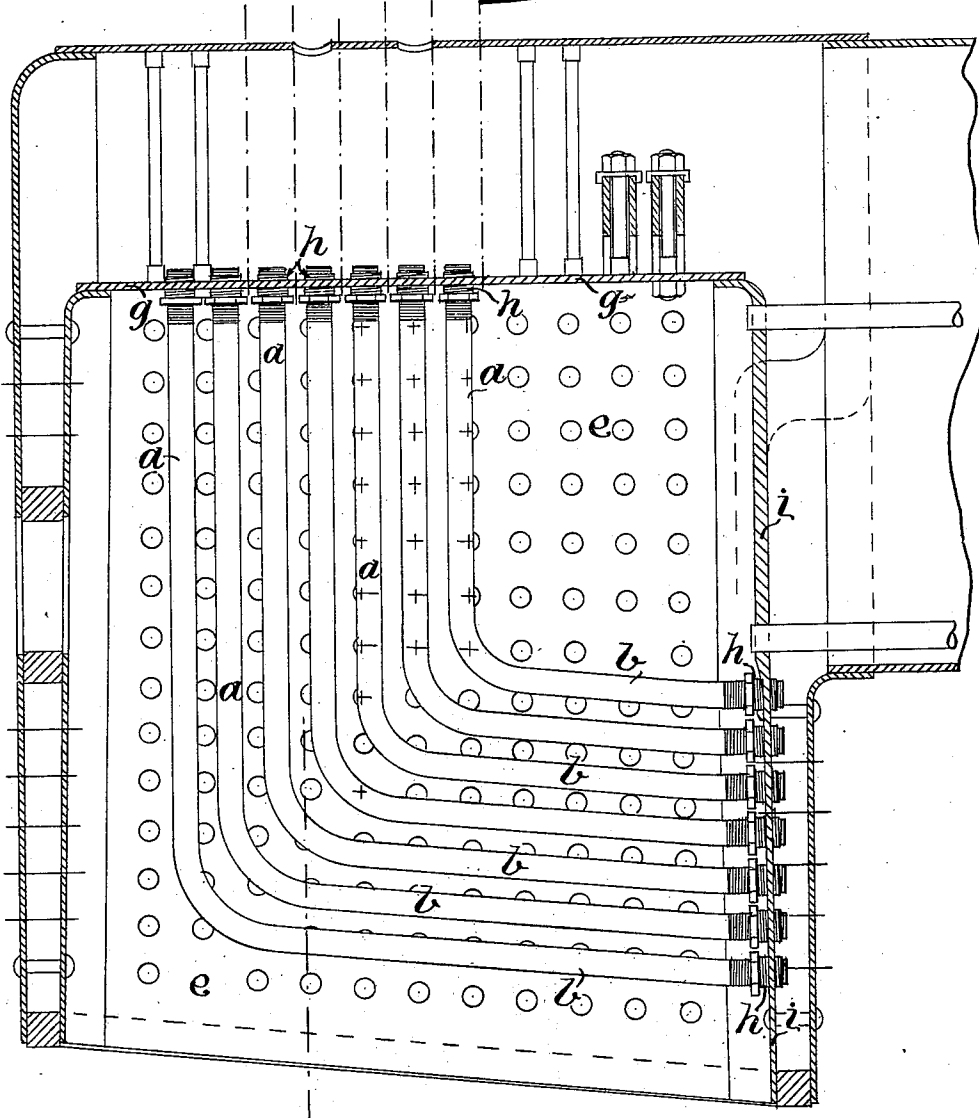


Fig. 1.



*Clark Jefferson*  
*Ernest Jackson*

Witnesses

*Leonard Glover*  
*Clarence Glover*  
*David Crowther*

Inventors

L. & C. GLOVER & D. CROWTHER.

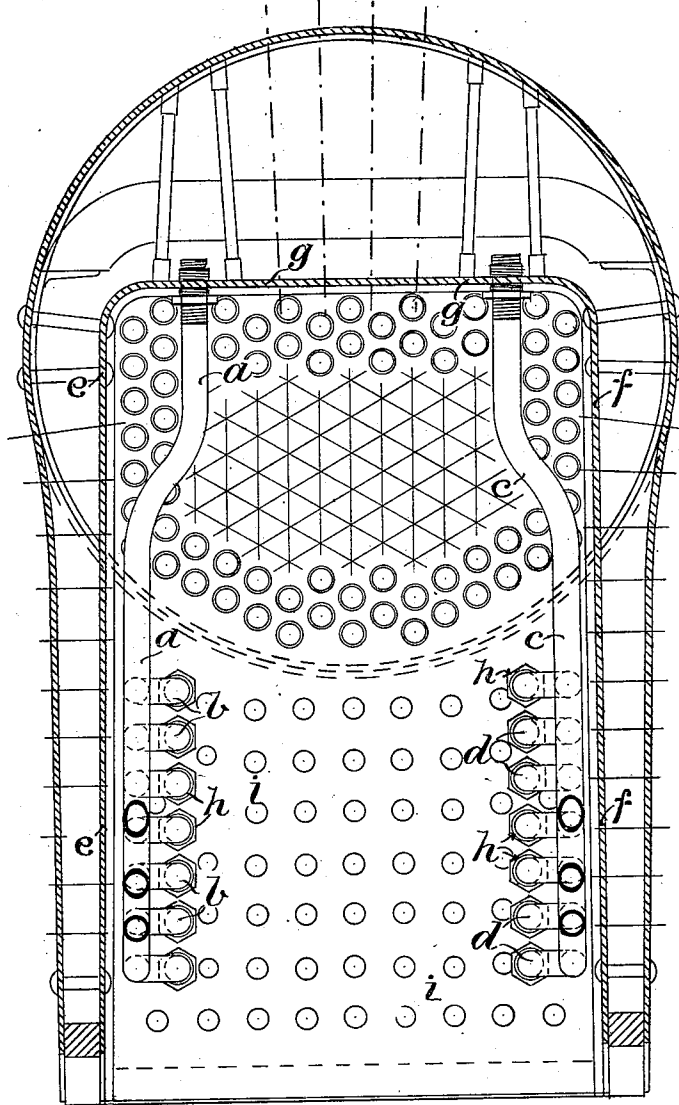
FIRE BOX.

APPLICATION FILED MAR. 10, 1903.

NO MODEL.

2 SHEETS—SHEET 2.

*Fig. 2.*



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# UNITED STATES PATENT OFFICE.

LEONARD GLOVER, CLARENCE GLOVER, AND DAVID CROWTHER, OF  
LEEDS, ENGLAND.

## FIRE-BOX.

SPECIFICATION forming part of Letters Patent No. 730,905, dated June 16, 1903.

Application filed March 10, 1903. Serial No. 147,100. (No model.)

*To all whom it may concern:*

Be it known that we, LEONARD GLOVER, CLARENCE GLOVER, and DAVID CROWTHER, all subjects of the King of Great Britain and Ireland, and all residents of Low Wortley, in the city of Leeds, England, have invented a certain new and useful Improvement in or in Connection with the Fire-Boxes of Boilers of the Locomotive Type, (for which we have applied for Letters Patent in England, No. 18,037, and bearing date August 16, 1902,) of which the following is a specification.

This invention refers to the use of water-tubes in connection with the fire-boxes of boilers of the locomotive type; and it consists, essentially, in the provision in such fire-boxes of two sets of L-shaped or approximately L-shaped water-tubes placed close to the two longitudinal sides of the fire-box, respectively, and with the upper ends of the vertical limbs projecting through the roof and the ends of the lower horizontal or slightly-inclined limbs projecting through the lower part of each side of the front or tube plate into the water-space behind, whereby not only is the steaming capacity of the boiler increased, due to the increased circulation, but more particularly protection is afforded to the longitudinal side plates of the fire-box against the intense heat of the fire, and consequently the wear and tear of the fire-box is vastly reduced.

The invention is illustrated by the accompanying drawings, in which—

Figure 1 is a longitudinal section, and Fig. 2 a cross-section section, of a locomotive fire-box fitted with our invention.

*a b* indicate the water-tubes of the set on the left-hand side of the fire-box and *c d* those of the set on the right-hand side of the fire-box, *a* and *c* indicating the vertical or approximately vertical limbs and *b* and *d* the horizontal or slightly-inclined lower limbs. The set *a b* is placed close to the left-hand longitudinal side *e* of the fire-box and the set *c d* close to the right-hand longitudinal side *f* of the fire-box. The upper ends of the vertical limbs *a* and

*c*, which may be slightly cranked or bent inward to miss the bends joining the roof *g* and the sides *e* and *f*, project through the roof *g* and are secured by screwed and tapped conical ferrules *h*, having six or eight sided collars. The ends of the lower limbs *b* and *d*, situated in two vertical rows, respectively, on each side of the front or tube plate *i*, pass through the latter into the water-space behind, while the limbs may be inclined slightly inward to miss the bends joining the front or tube plate *i* with the longitudinal side plates *e* and *f*. The lower limbs *b* and *d* are preferably inclined so as to be parallel to the fire-grate. Both the vertical and the horizontal limbs are at such a distance apart and at such a distance from the adjoining side plates that not only can the stay-bolt heads be readily inspected, but also got at for calking when necessary.

We are aware that L-shaped water-tubes having the ends of their vertical limbs projecting through the roof and the ends of the horizontal limbs connecting with the water-space around the fire-box are not new, and we do not, therefore, claim such generally; but, Having now described our invention, what we claim as new and novel, and desire to secure by Letters Patent, is—

In fire-boxes of boilers of the locomotive type the combination with the roof-plate and the front or tube plate and near to the two longitudinal sides of the fire-box respectively of two rows or sets of L-shaped water-tubes with both limbs of successively-shorter length toward the tube-plate and with the front ends of the horizontal or inclined lower limbs in two vertical rows respectively at the two sides of the front or tube plate substantially as set forth, for the purposes specified.

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Witnesses:

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