

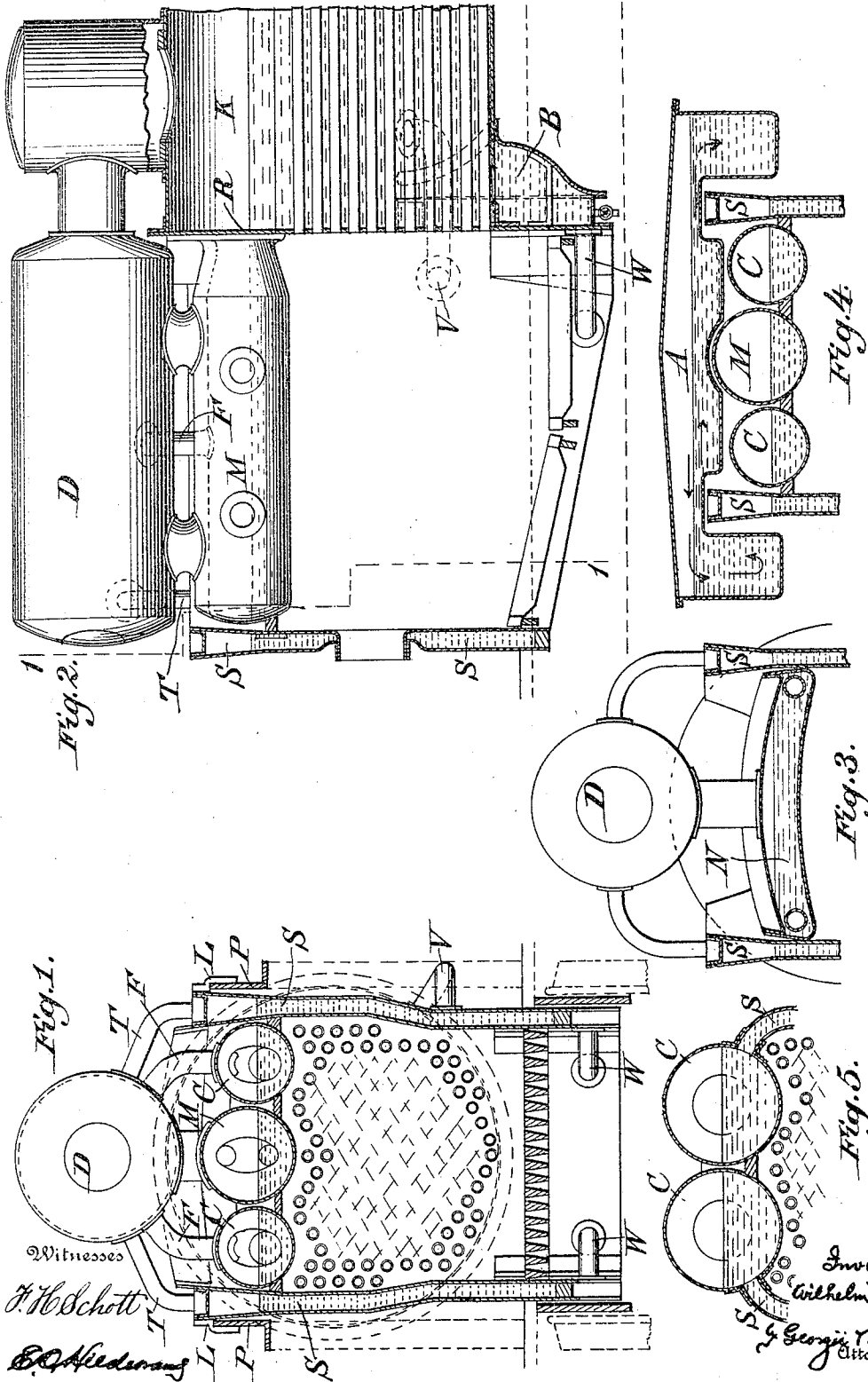
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W. KEMMERICH.

FIRE BOX.

APPLICATION FILED MAR. 24, 1904.



UNITED STATES PATENT OFFICE.

WILHELM KEMMERICH, OF MUNICH, GERMANY.

FIRE-BOX.

SPECIFICATION forming part of Letters Patent No. 784,495, dated March 7, 1905.

Application filed March 24, 1904. Serial No. 199,866.

To all whom it may concern:

Be it known that I, WILHELM KEMMERICH, a citizen of Germany, residing at Munich, Bavaria, Germany, have invented certain new and useful Improvements in Fire-Boxes for Locomotives and the Like; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to locomotive and other steam boilers which have their grate or fire-place inclosed in a fire-box.

The new fire-box is of an improved construction, as it allows to use a very high steam-pressure in the boiler and locomotive without applying stays, bar-stays, or ribs for strengthening the roof of the furnace-chamber and the steam-space. Such stays and bar-stays are hitherto generally in use with the fire-box crown-plate; but they are expensive, cause repairs, and make the interior inaccessible.

While in all boilers with fire-boxes at present in use the considerable expansion of the boiler-shell and of the tubes in consequence of the heat are different, but transferred so to the fire-box walls, damaging their plates and stay-bolts, this is entirely avoided in my new construction.

My fire-box is a separate and self-contained part of the boiler, to which it is attached on the tube-plate or other parts of the barrel, only communicating with it in steam and water spaces. Thus the fire-box can expand for itself and receives no pressure from the boiler or the tubes. In this way my arrangement insures durability and few repairs of the fire-box and accessibility of its parts. It permits to increase the steam-pressure and to build thus boilers for locomotives, ships, torpedo-boats, and other use with the highest power and the least consumption of fuel and water.

I attain the advantages above stated by the peculiarities of arrangement and construction hereinafter more fully described and claimed, and illustrated in the accompanying drawings, in which—

Figure 1 is a cross-section of a locomotive fire-box and surroundings constructed according to my invention. Fig. 2 is a longitudinal

section of the same construction. Figs. 3 and 5 are cross-sections showing modifications of water-heaters forming the roof of the fire-chamber. Fig. 4 shows an open water-heater more arranged above the fire-box.

Referring to the drawings more in detail, the tubular boiler K is separated from the fire-box, as shown in Fig. 2, by the tube-plate R, which is carried up above the tubular portion of said boiler to its shell or beyond it. On each side and at the front the fire-chamber and the grate are inclosed by a vertical water-casing S. This water-casing is built by double plates joined by stay-bolts or the like containing the water and surrounding the grate with exception of the tube-plates side. The space between the plates of casing S can be widened in the upper part, as shown in Fig. 1, to obtain more evaporating-surface and more room for cleaning holes and for fixing the pipes T, which lead off the steam to the reservoir D. Above the fire-space and the grate are arranged in the top of the water-casing S one or more water-containing barrels or vessels C C M, which are preferably cylindrical in shape and arranged side by side or otherwise, forming the roof of the fire-box. The space between these vessels C C M and the casing S is filled in with a fireproof material. The steam-reservoir D, arranged above the heaters C C M, receives also their steam by means of the pipes F or otherwise, and it is in communication with the dome or steam-space of the boiler K.

Instead of closing the top of the furnace by a plurality of cylinders a single flat water vessel N after Fig. 3 can be placed in the upper part of the water-casing S with or without a steam-reservoir D. Another arrangement is shown in Fig. 5, where the top cylinders C C are in direct connection with the water-casing S. Another water-container, B, is arranged behind the lower part of the tube-plate R in order to cool it. This container B below the boiler-barrel, with communication of their water-spaces, serves also as a collector for the deposits from the water and is provided with a blow-off cock.

The water-casing S is supplied with water from the boiler K through the pipes V and

W, while the cylinders C and M receive their water through openings in the tube-plate R. This intercommunication between the various water-containers C, M, S, K, and B insures the equalization of the water-levels and of the steam-pressures in the boiler and the fire-box parts. It will be understood that in all the arrangements above described the steam-container D can be dispensed with, and the cylinders C and M or vessel N and casing S can communicate directly with the usual steam-dome or with the steam-space of the boiler K.

In some cases an open water-container A is arranged above the top of the fire-box, as shown in Fig. 4. This tank may serve as a feed-water heater or water-purifier, utilizing the wasted heat escaping from the top of the fire-box. The tank A may be provided at the sides with pockets for collecting the scale and deposits from the water.

The weight of the upper parts of the fire-box C, M, or N and D is transferred partially to the main boiler, to which they are attached; further, to the tube-plate R and the water-casing S. This latter is fixed to the tube-plate or parts of it beyond the boiler-shell. The casing S is further supported and guided at the sides by the flanges L, as shown in Fig. 1, which overlap strong girders P, which are carried by the locomotive-frame.

It will thus be seen that the main boiler and the tubes can expand in consequence of the heat differently without exercising an injurious pressure to the fire-box parts, which are not hindered in their expansion. The construction of the fire-box is consequently strong and durable and practicable for the highest steam-pressures which may be intended.

Having thus fully described my invention and the manner of its operation, what I claim as new, and desire to secure by Letters Patent of the United States, is—

1. Means for generating steam, comprising, in combination, a tubular boiler, a fire-box arranged adjacent thereto, double walls forming a vertical water-casing inclosing the furnace and grate at the sides and front, horizontally-disposed cylindrical vessels forming the top of the fire-box, passages communicating be-

tween the boiler and the water-casing and the top vessels, a steam dome or container, and passages leading from the water-heaters to the steam-container.

2. Means for generating steam, comprising, in combination, a boiler, a fire-box arranged adjacent thereto, a vertical water-casing forming the sides and the front of the fire-box, a water-containing vessel arranged above and forming the top of the fire-box, a water-receptacle lying to the rear of the fire-box beneath the end of the boiler and cooling the lower part of the tube-plate, and passages communicating between the boiler and the several water-containing vessels, the casing and the vessel forming the top of the fire-box.

3. Means for generating steam, comprising, in combination, a tubular boiler, a fire-box arranged adjacent thereto, double walls forming a vertical water-casing inclosing the furnace and grate at the sides and front, horizontally-disposed cylindrical vessels forming the top of the fire-box, a water-receptacle lying to the rear of the fire-box beneath the end of the boiler and cooling the lower part of the tube-plate, and passages communicating between the several water-containing vessels, the casing and the cylindrical top vessels.

4. Means for generating steam, comprising, in combination, a boiler, a fire-box arranged adjacent thereto, a vertical water-casing forming the sides and the front of the fire-box, a water-containing vessel arranged above and forming the top of the fire-box, a steam dome or container, a water-receptacle lying to the rear of the fire-box beneath the end of the tube-plate, and passages communicating between the boiler and the several water-containing vessels, the casing and the vessel forming the top of the fire-box and passages leading the steam from the water-heaters to the steam-container or to the boiler directly.

In testimony whereof I affix my signature to this specification in the presence of two witnesses.

WILHELM KEMMERICH.

Witnesses:

ABRAHAM SCHLESINGER,
ULYSSES BYWATER.