(No Model.) 2 Sheets—Sheet 1.

W. MALAM.

FIRE BOX FOR STEAM BOILERS OF LOCOMOTIVE TYPE.

No. 524,902. Patented Aug. 21, 1894.

FIG: 2.

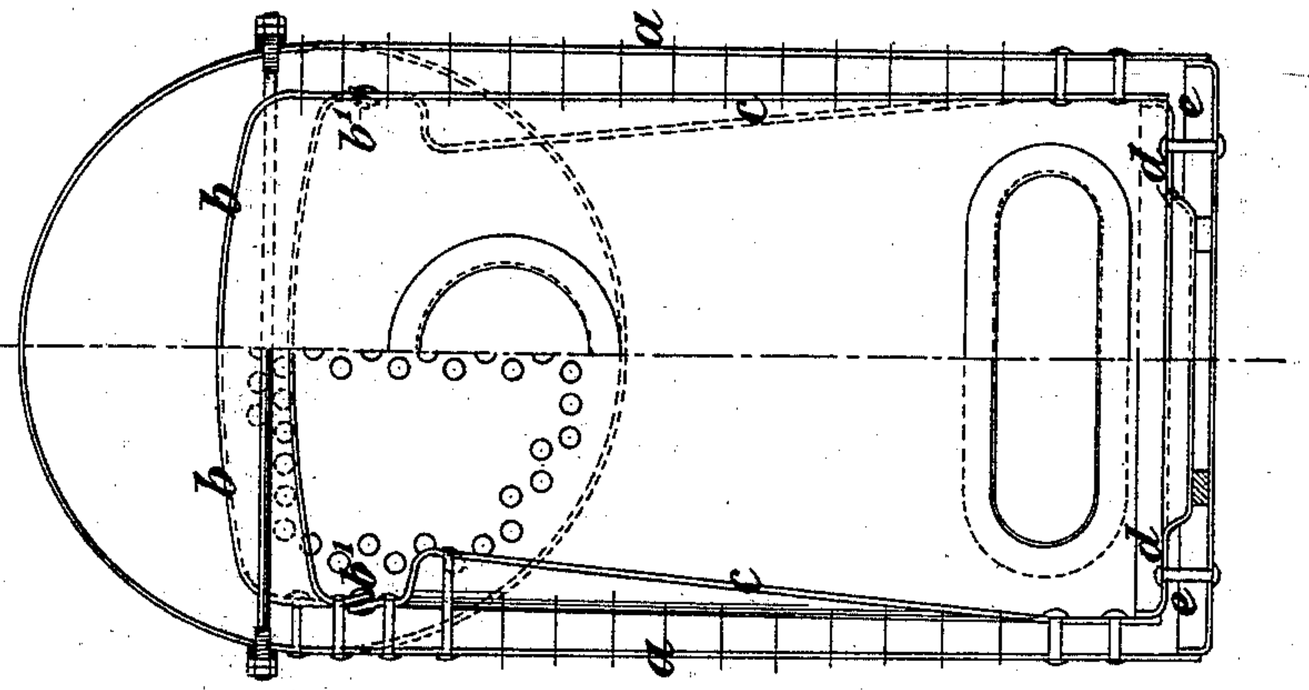
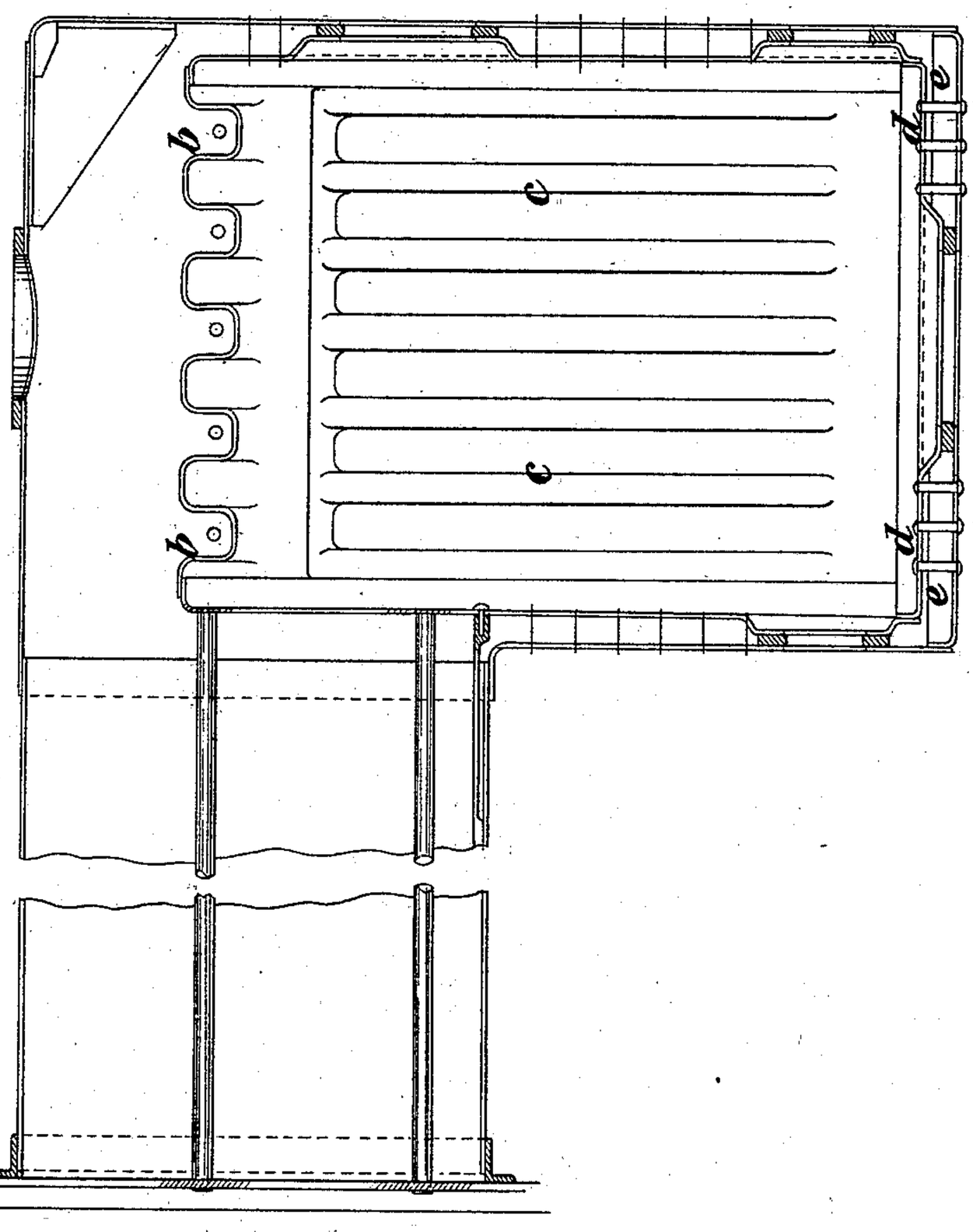


FIG: 1.



Witnesses:
George Baumann
E. J. Griswold

Inventor
William Malam
By his Attorneys
Howson and Howson

(No Model.) 2 Sheets—Sheet 2.

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FIRE BOX FOR STEAM BOILERS OF LOCOMOTIVE TYPE.

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FIG: 3.

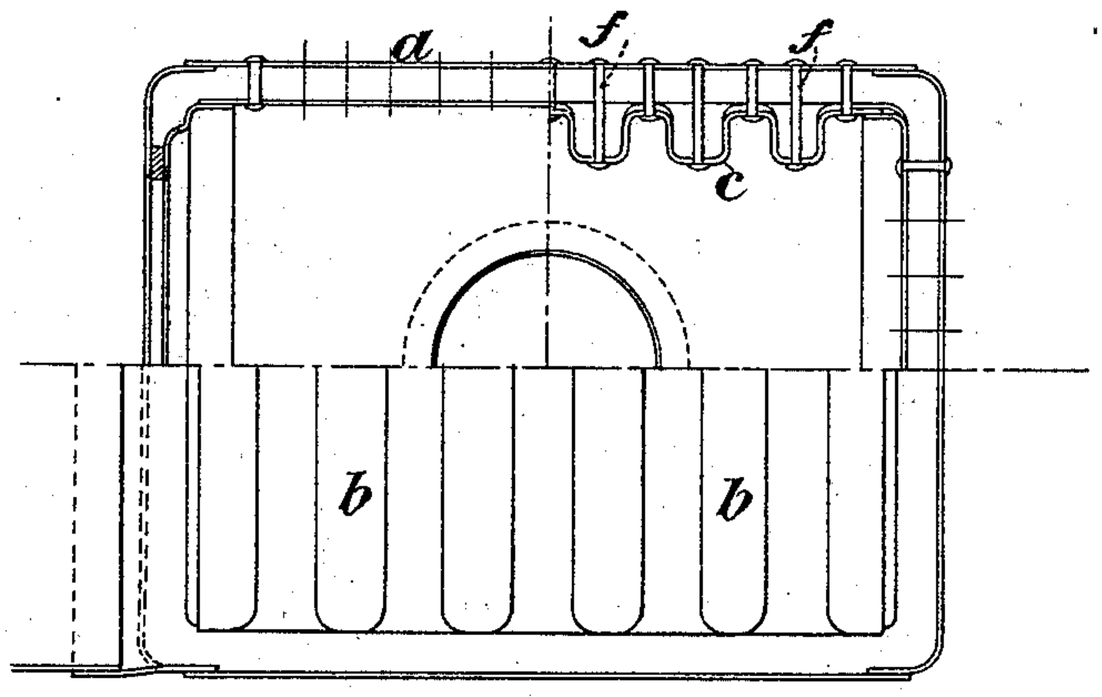
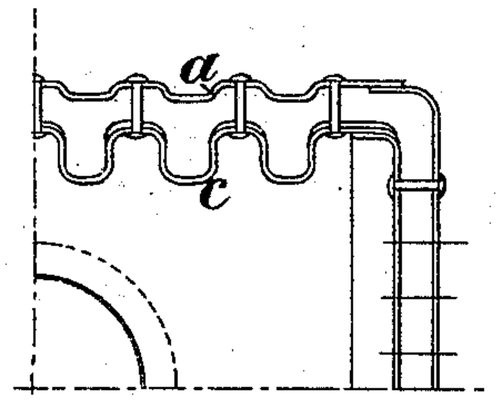


FIG: 4.



Witnesses
George Baumann
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UNITED STATES PATENT OFFICE.

WILLIAM MALAM, OF FAIRFIELD, ENGLAND.

FIRE-BOX FOR STEAM-BOILERS OF LOCOMOTIVE TYPE.

SPECIFICATION forming part of Letters Patent No. 524,902, dated August 21, 1894.

Application filed October 30, 1893. Serial No. 489,467. (No model.) Patented in England April 10, 1893, No. 7,305.

To all whom it may concern:

Be it known that I, WILLIAM MALAM, a subject of the Queen of Great Britain and Ireland, residing at Fairfield, near Manchester, in the county of Lancaster, England, have invented Improvements in Fire-Boxes for Steam-Boilers of the Locomotive Type, (for which a patent was granted to me in Great Britain April 10, 1893, No. 7,305,) of which the following is a specification.

This invention relates to the construction of the fire boxes of steam boilers of the locomotive type the principal object of the invention being to make a corrugated fire box so as to obtain increased heating surface without diminishing the area of the fire bars.

The nature of my said invention and the manner in which the same is to be performed or carried into practical effect will be readily understood on reference to the two sheets of drawings hereunto annexed and the following explanation thereof.

Figure 1 is a longitudinal section through a boiler and firebox of the locomotive type showing the application of my invention thereto. Fig. 2 is a half transverse section and elevation of the same; Fig. 3 a half horizontal section and plan view, and Fig. 4 a modification of the same.

a represents the shell or outer casing of the boiler.

In the crown sheet *b* of the fire box the corrugations run in a transverse direction and terminate flush in the same vertical plane with the side sheets *c* of the firebox. The sides of the crown sheet are preferably provided with vertical flanges *b'* by means of which they are riveted to the side sheets (see Fig. 2) so that separation of the crown sheet from the side sheets would necessitate the shearing of these rivets. The bottom sheet *d* of the fire box is also preferably attached to the side sheets *c* in a similar manner.

The vertical corrugations formed in the body of the side sheets *c* are not made of the same depth from the top to the bottom but are wedge shaped as seen at Fig. 2 being of the full depth where they commence at or near the top, and gradually becoming shallower until they disappear at or above the lowest line of rivets where the bottom sheet is connected so that there is little or no diminution of the area of the fire bars. The water space is by preference also carried under the fire box as shown at *e* Figs. 1 and 2 whereby I obtain the advantages of what is known as a "wet bottom" in combination with a corrugated fire-box.

In the modification shown at Fig. 4 the outside shell *a* of the boiler is shown as slightly corrugated in a vertical direction opposite to each wedge shaped corrugation in the side sheets of the firebox, whereby I am enabled to dispense with the long stays *f* shown on Fig. 3.

I claim as my invention—

1. A corrugated fire box of a locomotive type of boiler having vertical corrugations formed in the body of the side sheets, the said corrugations being wedge-shaped that is to say of the full depth at or near the top and gradually diminishing toward the line of grate bars so as to obtain the increased heating surface without diminishing the area of the fire-bars, substantially as hereinbefore described.

2. The combination of a corrugated fire box having vertical wedge shaped corrugations formed in the body of the side sheets, with a water space extending beneath the bottom of the said fire box, substantially as hereinbefore described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

WILLIAM MALAM.

Witnesses:
CHARLES A. DAVIES,
JNO. HUGHES.