

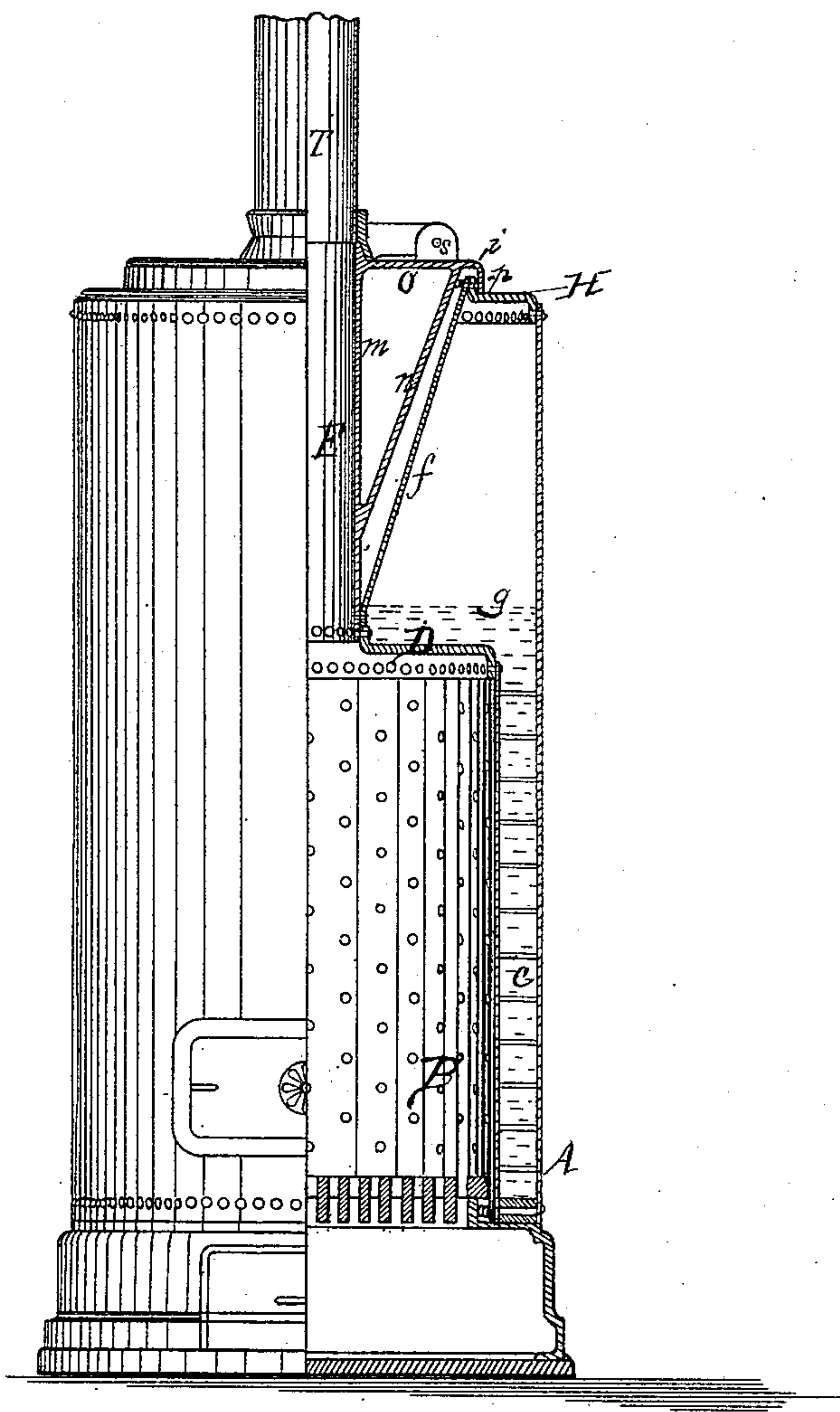
(No Model.)

M. CRIDGE & T. H. CARLIN.

UPRIGHT BOILER.

No. 332,188.

Patented Dec. 8, 1885.



WITNESSES:

*Alva A. Moore*  
*Witness*

MATTHEW CRIDGE  
THOMAS H CARLIN  
INVENTORS

*By*  
*Connolly Bros & Co*  
ATTORNEYS

# UNITED STATES PATENT OFFICE.

MATTHEW CRIDGE AND THOMAS H. CARLIN, OF ALLEGHENY, PENNSYLVANIA, ASSIGNORS TO THOMAS H. CARLIN.

## UPRIGHT BOILER.

SPECIFICATION forming part of Letters Patent No. 332,188, dated December 8, 1885.

Application filed November 29, 1884. Serial No. 149,174. (No model.)

*To all whom it may concern:*

Be it known that we, MATTHEW CRIDGE and THOMAS H. CARLIN, of Allegheny, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Upright Boilers; and we do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawing, which forms a part of this specification.

This invention relates to the construction of upright boilers of that class in which the fire-chamber terminates in a central flue, which passes upwardly to the stack. In this form of boilers the water-level is always maintained at a height some distance below the top sheet and as near the fire-box as can safely be permitted, in order to give as large a steam-space to the boiler as practice will allow; but whether the steam-space is large or small a certain consequence is that the sheets of the flue which correspond to it, having no water in contact with them, soon become burned and weak, and the boiler, otherwise in sound and perfect condition, is liable to a damaging explosion at any moment.

Our object is to prevent the contact of the flames and products of combustion with the inner sheets forming the flue, and thereby prevent damage to the said sheets.

This invention consists in forming the flue-sheets so as to flare outwardly and upwardly from or below the normal water-line of the boiler, and taking up the conical space thus formed by means of any suitable filling, so as to preserve the original shape of the flue; also, in the utilization of this filling-space for feed-water-heating purposes, all substantially as hereinafter fully described and claimed.

The accompanying drawing is a vertical elevation of our improved boiler, shown partly in section.

A is the shell of the boiler; B, the fire-box wall inclosing the water-space *c*; and D represents the crown-sheet, opening centrally into the flue E, all of any of the usual forms of construction.

Instead of building the flue-sheet *f* in the

usual straight tube form, we begin at a point even with or preferably somewhat below the normal water-line *g*, and flare the sheets *f* outwardly as they rise to form an inverted cone, so that their diameter is greatly increased at their junction with the top sheet or head, H. The flaring sheets *f* are riveted to head H, whose flange *i* is turned outwardly to correspond. The cylindrical or tubular form of the flue E is preserved by inserting the filling in one of the following ways: a hollow casting having the cylindrical wall *m*, flaring wall *n*, and top *o*, dropped in so as to fit the space and cut off communication between the flue proper and the sheets *f*, being conveniently supported and draft closed against leakage by the flange *p*. Lugs *s* on top *o* of casting form hinge-support for the stack T. The air-space inside the casting prevents the excess of heat of the flue from reaching the flaring sheets *f*, which surround the steam-space, and therefore these sheets cannot become burned out, no matter how hard the fire may be forced. By the form shown, however, we obtain a convenient feed-water heater, since we can attach inlet and outlet pipes to the casting *m n o* and utilize the water-heat to raise the temperature of the feed-water by passing it through said casting.

We claim as our invention—

1. In a vertical central-flue boiler comprising the shell A, fire-box B, water-space *c*, crown D, flue E, and flaring or expanding steam-space, sheets *f*, the flue E, flaring wall *n*, and top O, cast integral and inclosing the water-space *m*, substantially as described.

2. In a vertical central-flue boiler, the combination, with the single casting constituting the flue E, flaring wall *n*, and top O, having depending flange *p*, of the head H, having upturned flange *i*, bolted or riveted to the flange *p*, substantially as described.

In testimony that we claim the foregoing as our own we have hereto affixed our signatures in presence of two witnesses.

MATTHEW CRIDGE.  
THOMAS H. CARLIN.

Witnesses:

A. A. CONNOLLY,  
A. A. MOORE.