No. 811,748. PATENTED FEB. 6, 1906.

F. D. SHEPHERD.

SMOKELESS FURNACE.

APPLICATION FILED MAR. 18, 1904.

2 SHEETS—SHEET 1.

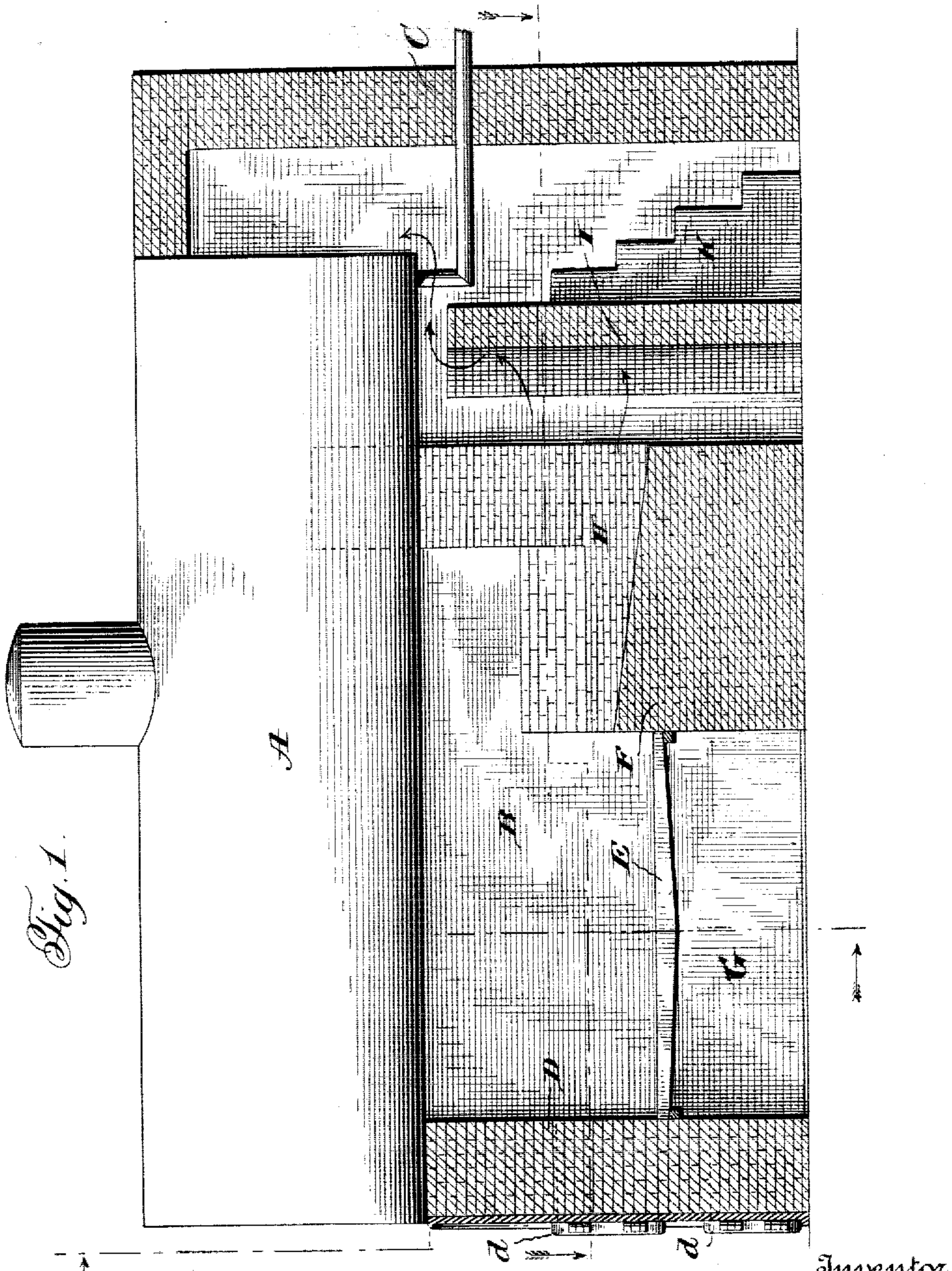


Fig. 1.

Witnesses:
Jas. E. Hutchinson.
J. L. Taylor,

Inventor:
Frank D. Shepherd,
By Edwin J. Prindle, Attorney

No. 811,748. PATENTED FEB. 6, 1906.

F. D. SHEPHERD.

SMOKELESS FURNACE.

APPLICATION FILED MAR. 18, 1904.

2 SHEETS—SHEET 2.

Fig. 2.

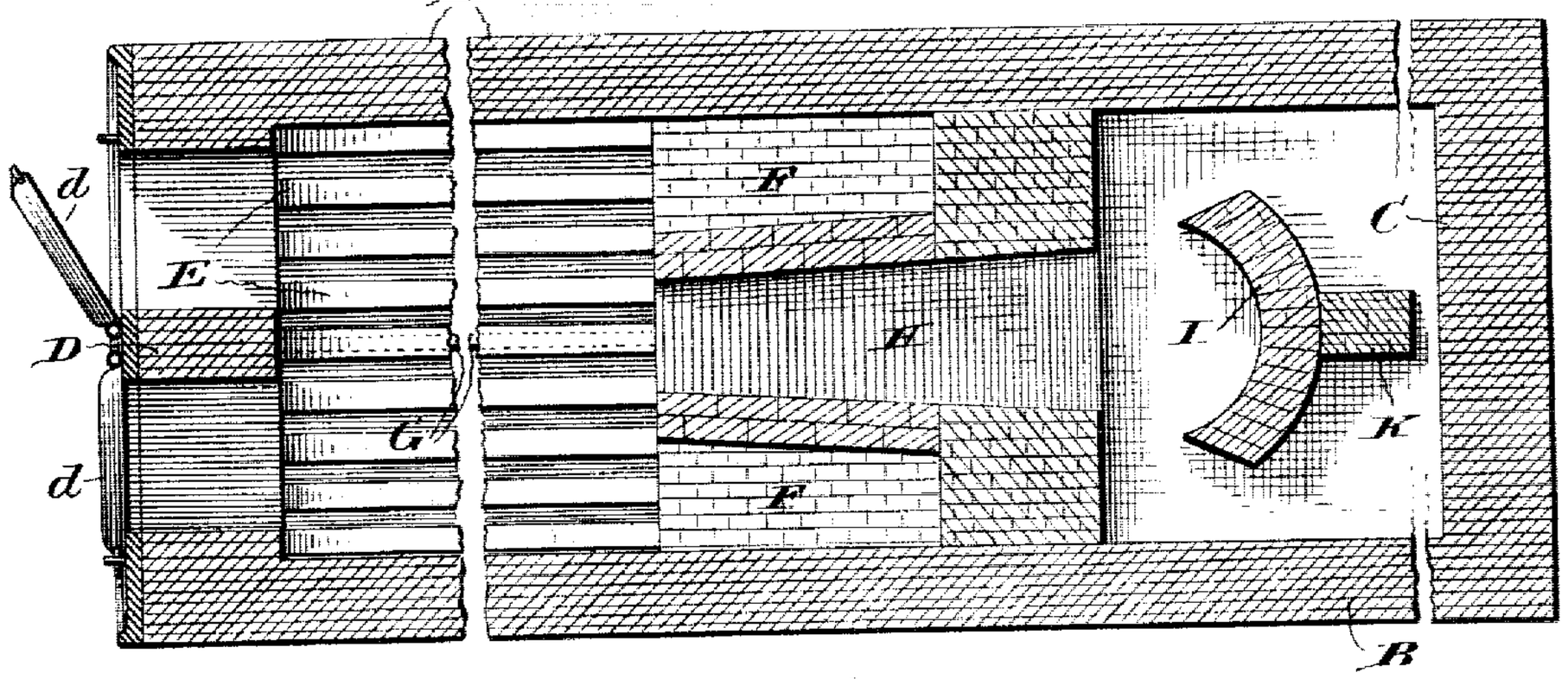
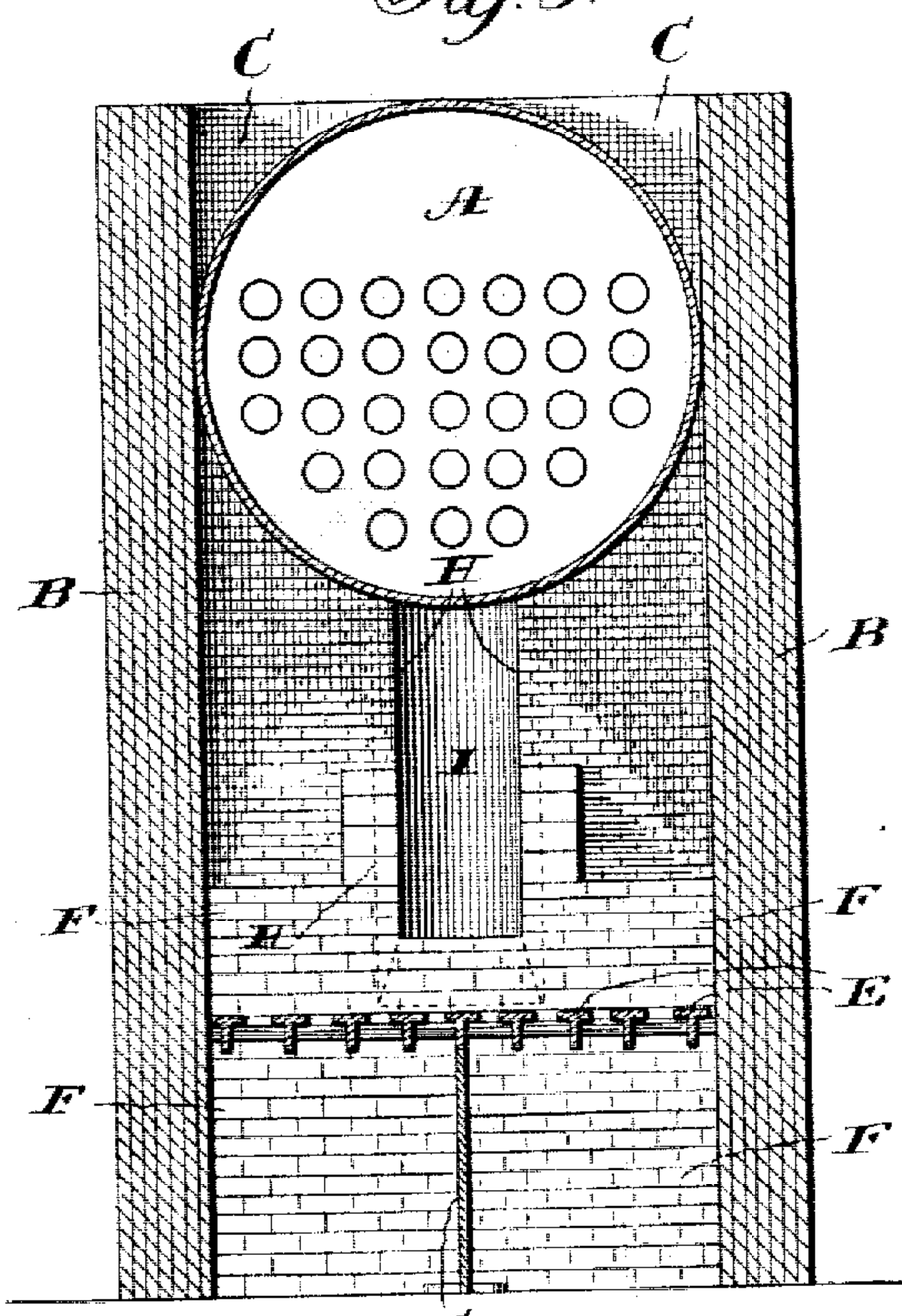


Fig. 3.



Witnesses:
Jas. E. Hutchinson.
J. L. Taylor.

Inventor:
Frank D. Shepherd,
By Edwin J. Prindle. Attorney:

UNITED STATES PATENT OFFICE.

FRANK D. SHEPHERD, OF SALT LAKE CITY, UTAH.

SMOKELESS FURNACE.

No. 811,748. Specification of Letters Patent. Patented Feb. 6, 1906.

Application filed March 18, 1904. Serial No. 198,810.

To all whom it may concern:

Be it known that I, FRANK D. SHEPHERD, of Salt Lake City, in the county of Salt Lake, and in the State of Utah, have invented a certain new and useful Improvement in Smokeless Furnaces; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, in which—

Figures 1, 2, and 3, are respectively vertical, horizontal, and transverse sectional views of a furnace embodying my invention.

The object of my invention has been to provide a furnace which shall be capable of being operated to produce a substantially smokeless fire; and to such end my invention consists in the furnace hereinafter specified.

In carrying my invention into practice I provide the usual boiler A, inclosed in side walls B, a back wall C, and a front wall D. The front wall is provided with two or more fire-doors *d*. The grate E is supported between the front wall and a bridge-wall F, the latter extending from the floor up to and some distance above the level of the grate, but not extending to the under side of the boiler. A vertical partition-wall G, which is preferably thin, divides the ash-pit and extends from the front wall to the bridge-wall and from the floor to the grate. A partition-wall at the rear of the bridge-wall extends up to and in contact with the lower side of the boiler. A flume H extends through the upper portion of the bridge-wall and through the partition-wall and opens up to the lower side of the boiler. Said walls increase the depth of the flume where it passes through the bridge-wall. The flume preferably increases in width and depth as it extends rearward. Opposite the rear end of the flume an arc-shaped deflector-wall I is built upon the floor and extends nearly up to the lower surface of the boiler. The deflector-wall may be braced by a wall K in the rear thereof, if desired.

In operating my furnace fresh fuel is fed to but one side of the grate at a time, and I prefer to close the ash-pit door upon that side of the grate while the hydrocarbons are being distilled, for the reason that such action causes a slower distillation of the hydrocarbons and affords a better opportunity for their consumption. As the hydrocarbons are distilled they pass, owing to the draft, through the flue, and there they are met by the incandescent gases from the opposite side of the grate and are mixed with such gases so that their combustion is assured. The flume being flaring provides room for the constantly-increasing volume of gases without causing any choking action. As the gases leave the flume they strike the deflector and are thrown rearward and upward against the sides of the boiler immediately in the rear of the partition-wall, so that such portions of the boiler are thoroughly heated.

I have found in actual practice that the construction above illustrated is exceedingly effective in consuming the smoke which is unavoidably produced over the grate.

My construction can be applied to a furnace without cutting down the grate-surface and without interfering with the repair or replacement of the grate.

It is obvious that various changes can be made in the above-illustrated construction which will be within the scope of my invention.

Having thus described my invention, what I claim is—

1. A furnace, comprising a grate, a longitudinal partition-wall dividing the ash-pit, beneath the grate, a bridge-wall supporting the rear end of the grate, doors upon either side of said partition-wall, a second partition-wall in rear of said bridge-wall, and extending from the floor to the lower side of the boiler, a flume extending through said bridge-wall and through said partition-wall, side walls built on said bridge-wall for increasing the depth of said flume, said side walls flaring rearwardly, and a curved deflector-wall opposite the rear exit of said flume and presenting a concave face toward said flume.

2. In a furnace, the combination of a grate, a bridge-wall having a flume formed therein which flume is open at its forward end and is open above to the boiler, and a deflector-wall opposite the rear end of said flume to deflect the gases upward toward the boiler and laterally.

3. In a furnace, the combination of a grate, a bridge-wall, and a partition-wall, there being a flume constructed through said bridge-wall and said partition-wall, and a deflector-wall spaced from the rear end of said flume for throwing the gases upward and laterally against the under side of the boiler.

4. In a furnace, the combination of a grate, a bridge-wall, and a partition-wall, there being a flume constructed through said bridge-wall and said partition-wall, and a deflector-

wall spaced from the rear end of said flume for throwing the gases upward and laterally against the under side of the furnace, said flume increasing in cross-sectional area progressively in a rearward direction.

5. In a furnace, the combination of a front wall having air-admitting openings at each side of the center and below the level of the grate, a grate, a longitudinal wall beneath the grate and dividing the ash-pit into two chambers, a bridge-wall, and a partition-wall having a flume extending therethrough, and a deflector-wall opposite the rear end of said flume and having a reëntrant front face, said deflector-wall being adapted to throw the flames against the under side of the boiler.

6. In a furnace, the combination of a front wall having air-admitting openings in each side of the center and below the level of the grate, a grate, a longitudinal wall beneath the grate and dividing the ash-pit into two chambers, a bridge-wall, a partition-wall, said bridge and partition walls having a flume extending therethrough, and a deflector-wall opposite the rear end of said flume and having a reëntrant front face, said flume having side walls built upon said bridge-wall for increasing its depth.

7. In a furnace, the combination of a grate, a bridge-wall, and a flume passing through said bridge-wall, and formed partially by vertical walls extending forward from said bridge-wall, said vertical walls approaching each other in a rearward direction.

In testimony that I claim the foregoing I have hereunto set my hand.

FRANK D. SHEPHERD.

Witnesses:

WILLIAM JACKMAN,

DELOS IRISH.