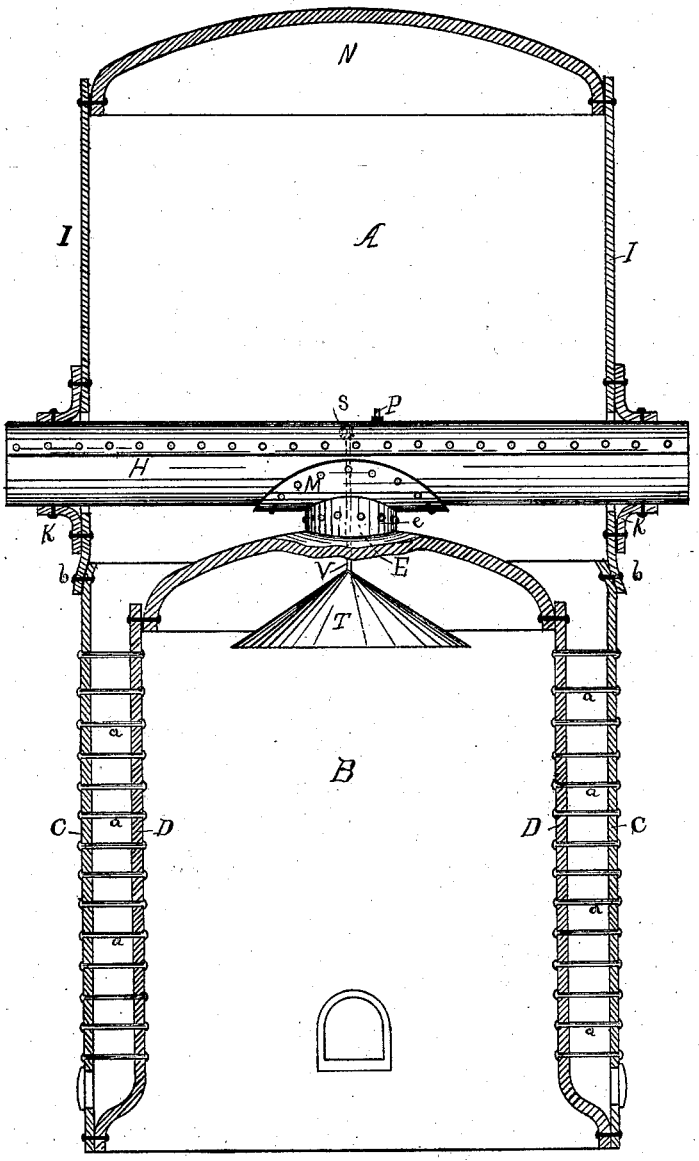
W. SPIEGEL.
Upright Steam-Boilers.

No. 217,421. Patented July 8, 1879.

Fig. 1.



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E. R. Hill
Jno. T. Strehli.

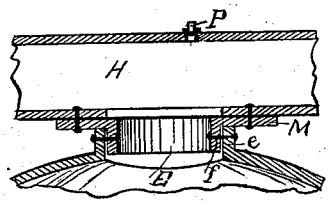

Fig. 2.

Inventor.
Wm. Spiegel
per Wm. Hubbell Fisher,
Atty

UNITED STATES PATENT OFFICE.

WILLIAM SPIEGEL, OF NEWPORT, KENTUCKY, ASSIGNOR TO McILVAIN & SPIEGEL, OF CINCINNATI, OHIO.

IMPROVEMENT IN UPRIGHT STEAM-BOILERS.

Specification forming part of Letters Patent No. **217,421**, dated July 8, 1879; application filed February 17, 1879.

To all whom it may concern:

Be it known that I, WILLIAM SPIEGEL, of the city of Newport, in the county of Campbell and State of Kentucky, have invented certain new and useful Improvements in Upright Steam-Boilers, of which the following is a specification.

My invention consists in general in the combination of the usual fire-chamber and a vertical exit-flue communicating with a second transverse flue.

Some of the advantages of a boiler embodying my improvements are cheapness, strength, and ease of construction. A boiler so constructed is also exceedingly compact and utilizes very effectively in the generation of steam the waste products of combustion.

In the accompanying drawings, making a part of this specification, Figure 1 represents a vertical central section of an upright boiler embodying my invention, the transverse exit-flue being left unsectional. Fig. 2 is a longitudinal section through the transverse flue and its connection to the fire-chamber.

A represents an upright boiler, preferably circular, in horizontal section, of which B is the fire-chamber, composed of the exterior shell, C, and interior shell, D, riveted together, and, when desired, strengthened by the usual cross-stays *a*, and provided with an appropriate door for the admission of fuel, and near the bottom a grate or other proper support for the latter.

The roof of the shell D is preferably arched, as shown, and is provided with a vertical orifice or flue, E, of any desired length, opening into a cross-flue, H, the whole of which latter flue lies below the water-line.

The upper part of the boiler consists of the shell I, provided with the cap or roof N, and the flue H traverses the shell I and penetrates the sides of the latter, so as to afford a perfect means of communication between the ends of this flue and the outer chimney flue or flues.

Preferably each end of the flue H is connected with a chimney-flue; but when necessary one end of flue H is closed, and all the smoke and gases from the fire are directed out of the other end of the flue into the chimney or an equivalent exit-flue.

The water-line in the boiler may be at any desired height above the flue H, but is usually about three inches above the top of the latter. In order to obviate the danger of explosion from the water accidentally getting below the top of flue H, and also to prevent the said flue from being burned out without notice, there may be introduced into the top of this flue the common safety fusible plug P, whose functions are too well understood to require explanation.

The mode in which my invention operates is as follows, viz: The boiler having been filled with water to the water-line, and fuel having been introduced into the fire-chamber, the fuel is fired. The smoke, gases, and heated air pass up through the fire-chamber, and a portion of the same impinge against the sides and roof of the chamber and give off much of their heat to the inner shell, D, which latter in turn communicates it to the water of the boiler. The smoke, &c., then pass up through the orifice or flue E into the transverse flue H, where they again impinge against the top and sides of the latter flue, and where both ends of the flue are open divide, a portion passing through the right and the other portion through the left hand branch or half of this flue, and giving off the greater portion of their heat to the flue.

When one end of the flue H is closed, and all of the smoke, &c., is forced to pass out at the other end of said flue, while much of the heat generated by the fire is economized, nevertheless some of it is lost, as the smoke, &c., is not so thoroughly and continually distributed over that half of flue H whose end is closed as if the end were open and a continuous current through said portion into the chimney were permitted.

A useful but not indispensable adjunct in more thoroughly spreading and distributing the heat against the sides and roof of the fire-chamber B is the damper T, composed of metal or fire-brick or other suitable material, whose preferred form is of a cone, as illustrated in the drawings. This damper is located at such a point in the fire-chamber that its top is a short distance below the roof of the fire-chamber, and directly beneath the orifice E, just sufficient space being left between the fire-chamber roof and the top of the damper to allow of the proper escape of the smoke, &c.

Various modes of sustaining this damper in position can be employed. The one which I prefer is the following, viz: An eye or loop, S, provided with a screw-threaded shank, is screwed from below into the upper portion of the flue H, so as to be over the center of the orifice E. A rod, V, connected at one end with the damper T, and at the other end provided with a hook, is, by means of said hook, connected to or detached from said eye S at pleasure. The rod V is of sufficient length to enable the damper to be located at the desired position. This damper aids in forcing the smoke, gases, &c., against the sides and roof of the fire-chamber, and thus compelling said smoke, &c., to give off their heat to the shell D.

While my invention can be constructed in various ways, I have a novel and very convenient and useful mode, which I will now describe.

The fire-chamber, consisting of the shell D and the outer shell, C, as far as *b*, is put together in the usual manner, and provided with any desired description of door and grate, blowing-off holes, &c., the flange *e* having been formed and the rivet-holes punched therein before the shell D was inserted into shell C. Rivet-holes have also been punched in shell C at *b*.

The collar M surmounting the fire-chamber is provided with holes in the upper portion for attaching same to the flue H, and is flanged so as to have a flange, *f*, fitted to closely set within flange *e*.

The shell I of the boiler is constructed, and holes cut in the sides thereof to admit the flue-tube H. In this flue H is cut the orifice connecting the fire-chamber and said flue H, the flue being formed by riveting two opposite edges of the flue-sheet together. Collar M is set in place in the top of the fire-chamber and shell I placed in position upon shell C, flue H run into shell I, and the place for rivet-holes in the flue H is marked through the holes in collar M, and the place for rivet-holes in the flange *f* is marked thereon through the holes in flange *e*. At the same time a collar, K, for attaching the flue H to the shell I, and in which rivet-holes have been previously punched, is placed upon each end of the flue H, and the holes marked on the shell I and on the end of the flue H.

It may be here remarked that the flue H projects at each end beyond the shell I a sufficient distance to afford room for riveting the flange to the flue, and also for fitting a chimney-pipe thereon. The rivet-holes in shell I for riveting the shell to shell C at *b* have been previously punched when the shell I was made. The aforesaid loose parts are then separated, and the holes punched therein where marked, and the collar M riveted to flue H. The flue H is then slipped into the shell I by first slipping one end of the flue into the hole at one side of the shell, and then slipping the other end of the flue into the other hole at the opposite side of the shell, and the shell I is placed upon shell C, and the collar M is fitted to flange *e*, and collars K to their respective ends of flue H. The collar M is then riveted to the fire-chamber, and the shell I to shell C, and the collar K to flue H and to shell I.

The cap N, having been marked and punched, is riveted to shell I, or, when desired, the cap may be riveted to the shell I when the latter is first made, in which case a man-hole should be left in order to admit a workman to aid in marking and riveting the parts together.

It will be apparent that the arrangement of flange *e* and collar M, provided with flange *f*, in connection with the transverse flue H, is a very convenient and useful mode of carrying into effect my invention.

What I claim as new and of my invention, and desire to secure by Letters Patent, is—

1. The combination, in a boiler, of the inner shell, D, collar M, and transverse flue H, connected to the crown-sheet by flue E, outer boiler-shell, and collars K, substantially as and for the purposes specified.

2. The steam-boiler herein set forth, consisting of the combination of the inner shell, D, collar M, and transverse flue H, outer shells, C I, and collars K, substantially as and for the purposes set forth.

WILLIAM SPIEGEL.

Attest:

BENJAMIN BINDLEY,
JNO. L. BRUNSON.