

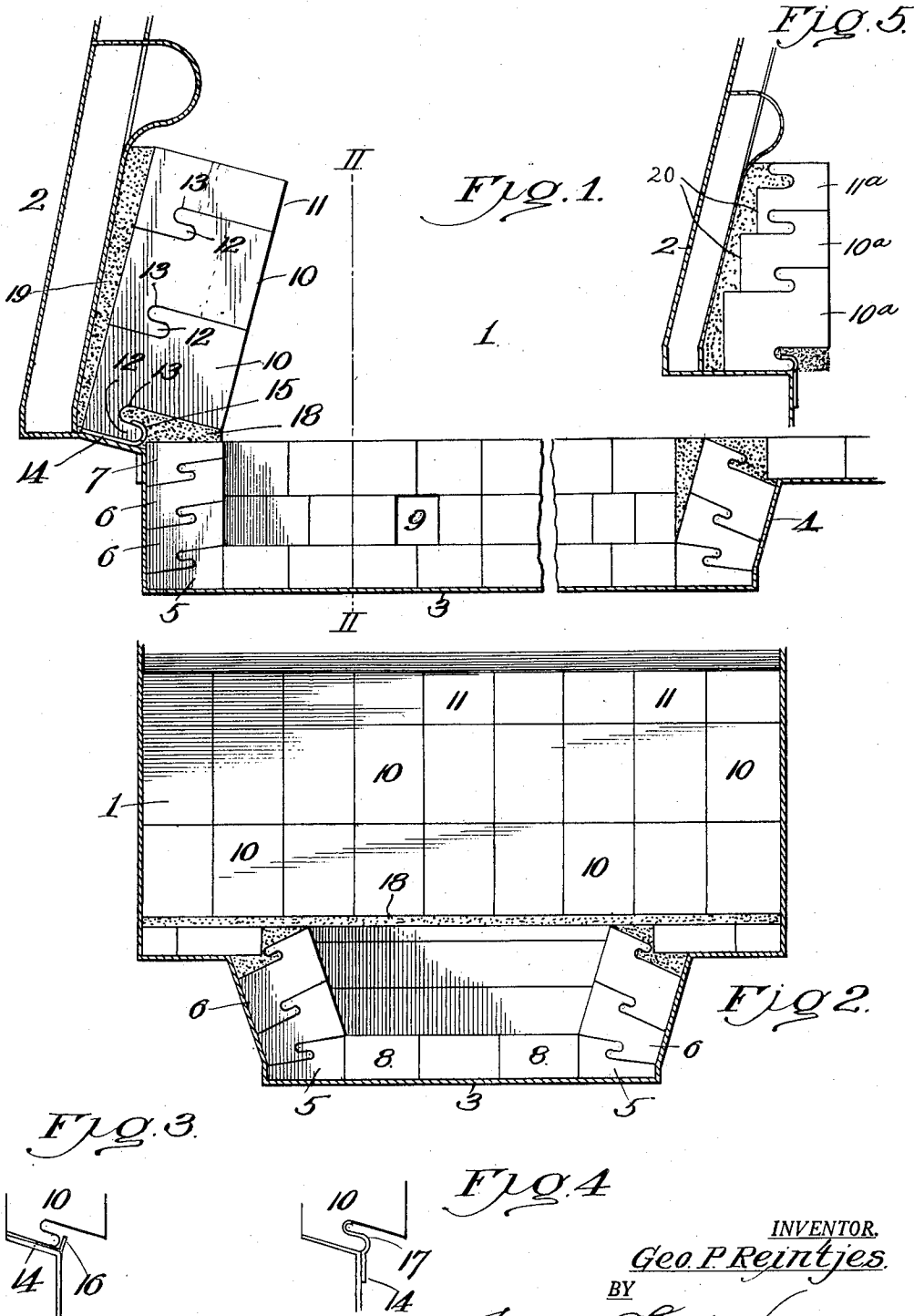
Dec. 31, 1929.

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1,741,584

LOCOMOTIVE FIRE BOX LINING

Filed July 25, 1927



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LOCOMOTIVE-FIRE-BOX LINING

Application filed July 25, 1927. Serial No. 208,251.

This invention relates to locomotive boilers or the like, and more particularly to that class of boilers in which oil is utilized as a fuel.

Boilers of the class mentioned are commonly provided with fire brick linings at the points most susceptible to burning out under the intense heat of combustion of liquid fuels, and this susceptibility is greatest at the point upon which the flames from the burner or combustion chamber, as in most boilers of this point in the most conventional type of such boilers, is below the point usually occupied by the front door opening leading to the combustion chamber, as in most boilers of this character the burner discharges from the rear wall of the ash pit chamber toward the front wall of the boiler contiguous to the front end of the ash pit chamber.

Ordinarily fire brick linings, especially those protecting the wall of the boiler toward which the burner discharges, last about three weeks before renewal becomes necessary, and this frequent replacement is almost exclusively due to the fact that the lining, especially at the point mentioned, falls apart or becomes dislodged under the jolting and jarring to which the locomotive is subjected in service. Various methods, as by wedging and otherwise, have been resorted to in the endeavor to hold the walls intact for an extended period of service, but today the same objectionable conditions obtains.

Accordingly, I have devised a construction in which the wall mentioned is locked securely against dislodgment, by providing a wall composed of a series of superposed units or blocks interlocked together and to the wall or shell of the locomotive fire box, and I have found that interlocking units of the same general character are advantageous as a lining for the ash pit chamber itself.

With the object in view of producing a lining construction susceptible of use for a long or indefinite period, and which therefore will maintain the locomotive in operative condition without any necessity for frequent repair of the fire box linings, this invention is directed, and in order that it may be fully understood, reference is to be

had to the accompanying drawing, in which:

Figure 1 is a vertical longitudinal section of a part of a conventional type locomotive boiler fire box equipped with a lining embodying the invention.

Figure 2 is a cross section taken on the line II—II of Figure 1.

Figures 3 and 4 are fragmentary vertical sections showing modifications of the plates for securing the bottom tier of units of the front wall section against dislodgment.

Figure 5 is a view similar to Figure 1 of a modified construction.

In the drawing, 1 indicates the combustion chamber, 2 the front wall, and 3 what is ordinarily the ash pit chamber of the fire box of a locomotive of oil-burning type, and 4 is the rear wall of the ash pit chamber, through which the burner or burners (not shown) project for the purpose of discharging diagonally upward and forward.

The original ash pit chamber, constituting a depressed section in the combustion chamber in old locomotives, but being intentionally constructed in new equipment as a part of the combustion chamber, is provided with a fire brick lining which may be of any suitable character, but preferably consists of superimposed bottom units 5 constituting securing means for the wall lining of the depressed portion, said bricks or units having stepped upper faces, one or more intermediate units 6 stepped at both their upper and lower faces, and top units 7 having stepped lower faces, the intermediate units being interlocked together and to the bottom units, and the top units interlocked to the topmost intermediate units, the stepped arrangement being such that it shall be impossible for any of the units above the bottom units, to slide or move inwardly or upwardly. The side linings of the ash pit chamber and the lining for the rear wall thereof is likewise constructed, but are shown as of sloping or inclined construction as indicated in the drawing. They are preferably shallower than the front wall and need not be equipped with units corresponding to units 7. The bottom of the ash pit chamber may and preferably will be composed of plain rectangular units

8, which are laid so as to prevent inward movement of the bottom units at the ends and sides, and thus guard against inward movement or creepage simultaneously of the superposed end and side wall units. In the preferred construction the intermediate side wall units will be narrower than the underlying and overlying units so as to stand in break-joint relation therewith as shown in Figure 1, as by this arrangement it will be a simple matter to provide one or more air inlet holes 9 in the side wall linings, while still maintaining a stable support for the units forming the upper side or sides of such opening or openings. The air supply hole or holes provide for more efficient and economical combustion, but have no relation to the invention itself.

Referring now the lining construction for the front wall of the combustion chamber, toward which the flame from the burner or burners is discharged, and at which point it has heretofore been impracticable to properly protect against the dislodgment of the lining therefor, it will be noted that I have provided a plurality of tiers of superposed units, there being one or more units 10 of each set or column, topped preferably by a shallow unit 11. Ordinarily the wall at the front of the conventional boiler slopes upwardly and rearwardly as shown by Figure 1, and the lining at this point preferably has a substantially corresponding slope or inward leaning. Under such conditions it has heretofore been impracticable, as far as I am aware, to provide a wall lining which would stand up under any extended period of service, and hence it is the chief object of the invention to provide a lining of units which may lean inward as described, if desirable, and yet maintain their positions for an indefinite period. To accomplish this purpose, each unit is provided with a stepped underface, the step being of substantially compound curved form in cross section so as to provide an inwardly projecting lug 12 and an overlying groove 13. Each of the units 10 is also provided at its upper side with a corresponding but reversed step formation, and the lower stepped side of overlying tiers of units interlock with the oppositely or opposing stepped faces of the units below, so that it shall be impossible for any of the units except the bottom ones to slide or move inward, and to prevent such movement on the part of said bottom units, their lower stepped faces are engaged by one or more abutment or stop plates 14. Each plate 14, if there are more than one, is securely fastened in any suitable manner, not shown, to an underlying portion of the locomotive. In Figure 1, the plate 14 is provided with an upwardly-turned outwardly-facing hook 15 interlocked with the stepped portion of the bottom tier of units 10. In Figure 3,

the plate 14 is provided with an upwardly-projecting arm 16 inward of the steps of the bottom units 10 to prevent the latter moving inwardly. In Figure 4, the stop plate 14 has a terminal 17 which follows the compound curvature of the engaged unit 10, and will guard more effectively against toppling inward of the entire front wall referred to, than the terminals 15 and 16 of the other plates 14 mentioned. It is to be understood however, that these plates 14 are primarily intended as stop plates, as in all cases there will preferably be a bed 18 of heat-resisting material underlying and forming a stable support for the said wall, and there will also be a corresponding filling 19 interposed directly between the wall and the front wall of the furnace, in the event the wall and lining thereof, are not in parallel relation. As the sides of the wall composed of the units 10 and 11 about the sides of the furnace wall, as shown in Figure 2, there can be no lateral shifting of the units of the wall, and for this reason there need be no lateral interlocking or break-joint relationship between them, and the wall can be erected more readily and economically.

Figure 5 illustrates a modified construction in which the blocks 10^a have a stepped relation at their rear ends at 20 in proximity to the boiler. This type of construction is believed to be more efficient than that shown in Figure 1, inasmuch as a wall tapering as illustrated makes it possible for the upper tiers of blocks to conduct heat to the water in the boiler with greater ease and dispatch. It will be apparent that where blocks of less thickness are used, they must transfer their heat relatively rapidly as otherwise they will fuse due to the intense heat in the combustion chamber.

From the above description, it will be apparent that I have produced a device which embodies the features of construction set forth as desirable in the statement of the objects of the invention, and which is susceptible of modification in minor particulars without departing from the principle of construction involved or from the spirit and scope of the appended claims.

I claim:

1. The combination with the wall of a combustion chamber, of a lining therefor, comprising a plurality of courses of tiles, the tiles of each course being interlocked together at their meeting faces in a step-joint relation against upward movement from or inward sliding movement upon the underlying tiles, said step-joint relation being produced by complementary lugs and grooves on adjacent tile, and securing members fastened to the combustion chamber and engaging the lugs of predetermined tile to prevent endwise shifting thereof in one direction.

2. The combination with the wall of a com-

bustion chamber, of a lining therefor comprising a plurality of courses of tiles, the tiles of each course being interlocked together at their meeting faces in a step-joint relation against upward movement from or
5 inward sliding movement upon the underlying tiles, said step-joint relation being produced by complementary lugs and grooves on adjacent tile, and securing means fastened
10 to the wall of the combustion chamber and engaging predetermined tile to prevent endwise shifting movement thereof in one direction.

3. The combination with the wall of a combustion chamber, of a lining therefor comprising a plurality of courses of tiles, the tiles of each course being interlocked together at their meeting faces in a step-joint relation against upward movement from or
20 inward sliding movement upon the underlying tiles, said step-joint relation being produced by complementary lugs and grooves on adjacent tile, and securing members fastened to the wall of the combustion chamber and corresponding at one end to the shape
25 of the lugs and in engagement with the lugs of predetermined tile to prevent endwise shifting movement thereof in one direction or vertical upward movement.

4. The combination with the wall of a combustion chamber, of a lining therefor comprising a plurality of courses of tiles, the tiles of each course being interlocked together at their meeting faces in a step-joint relation
35 against upward movement from or inward sliding movement upon the underlying tiles, and securing means bearing a fixed relation to the wall of the combustion chamber and engaging predetermined tile to prevent endwise
40 movement thereof away from the wall of the combustion chamber.

In testimony whereof I affix my signature.
GEORGE P. REINTJES.