June 19, 1928. 1,674,241

P. H. CONNIFF

FIRE BRICK CONSTRUCTION FOR LOCOMOTIVE FIRE BOXES

Filed Dec. 10, 1924

Fig. 1.

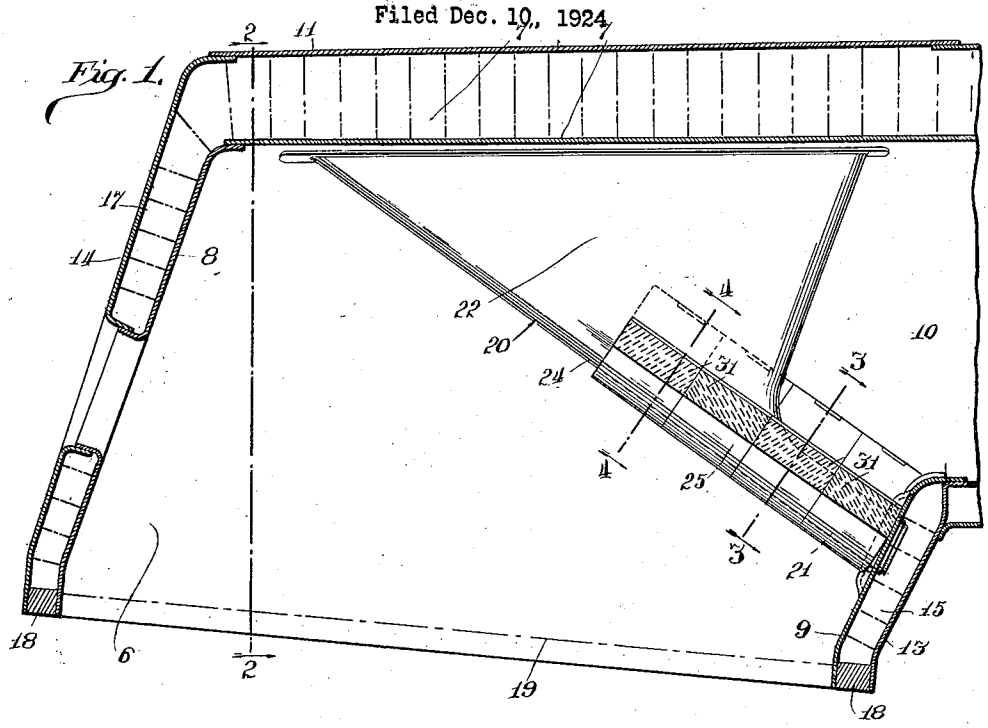


Fig. 2.

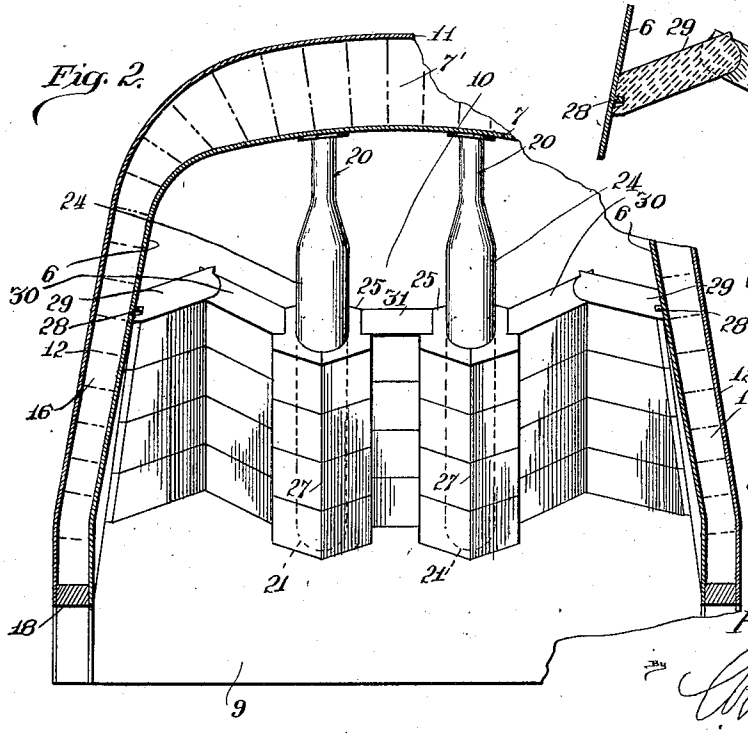


Fig. 3.

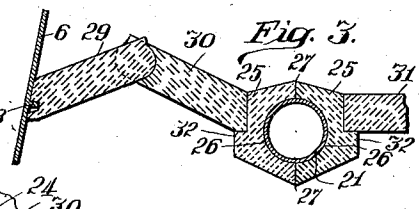


Fig. 4.

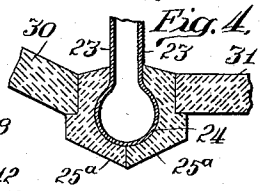
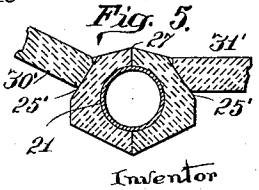


Fig. 5.



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UNITED STATES PATENT OFFICE.

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FIRE-BRICK CONSTRUCTION FOR LOCOMOTIVE FIRE BOXES.

Application filed December 10, 1924. Serial No. 754,890.

My invention relates generally to improvements in firebrick construction for locomotive fireboxes but relates more particularly to firebrick construction adapted for use in locomotive fireboxes equipped with water circulating elements. There are in use in locomotive fireboxes water circulating elements of which the well-known Nicholson thermic siphon is the best example. These circulating elements extend from the throat sheet upwardly and rearwardly. In use the lower edge or bottom portion of the water circulating element is the first to give way, thus necessitating repair or replacement of the water circulating element. This earlier failure of the lower bottom portion no doubt results from the fact that such portions are closer to the fire and therefore are subjected to more intense heat as well as the more forcible impingement of the flames and the products of combustion. In any event, whatever may be the reason such portions are the first to give way under actual conditions.

The general object of my invention is to provide means for lengthening the life of such firebox water circulating and steaming elements.

It is also an object of my invention to provide means for so protecting the most vulnerable portion of the water circulating and steaming element that the element will wear out substantially uniformly throughout and thereby extend the effective life of the entire element.

Again I aim to provide means for protecting water circulating elements which means shall be simple, inexpensive, easily applied and adapted to fireboxes of usual or desired construction.

A further object of my invention is to provide a construction which shall not only protect the water circulating and steaming elements against premature destruction but shall also form a fire arch adapted to assist in the combustion of the fuel.

My invention consists generally in a device of the form, arrangement, construction and co-operation of the parts, whereby the above named objects, together with others that will appear hereinafter, are attainable, and my invention will be more readily understood by reference to the accompanying drawings which illustrate what I consider, at the present time, to be the preferred embodiment thereof.

In said drawings:

Fig. 1 is a vertical longitudinal central sectional view through a locomotive boiler firebox equipped with a device embodying my invention.

Fig. 2 is a sectional view substantially on the line 2—2 of Fig. 1, a portion of the firebox being broken away because of lack of space.

Fig. 3 is a detail sectional view substantially along the line 3—3 of Fig. 1.

Fig. 4 is a detail sectional view substantially along the line 4—4 of Fig. 1, and

Fig. 5 is a fragmentary detail sectional view similar to Fig. 3, but illustrating a modified construction.

Referring first to Figs. 1 to 4 inclusive, the firebox is formed of the side sheets 6, the connecting crown sheet 7, the back sheet 8, the throat sheet 9 and the flue sheet which is not shown but which is arranged at the forward end of the combustion chamber 10. While a firebox of the combustion chamber type is shown, this, it should be understood, is by way of illustration and not by way of limitation.

Spaced from the firebox sheets will be found the usual wrapper, to wit, the top plate 11, the side plates 12, the outside throat plate 13 and the back plate 14.

The wrapper with the fire sheet form the several water legs of the boiler, to wit, the front water leg or throat 15, the side legs 16—16 and the back water leg 17, all of which are closed at the bottom by the mud ring 18.

The grates or other devices have been omitted from the firebox as they form no part of the invention, but it will be understood that if it is a coal burning locomotive the grates will be arranged generally along the line 19, whereas if it is an oil burning locomotive the bottom of the firebox will be appropriately formed and the oil burner usually arranged below the line 19. In either event, there is generated a flame which impinges, on its way to the flues, with great force and intensity upon the lower portion of the water steaming and circulating elements about to be described and which is responsible for the earlier destruction of such portions.

The water circulating and steaming elements are the well-known Nicholson thermic siphons, and need not therefore be described in detail. Suffice it to say that they are generally triangularly shaped hollow members which are connected to conduct water from the water leg 15 to the space 7' above the crown sheet 7. Two Nicholson thermic siphons are shown at 20 but this, it should be understood, is by way of illustration and not by way of limitation, as the number may be more or less depending upon the characteristics of the particular firebox. Each siphon, as shown, is composed of an upwardly and rearwardly inclined tubular bottom or neck portion 21 and a substantially triangular body portion 22 which is composed of the parallel side sheet portions 23 which merge into the lower bulge portion 24 probably best shown in Fig. 4. The bulge portion 24 is substantially a continuation of the tubular intake neck portion 21. It is this intake neck portion and the lower bulging and contiguous portion of the siphons that is subjected to the greatest impinging action of the flames and products of combustion and which is the portion in use which is first to give way. This impinging action is particularly severe in oil burning locomotives of certain types, but also occurs to a greater or lesser degree in other locomotive boilers, irrespective of the character of the fuel used.

In order to protect such portions of the siphon against these destructive forces I provide a fire brick structure of novel character.

Thus along the intake neck portion of the siphon I provide complementary bricks 25, each of which is provided with a substantially semi-cylindrical concavity 26 so that when placed in position they surround the intake neck, the faces 27 thereof substantially meeting. It should be obvious that when the bricks 25 are so positioned if they can be prevented from lateral separation they will be supported by the siphon notwithstanding the severe jarring and jolting action which obtains in locomotive practice. To this end I have built an arch of firebrick between the firebox side sheets and the siphon and where there is more than one siphon (as in the instant case) also between respective siphons. Thus supported on the side sheets 6 in any suitable manner as for example, by means of metallic lugs 28 welded to the side sheets, are side brick 29 which extend upwardly and inwardly into mutually leaning contact with the bricks 30, the lower inner ends of which come into supporting engagement with the adjacent siphon engaging brick members 25. This construction causes the bricks 29 and 30 to exert a considerable force tending to hold the brick 25 against the contiguous portion of the siphon and therefore prevent any such looseness as would permit them to vibrate or chatter to a detrimental extent under the jolting action of the locomotive in use. Furthermore, these brick will so act notwithstanding differences in the spacing of the siphons from the side sheets or irregularities in the side sheet limits. Where a single siphon only is installed the bricks 29 and 30 would be sufficient with the brick 25 as is at once obvious, but where a plurality of siphons are installed the arch is completed by a central or key brick 31. Thus, it should be obvious that the brick 25 are firmly and securely held in place and yet when it is necessary to repair or replace them it can be easily accomplished.

Better to support the engaging portion of the bricks 30 and 31 I prefer to provide the bricks 25 with ledge portions 32.

Those brick which engage the bulge portion 24 of the siphon are similar to the brick 25 and have therefore been given the reference character 25^a. The upper portion of the brick 25^a however, do not extend substantially to the medial line of the siphon as in the bricks 25 but are cut away to conform to the side walls 23 of the siphon body. In other respects they are the same.

In Fig. 5 I have shown a modification in which the siphon engaging brick are provided with bevel faces 25' with which the ends 30' and 31', of suitably formed brick taking the place of the bricks 30 and 31, abut. This construction forms a wedging action with respect to all of the bricks.

The many advantages of my invention will now be understood without further comment by those skilled in the art to which it relates.

I claim:

1. A locomotive firebox having side sheets and a water circulating and steaming element spaced therefrom in combination with a firebrick arch extending from side sheet to side sheet, said firebrick arch being composed of complementary brick which contact the lower portion of the water circulating and steaming element and enclose the bottom thereof, at least one of said complementary bricks being held in place by a plurality of upwardly extending brick having mutually leaning contact one with the other at one end and one thereof engaging the side sheet while the other engages the complementary brick, said complementary brick having a portion inclined to the vertical plane and forming a seat for the last mentioned brick in engagement with it.

2. A locomotive firebox having side sheets and a plurality of water circulating and steaming elements spaced from the side sheet and from each other in combination with a firebrick arch extending from side sheet to side sheet, said arch being formed of

complementary brick arranged upon opposite sides of the water circulating and steaming elements and having portions which extend under the bottom of the elements together with brick extending between the side sheets and the nearest element engaging bricks, and other brick extending between the element engaging brick that are positioned upon the inner sides of said element whereby the element engaging brick are held firmly in place.

In testimony whereof, I have hereunto set my hand, this 1st day of December, 1924.

PHILIP H. CONNIFF.