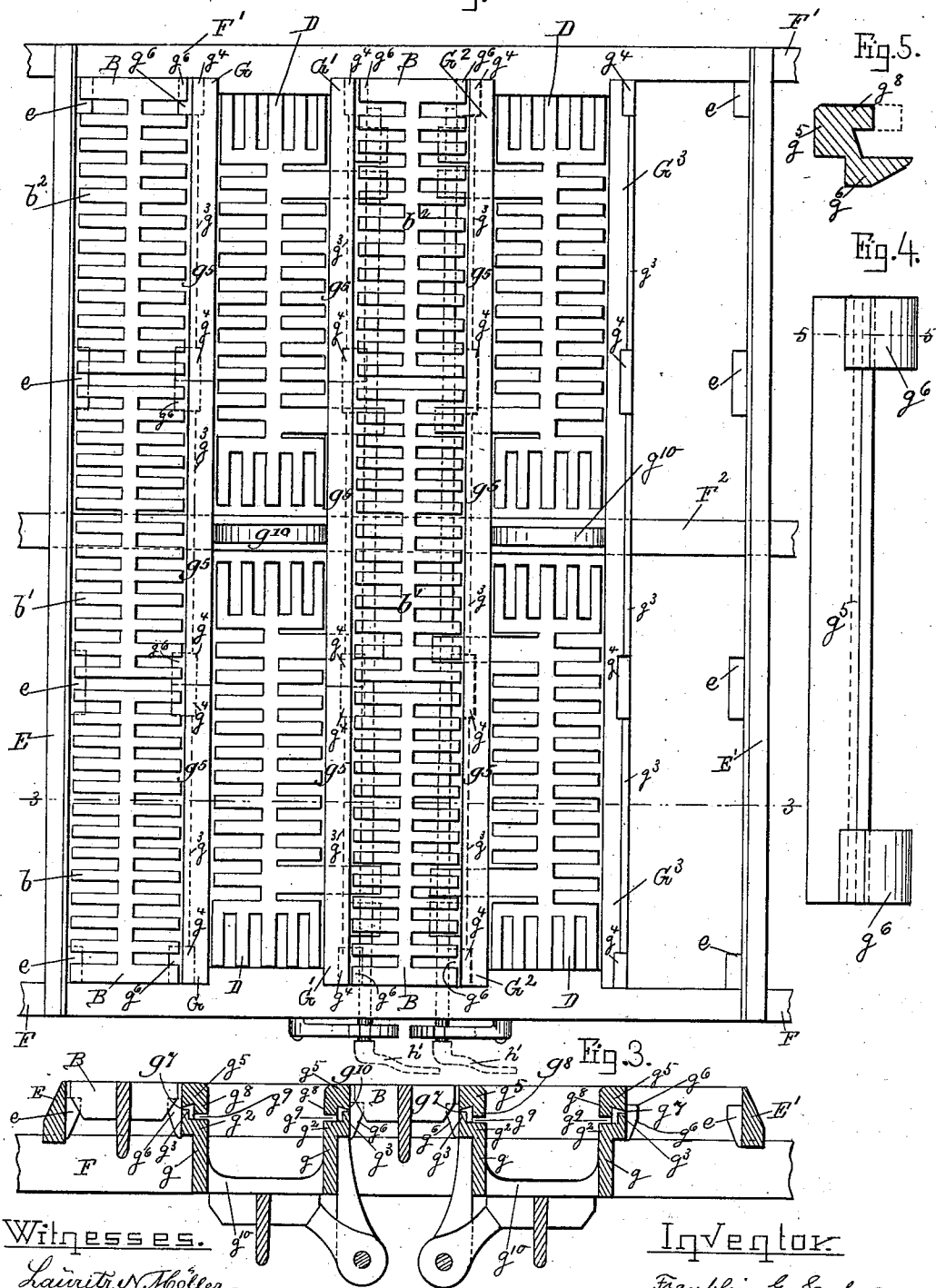


F. G. SAYLOR.
GRATE.

No. 563,986.

Patented July 14, 1896.

Fig. 2.



Witnesses.

Laird W. Hollar
Charles M. Burke

Inventor.

Franklin G. Saylor
by W. A. Copeland
his atty.

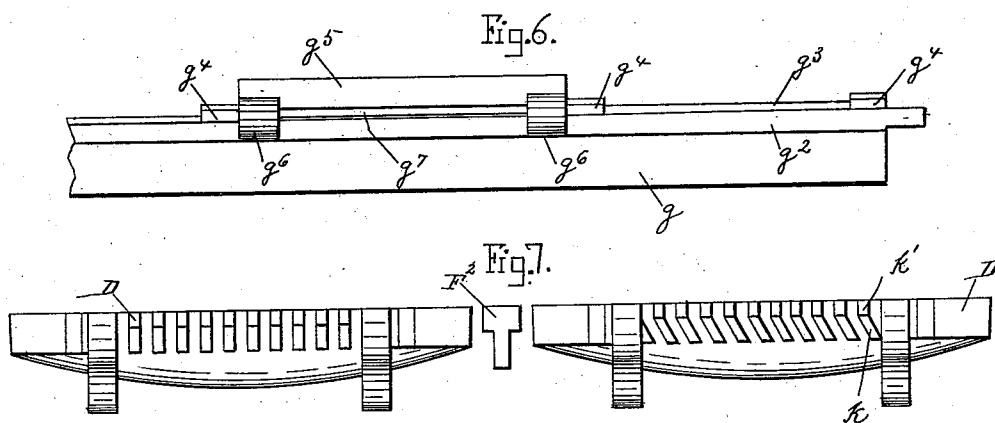
(No Model.)

3 Sheets—Sheet 3.

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Witnesses.

Lauritz N. Möller
Charles Burke

Inventor.

Franklin G. Saylor
by *N. A. Leopeland*
his atty.

UNITED STATES PATENT OFFICE.

FRANKLIN G. SAYLOR, OF BOSTON, MASSACHUSETTS.

GRATE.

SPECIFICATION forming part of Letters Patent No. 563,986, dated July 14, 1896.

Application filed November 19, 1895. Serial No. 569,395. (No model.)

To all whom it may concern:

Be it known that I, FRANKLIN G. SAYLOR, a citizen of the United States, residing at Boston, in the county of Suffolk and Commonwealth of Massachusetts, have invented a new and useful Improvement in Grates, of which the following is a specification, reference being had to the accompanying drawings, which form a part hereof.

My invention relates to that class of grates comprising a series of grates alternating with each other in planes of different levels and upright walls between each grate in the lower plane and its adjacent grate in the upper plane. When these intermediate walls are integral and air-tight, they become heated to such a high degree that they soon burn out, and they also very often buckle and warp.

The object of my invention is to construct the walls in such a manner as to avoid the excessive heating and burning out and buckling of the walls. I attain these objects in the manner which will be more particularly described and claimed.

In the drawings, Figure 1 is a front elevation of a return-flue boiler embodying my invention, the front wall being broken away and two of the top grates removed. Fig. 2 is a plan view of the grates. Fig. 3 is a vertical cross-section on line 3 3 of Fig. 2. Fig. 4 is a side elevation of one of the "refractory" pieces, as I term them, or removable top portion of the wall. Fig. 5 is a cross-section on line 5 5 of Fig. 4. Fig. 6 is a side elevation of a portion of the side wall of one of the boxes or troughs of the grate. Fig. 7 is a side elevation of the two sections of one of the lower grates, with the cross-bar between them detached.

I have shown my grate as used with a return-flue boiler A, although it is adapted for use in any boiler, furnace, range, or stove, or wherever else grates are used, and I have represented it as adapted for three upper grates and two lower grates forming boxes or troughs, the right-hand upper grate being removed for purpose of showing more clearly the construction of the walls. I have also, for clearness, removed the locking-bar at the front of the grate. I preferably make the upper grates B in short sections $b\ b'\ b^2$, placed endwise to each other with a space between them to al-

low for expansion of the metal when heated. It is also a matter of convenience in handling. On the two sides of the fire-box are side carrying-bars E E', having lugs e , which support one side of the outside upper grates B. At the front and rear of the fire-box are the front and rear carrying-bars F F', and across the middle is the resting-bar F². Extending from front to rear are walls G G' G² G³, which separate the upper grates from the adjacent lower grates, and help support the grates. In the preferred form of construction, each wall is made with a lower portion g and an upper portion g^5 . This lower portion g of each wall is formed with a flanged shoulder g^2 and a lip g^3 , extending throughout its length. It also has a series of lugs or short tongues g^4 , on which rest the upper portions g^5 of the walls, which I term "refractory" bars. I prefer to make these refractory bars in short-length sections with a space between the ends.

Each refractory bar g^5 has at each end a lug g^6 , which, with the flange g^8 , forms a groove for tongues g^4 , the tongues g^4 holding the refractory bars sufficiently high to leave a narrow opening g^7 , as shown in Figs. 3 and 6, between the refractory bar and the lip g^3 , except where it rests on the tongues g^4 . The refractory bar has on one side a downwardly-projecting flange g^8 , which overhangs the shoulder g^2 of the under portion g at a short distance above it and a little to one side of the lip g^3 , thus leaving between the upper and lower wall-sections a sinuous passage g^9 , extending entirely through the wall and including the distance between the lugs g^6 . The lip g^3 is not essential, but is desirable to give sinuosity to the passage.

When the walls are solid or unperforated, they become so highly heated that the walls burn out very quickly and buckle and warp out of shape. By having an air-passage, as described, there is constantly a circulation of air which prevents the walls from becoming heated to nearly as high a degree, and therefore they wear very much longer, and retain their shape without buckling. The upper sides of the lugs g^6 also form rests for support of the upper grates. The flange g^8 may be extended lower down, if desired, as shown in dotted lines in Fig. 5. In order to give

the walls additional power to resist the action of the heat, I prefer to cast the walls in pairs with a central cross bar or brace g^{10} and end bars g^{11} , thus forming with the included bottom grate a box or trough, the end bars g^{11} resting upon the front and rear carrying-bars F F'. The lower grates D are preferably hinged for dumping, one of them being shown dropped in Fig. 1 and the other in position. I employ a fastening device to prevent the hinged grate from self-dumping, and the preferred means is a ratchet-and-pawl device h , as shown in Fig. 1. h' h' are socket-wrenches for turning the grates.

I regard it as desirable to make the air-passage through the walls sinuous, so as to deflect the current of air, as deflected currents will hold the gases nearer to the surface of the burning fuel than a direct current. In order to still further deflect the current of air and produce antagonistic currents, I prefer to form one section of each lower grate with the cross-bars made angular, having their lower portions k set at an angle with the upper portions k' .

What I claim as my invention is—

1. In a trough-grate, a series of grates alternating with each other in planes of different level, intermediate walls between the grates in the lower plane and the grates in the upper plane, the side walls having separable top portions or refractory pieces, the lower portions having flanged upper edges with lugs or tongues extending above said flange on which the refractory pieces rest, the refractory pieces having on one side a downwardly-projecting flange and on the other side downwardly-projecting flanged short guides with an interval between them, the refractory pieces being supported on the lugs above the flanges of the lower portions so that there is a passage, sinuous in cross-section, through the wall between the lower portion and the refractory pieces, substantially as described.
2. In a trough-grate, a series of grates alternating with each other in planes of different level, intermediate walls between the grates in the lower plane and the grates in the upper plane, the side walls having separable top portions or refractory pieces g^3 , the lower portion g having a flange-lip g^3 throughout its length and having at intervals lugs g^4 of greater width than the lip g^3 and projecting above the lip g^3 , the refractory pieces having on one side a downwardly-projecting flange g^8 and on the other side, at intervals, downwardly-projecting flanged guides g^6 , the refractory piece resting on the lugs g^4 which fit in the groove between the guides g^6 and flange g^8 , and leaving a passage, sinuous in cross-section, through the wall between each refractory piece g^5 and the lower portion g , substantially as described.
3. In a trough-grate, a series of grates alternating with each other in planes of different level, intermediate walls between the grates in the lower plane and the grates in the up-

per plane, the side walls having separable top portions or refractory pieces, the lower portion having a flanged upper edge with lugs or tongues extending above said flange on which the refractory pieces rest, the refractory pieces having on one side a downwardly-projecting flange and on the other side downwardly-projecting flanged guides with an interval between them, the refractory piece being supported on the lugs above the flange of the lower portion so that there is a passage, sinuous in cross-section, through the wall between the lower portion and the refractory pieces, the flanged guides of the refractory pieces on the alternate vertical walls facing in opposite directions, the tops of said guides being offset below the tops of the refractory pieces and forming ledges which support the top grates, substantially as described.

4. In a trough-grate, a series of grates alternating with each other in planes of different level, intermediate walls between the grates in the lower plane and the grates in the upper plane, the side walls having separable top portions or refractory pieces g^3 , the lower portion g having a flange-lip g^3 throughout its length and having at intervals lugs g^4 of greater width than the lip g^3 and projecting above the lip g^3 , the refractory pieces having on one side downwardly-projecting flanges g^8 and on the other side, at intervals, downwardly-projecting flanged guides g^6 offset below the tops of the refractory pieces, the refractory pieces resting on the lugs g^4 which fit in the groove between the guides g^6 and flange g^8 , and forming a passage, sinuous in cross-section, through the wall between each refractory piece and the lower portion, the flanged guides g^6 on the refractory pieces of alternate vertical walls facing in opposite directions and forming ledges which support the separable top grates, substantially as described.

5. In a trough-grate, a series of grates alternating with each other in planes of different level, intermediate walls between the grates in the lower plane and the grates in the upper plane, the side walls having separable top portions or refractory pieces, the lower portions having lugs at intervals upon the upper edges on which rest the refractory pieces, the refractory pieces having on one side downwardly-projecting flanges and on the other side downwardly-projecting guides with intervals between them, the guides and the flanges forming grooves which shut down over the lugs on the lower portions, the guides of the refractory pieces forming offsets below the tops of said refractory pieces, said offsets facing in opposite directions on the alternate vertical walls, and forming ledges which support the separable top grates, substantially as described.

6. In a trough-grate, a series of grates alternating with each other in planes of different level, intermediate walls between the grates in the lower plane and the grates in the up-

per plane, the side walls having separable
top portions or refractory pieces, said refrac-
tory pieces having on one side downwardly-
projecting flanges and on the other side down-
5 wardly-projecting guides which together with
the flanges form grooves which receive the
upper edges of the lower portions, a passage
sinuous in cross-section through the walls be-
tween the refractory pieces and the lower
10 portions, the guides forming offsets below the

tops of the refractory pieces and facing in
opposite directions on the alternate vertical
walls, and forming ledges which support the
separable top grates, substantially as de-
scribed.

FRANKLIN G. SAYLOR.

Witnesses:

CHAS. S. BURKE,
EDWARD S. BEACH.