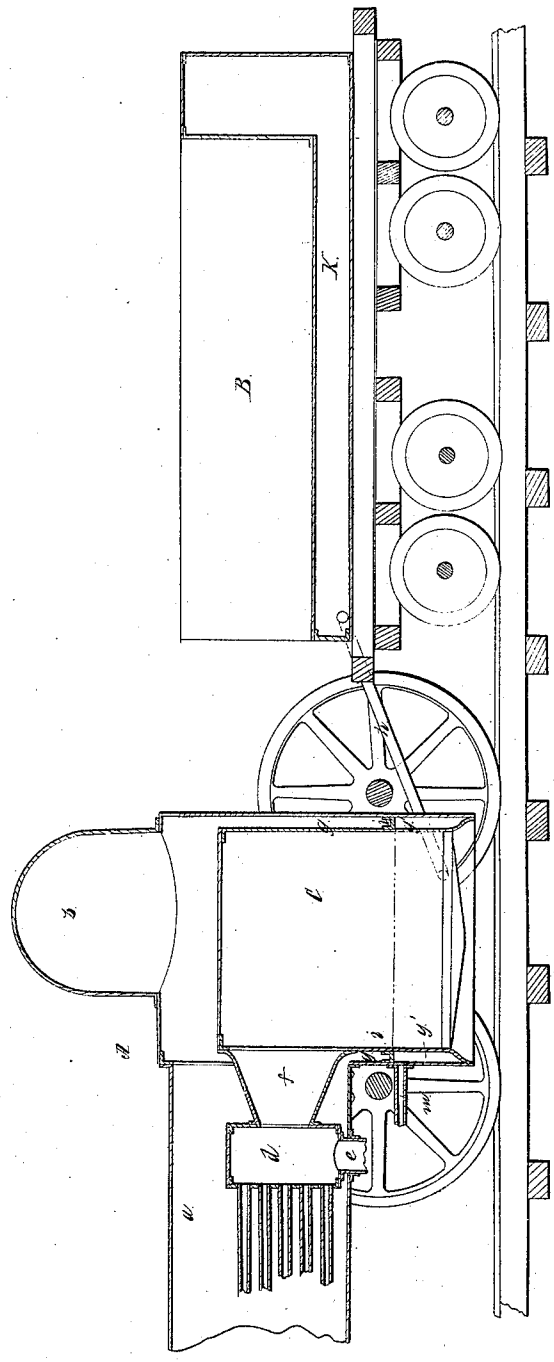
J. W. Farrell,

Steam-Boiler Furnace.

No. 8,955. Patented May 18, 1852.



UNITED STATES PATENT OFFICE.

JAS. W. FARRELL, OF READING, PENNSYLVANIA.

STEAM-BOILER.

Specification of Letters Patent No. 8,955, dated May 18, 1852.

To all whom it may concern:

Be it known that I, JAMES W. FARRELL, of Reading, in the county of Berks and State of Pennsylvania, have invented certain new and useful Improvements in the Furnaces of Steam-Engines, of which the following is a full, clear, and exact description, reference being had to the accompanying drawing, which makes part of this specification, and which represents a sectional view of a portion of a locomotive-engine and of the tender with its water-tank.

My invention and improvement has for its object the protection of the fire plates of the furnaces of steam boilers against the intense heat of the burning fuel; and it consists in isolating the lower portion of the water space surrounding the furnace, from the rest of the boiler, and in connecting it with the water tank by an open pipe or other channel, in such manner that the water of the tank is constantly in open and free communication with said isolated water space to keep the fire plates cool, the heat abstracted by the water from the plates being rendered available by feeding the heated water into the boiler.

The locomotive A and tender B represented in the accompanying drawings in their general external features are similar to those in common use. The boiler *a* being of the tubular variety, and surmounted by a steam dome *b* over the fire box *c*. In front of the sheet is a secondary combustion chamber *d* supplied by a current of air entering through an opening *e* in its bottom to complete the combustion of any inflammable gases that may escape from the fire box unburned. This secondary chamber of combustion is connected with the fire box or principal combustion chamber *c* by a short tapering flue *f*. The fire box is surrounded by a water space *g* in the usual manner, but the lower portion *g'* of this space is separated from the upper portion by a diaphragm, or partition plate *i* placed a foot more or less above the top of the grate bars. The lower portion *g'* of the water space separated from the rest of the boiler, is connected by a pipe *h* constantly open with the water tank *k* of the tender B, which keeps it full of comparatively cool water that protects the inner or fire plates of this part of the boiler from the intense heat of the burning fuel adjacent to them.

In order that the heat abstracted from the fire plates by the water thus supplied from the tank may be rendered available in the generation of steam, this part of the water space is connected with the suction pipe *m* of the pump which feeds the boiler, and which draws the heated water out of the space *g'*, to allow of its replacement by cooler water from the tank, to be in its turn heated and passed through the pump into the boiler.

In order that the coolest water may be left in contact with the fireplates, and the hottest pumped into the boiler, the supply pipe *h* from the tank *k* enters near the bottom, while the discharge pipe *m* of the pump, communicates with the top of the space *g'*. This arrangement not only provides for keeping the fire plates cool while the engine is in motion, but it also provides for keeping these plates cool when the engine is standing still, by the free circulation which will take place between the tank and the water space *g'* through pipes *h* which connect them.

Various changes may be made in the form and arrangement of the parts to adapt them to different circumstances, or to suit the views of different constructors, as my invention is not dependent upon either form or arrangement, so long as the lower part of the water space is kept isolated from the rest of the boiler, and in free and open communication with the water tank.

As there is comparatively little pressure in the lower or isolated part of the water space, stay bolts are not required to strengthen it; consequently the fire plates will present a smooth surface and uniformity of thickness, which will greatly retard their burning out. The constant contact of the feed pump with warm water will protect it from freezing while the engine is going.

What I claim as my invention and desire to secure by Letters Patent is—

Isolating the lower portion of the water space surrounding the furnace, from the upper portion, and connecting it by a free

and constantly open communication with the tank of feed water, in such manner that the feed water of the tank will circulate without being forced by a pump in contact with the fire plates, to cool them, and to be itself heated preparatory to being pumped into the boiler, substantially as herein set forth.

In testimony whereof I have hereunto subscribed my name.

JAS. W. FARRELL.

Witnesses:
JNO. F. BEATY,
CHARLES D. FANIES.