

(No Model.)

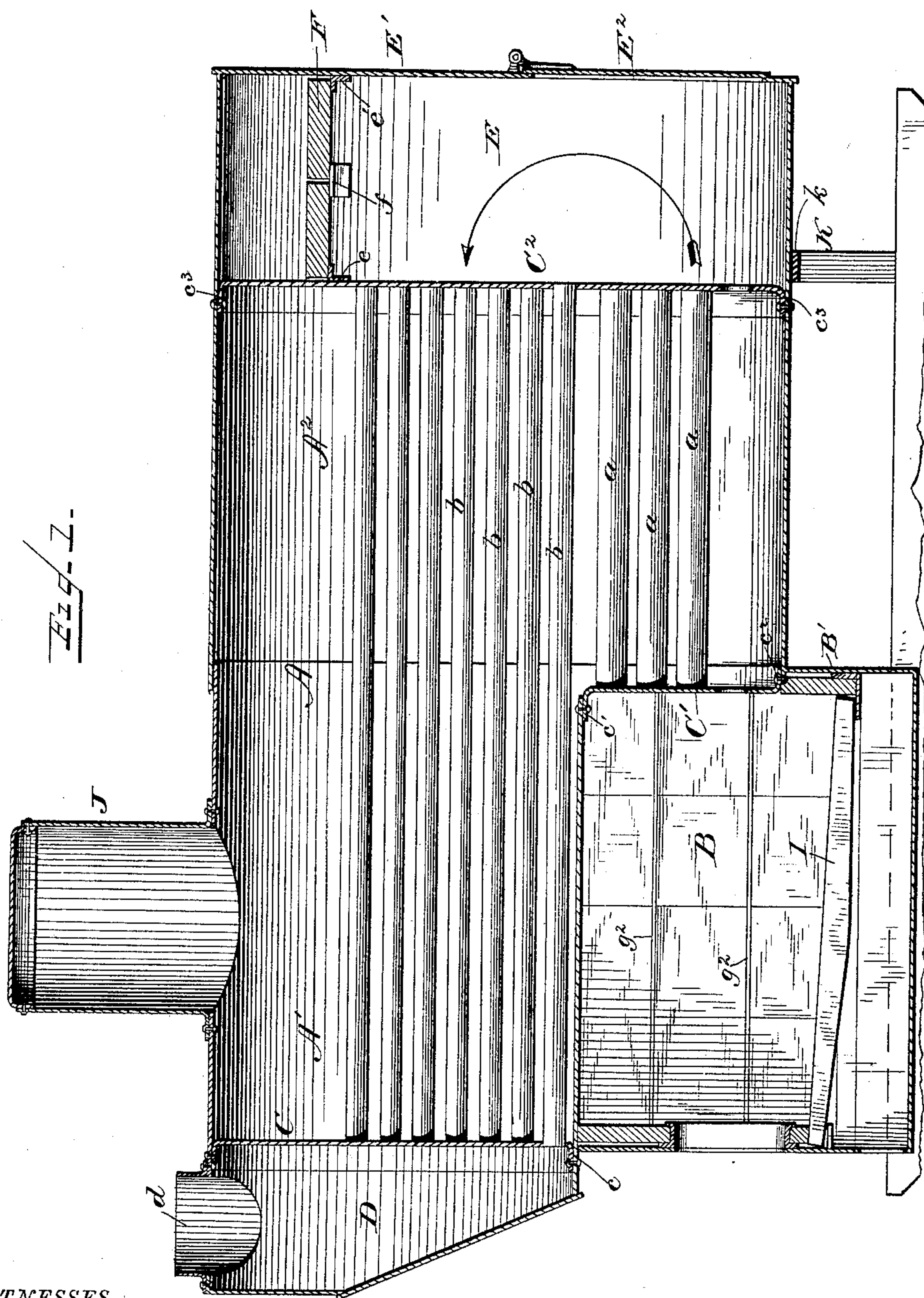
2 Sheets—Sheet 1.

W. MORAN.

PORTABLE TUBULAR BOILER.

No. 318,128.

Patented May 19, 1885.



WITNESSES

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INVENTOR

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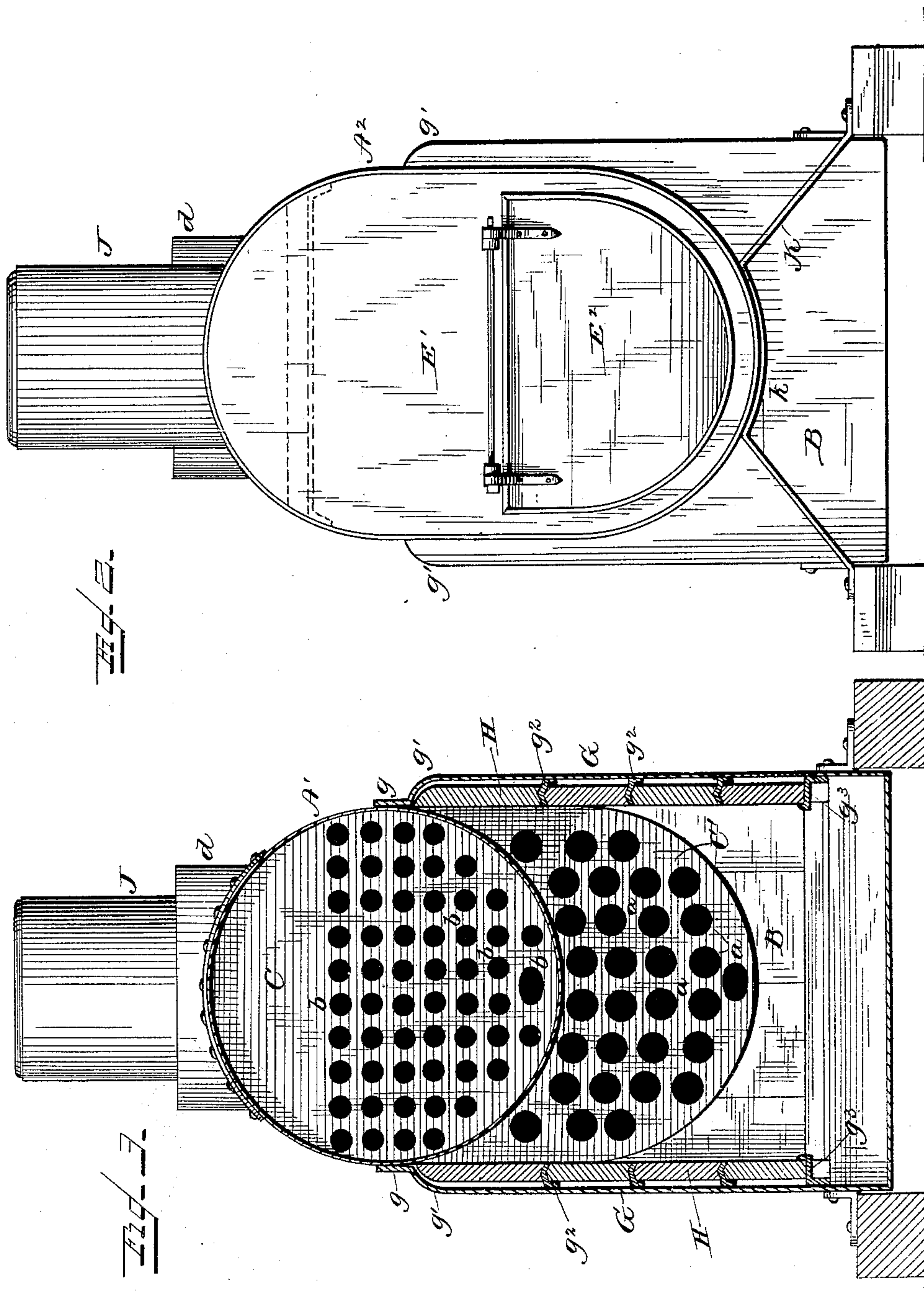
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F. L. Ourand,
Rev. M. Smith,

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UNITED STATES PATENT OFFICE.

WILLIAM MORAN, OF ERIE, PENNSYLVANIA, ASSIGNOR TO THE ERIE CITY
IRON WORKS, OF SAME PLACE.

PORTABLE TUBULAR BOILER.

SPECIFICATION forming part of Letters Patent No. 318,128, dated May 19, 1885.

Application filed December 2, 1884. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM MORAN, of Erie, county of Erie, and State of Pennsylvania, have invented a new and useful Improvement in Portable Tubular Boilers, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, making part of this specification.

My invention relates to that class of boilers known as "return-tube" tubular boilers, in which the products of combustion, after passing through tubes extending from the fire-pot through the boiler to a chamber at the rear end thereof, are returned through the boiler through tubes extending from said chamber and over the crown-sheet of the fire-pot to the smoke-box in front of the boiler, and communicating with the smoke-stack; and it consists in a novel construction of the boiler whereby it is made portable, complete in itself, and provided with a removable, brick-lined fire-pot, facilitating its handling and transportation, and in certain details of construction and arrangement of parts hereinafter fully explained, with reference to the accompanying drawings, in which—

Figure 1 represents a vertical longitudinal section through my improved boiler; Fig. 2, a rear elevation of the same, and Fig. 3 a vertical transverse section through the boiler and fire-pot.

A indicates the shell of the boiler, which in its forward portion, A', overlying the fire-pot B, is cylindrical in form, its lower surface constituting the crown-sheet of the fire-pot, in the form of an inverted arch, as is shown in Fig. 3, while the portion A² in rear of the fire-pot is extended downward, to form in part the rear wall of the latter, and assume an elliptical form, having its sides flattened, as shown. The forward end of the part A' is provided with a perforated head or tube-sheet, C, cylindrical in form, and provided with a forwardly-turned annular flange, c, through which it is riveted to the shell which extends forward of said flange to form the cylindrical shell of the smoke-box D.

To the lower side of the rear end of the cylindrical portion A' is secured a crescent-shaped perforated head or tube-sheet, C', forming the forward end of the portion A² pend-

ent below the part A', and in part also the rear wall of the fire-pot. This tube-sheet is provided on its concave upper edge with a forwardly-turned flange, c', through which it is secured to the cylindrical portion A' of the shell, and upon its outer convex edge with a rearwardly-turned flange, c², through which it is secured to the forward end of the lower part of the elliptical portion A² of the shell.

To the rear end of the boiler portion proper of the shell is secured a tube-sheet, C², elliptical in form, conforming to the shape of the rear portion of the shell, and provided on its edge with a forwardly-turned flange, c³, through which it is riveted to the shell surrounding it, as shown. By this arrangement of the joints between the heads or tube-sheets and the shell, in connection with the arrangement of fire-brick lining to the fire-pot shown in the drawings and hereinafter described, but a single joint—viz., that at c', between the head C' and cylindrical portion A' of the shell—will be exposed to the direct action of the heat from the fire-pot, and that being covered by the water in the boiler great durability of the joints of the boiler is secured.

The shell is extended in rear of the tube-sheet to form a chamber, E, which is closed by a sheet-metal plate or head, E', secured to the rear end of the shell in any suitable manner, and provided at E² with a man-hole and hinged door, through which access may be had to the rear tube-sheet, C², and rear ends of the tube terminating therein, or for cleansing the chamber E.

The tube-sheet C² and rear wall, E', have secured to their adjacent sides, above the plane of the tubes in the boiler and near the water-line in the latter, transverse angle-irons c and c', and between said angle-irons one or more stay rods or bars, f, extend from side to side of the boiler and serve, in connection with the angle-irons, to support a horizontal partition, F, of fire-brick, which serves to deflect the products of combustion into the return-tubes, hereinafter referred to, and to prevent the formation of eddies in the current thereof, and consequent obstruction in the draft. The flanges and rod or rods f also serve to stay and stiffen the sides and ends of the shell.

The smoke-box D is closed at its forward

end in a manner similar to the rear end of the chamber E, and may in like manner be provided with a man-hole and door for giving access to its contents or the forward ends of the return-tubes. It is adapted to receive at d the smoke-stack, which may be of any usual or preferred form.

Fire-tubes a extend from the tube-sheet C' below the crown-sheet of the fire-pot back to the chamber E, terminating in the tube-sheet C^2 , and return-tubes b extend forward from the chamber E over the crown-sheet of the fire-pot to the smoke box or chamber D, having their ends secured in the tube-sheets C and C^2 . The tubes a , leading directly from the fire-pot B, are preferably made larger than the return-tubes b . I compensate for the reduced size of the return-tubes by an increase in their number as compared with the tubes a , thereby distributing the products of combustion more evenly through the boiler in their return or forward movement and securing the best results attainable therefrom. The chamber E, it will be seen, serves to connect the tubes a with the return-tubes b .

The fire-pot is made separate from the boiler-shell, extending under the cylindrical portion A' of the latter, and sufficiently over the forward end of the part A^2 to adapt its rear wall, B' , to be secured thereto. It is provided with suitable flanges, g , through which it is secured to the shell in any suitable manner, and the walls G of the fire-pot shell, where these flanges unite with the shell of the boiler, have offsets formed in them at g' , or are bent, as shown, for giving the fire-pot shell a slightly increased width, as compared with the boiler, sufficient to accommodate a lining of fire-brick, H, and at the same time leave the entire lower surface or half of portion A' of the shell forming the crown-sheet of the fire-pot exposed to the direct action of the fire. The inner faces of the walls G of the fire-pot shell have horizontal angle-iron strips or ledges g^2 and g^3 secured to them through pendent flanges, the ledge or shelf portions of irons g^2 having each an upturned elbow, and the fire-brick, being correspondingly grooved on their lower edges and beveled from each side upward, on their upper edges, fit between said ledges and form, as it were, a tongue-and-groove connection therewith, such as to effectually hold the bricks in place. The lower irons, g^3 , have an upturned flange, g^4 , on their inner edges, which serves to hold the bricks in place thereon, and the others may be similarly formed, if desired; but the elbow form described is preferred, as it serves

the desired purpose with less of the metal exposed to the fire than in the form shown at g^3 .

The fire-pot is provided with the usual fire and ash-pit doors, and with a grate, I, which may be of any usual or preferred construction, and at its sides and front and also at its rear end below the boiler the fire-pot shell is protected by fire-brick, at all points not protected by the water in the boiler, and so arranged, as shown, as to protect all of the joints between the fire-pot and boiler except that at c' , as above explained.

The boiler is provided at J with a steam-dome, of any usual or preferred construction, and has its rear end supported in an angular bracket, K, provided at its upper end with a concave seat at k , conforming to the lower face of the boiler resting therein. The arms or legs of this bracket extend obliquely downward from the seat k , and being secured to the base-plates or timbers to which the other supporting-brackets are fastened, they serve to firmly brace and uphold the rear end of the boiler.

I am aware that return-tube tubular boilers have been employed, constructed with cylindrical and elliptical portions, and also with a chamber connecting the direct and return flues, and, further, that removable brick-lined fire-pots have been employed. These elements I do not claim specifically; but,

Having now described my invention, I claim as new—

1. The combination, in a portable return-tube tubular boiler having the cylindrical portion over the fire-pot, the elliptical portion in rear thereof, the direct and return tubes, and the chamber connecting said tubes, as described, of the removable brick-lined fire-pot and the smoke-box, all constructed and arranged substantially as described.

2. The combination, in a portable return-tube tubular boiler having the cylindrical portion over the fire-pot, an elliptical portion in rear thereof, the direct and return tubes, and the chamber connecting said direct and return tubes, of the removable deflecting-partition arranged in said chamber above the plane of the return-tubes, the smoke-box, and the removable brick-lined fire-pot, substantially as described.

In testimony whereof I have hereunto set my hand.

WM. MORAN.

Witnesses:

C. S. CROSSER,
HENRY L. PERKINS.