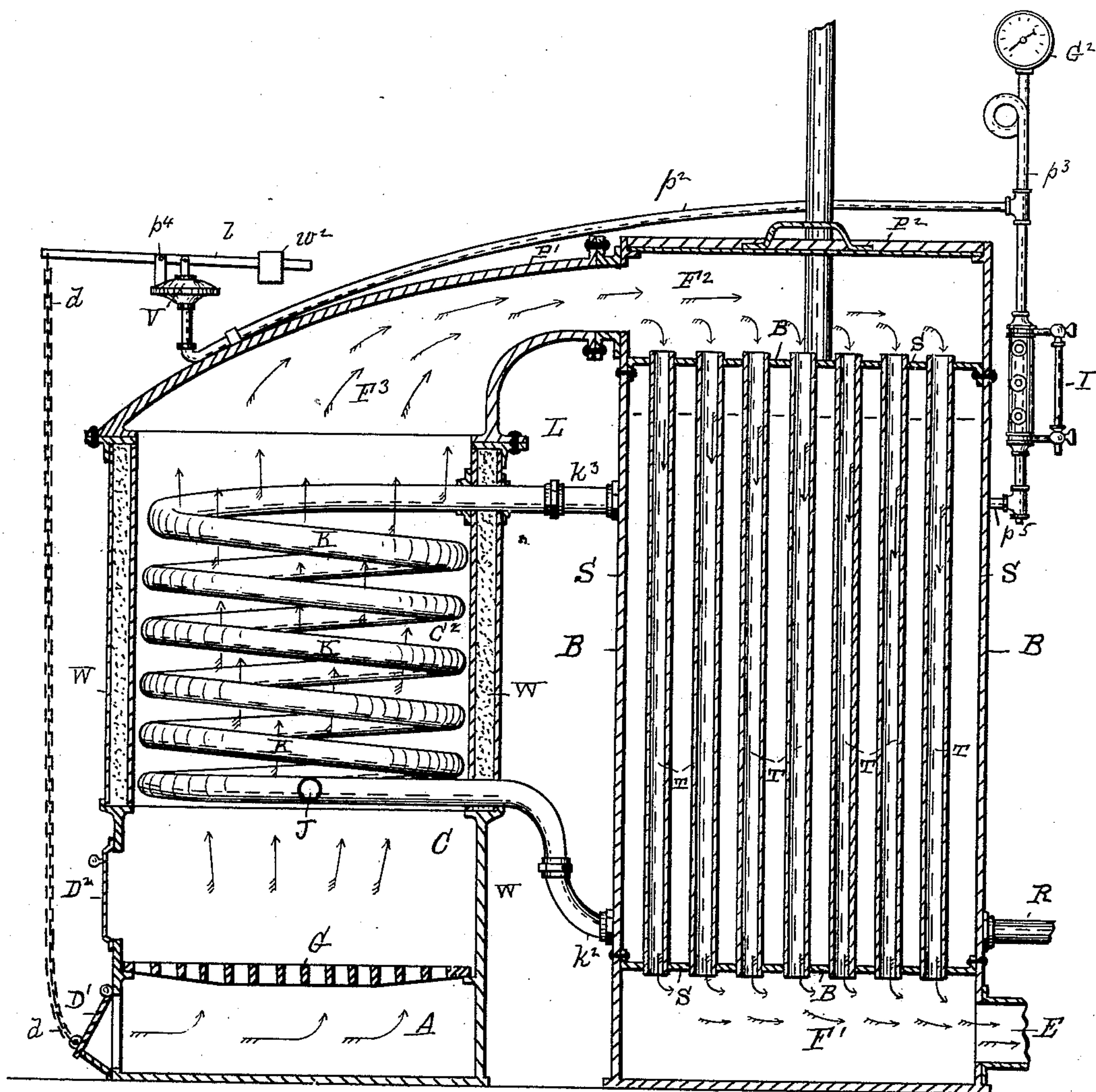


(No Model.)

J. MACCORMACK & H. L. VAN ZILE.
STEAM BOILER.

No. 446,785.

Patented Feb. 17, 1891.



WITNESSES

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UNITED STATES PATENT OFFICE.

JOHN MAC CORMACK AND HARRY L. VAN ZILE, OF ALBANY, NEW YORK.

STEAM-BOILER.

SPECIFICATION forming part of Letters Patent No. 446,785, dated February 17, 1891.

Application filed March 6, 1890. Serial No. 342,852. (No model.)

To all whom it may concern:

Be it known that we, JOHN MAC CORMACK and HARRY L. VAN ZILE, both of the city of Albany, county of Albany, and State of New York, have jointly invented new and useful Improvements in Steam-Boilers, of which the following is a specification.

Our invention relates to improvements upon steam-boilers, and more particularly to that class of them which are employed for steam-heating uses; and the object and purpose of our invention is by an improved construction and arrangement of the operative parts to insure a rapid heating and prompt circulation of the water and an increased steam-producing capacity.

Our invention consists (as will be more fully detailed hereinafter in connection with its illustration, and as set forth in the claim) in the combination, with a boiler provided with vertically-arranged hot-air tubes or flues and having a transverse flue above and below said air-tubes connecting therewith, of a fire-chamber provided with a grate, said fire-chamber connecting at its upper end with the transverse flue over the boiler, and a helical coil arranged in said fire-chamber, with the lower end of said coil-pipe descending to connect with the boiler near its bottom and the upper end of said coil connecting with said boiler near its top, but below its water line.

Accompanying this specification to form a part of it there is a sheet or drawing illustrating in a single figure a boiler containing our invention. This illustration shows in a central vertical section the boiler and fire-chamber, as well as the flue at the top of the fire-chamber connecting with the flue over the boiler, and the flue at the bottom of the boiler with the coil illustrated as arranged within the fire-chamber and shown in side elevation.

The several parts of the boiler thus illustrated are designated by letter reference, and the function of the parts is described as follows:

The letter B designates the boiler, S its shell, and T the vertically-arranged flues or tubes therein for the downward passage of the hot air; F', the bottom flue, provided with an exit E, and F² the top flue.

The letter C designates the fire-chamber, and G its grate; A, its ash-pit; D', its damper-

door, and D² its fuel-supply door; W, the side walls of the fire-chamber, made to inclose a combustion-chamber C².

The letter F³ designates a flue leading from the top of the fire-chamber to connect with the flue F² at the top of the boiler, said flue being inclosed by the roof-plate P', connecting with the roof plate P² of the flue F².

The letter K designates a helical coil of pipe, which at its lower end descends to connect with the boiler B at k², and which coil at its upper end rises slightly to connect with the boiler B at k³ below the water-line L in the latter, said coil being arranged within the fire-chamber C.

The letter p² designates a steam-pipe connecting with the steam-gage pipe p³ at one end and at its other end connecting with the valve V, which latter is provided with a pressure-lever l, that is weighted at w², is pivoted at p⁴, and at its long arm connected with the upper end of the chain d, with the lower end of the latter connecting with the damper-door D', so as to operate the latter by the measure of steam-pressure in the usual manner.

The letter G² designates the steam-gage arranged on the steam-pipe p³, which latter connects with the boiler at p⁵, and the letter I designates the water-gage arranged on the pipe p³, to show the height of water in the boiler.

The letter J designates the water-feed, and R the return-pipe.

The operation of the boiler thus constructed and arranged is as follows: The water in the boiler B is heated by the descending currents of hot air passing through the tubes T, while a circulation and additional heating is produced by the action of the coil and its connection with the boiler, which circulation makes the operation of the boiler more positive, which is of great advantage in boilers of this class.

We are aware that a water-heating and water-circulating coil has been combined with a fire-chamber and connected with a water-reservoir surrounded by a descending flue that encircled a part of the reservoir, with the upper end of the latter projected through the flue which surrounds it, and we are also aware that a boiler made with vertically-arranged flues passing through the boiler is an old con-

struction. Our invention differs from these
older constructions in the fact that the fire-
chamber of our apparatus and that in which
the waterheating and circulating coil is placed
5 connects with the vertical flues of a boiler by
means of a horizontal flue passing from the
top of the fire-chamber over the boiler-top, so
that the heat coming from the fire-chamber
may circulate over the top of the boiler and
10 down through the boiler-tubes in contradis-
tinction as to a flue passing around a part of
a reservoir projected downwardly into a flue,
or up through the tubes of the boiler with the
fire beneath, in neither of which older devices
15 can the coil co-operate with the same means
for heating the boiler as in the arrangement
which we illustrate and describe.

Having thus described our invention, what
we claim, and desire to secure by Letters Pat-
20 ent, is—

The combination, with a boiler having ver-

tical descending flues, a bottom flue provided
with an exit and connecting with the lower
ends of said vertical flues, and a top flue con-
necting with the upper ends thereof, of a fire- 25
chamber provided with a top flue connecting
with the top flue of the boiler, a helically-coiled
pipe arranged within said fire-chamber, with
the lower end of said coil connecting with the
boiler near its bottom, and the upper end of 30
said coil connecting with the top of said boiler
below its water-line, substantially in the man-
ner as and for the purposes set forth.

Signed at Troy, New York, this 26th day of
February, 1890, and in the presence of the 35
two witnesses whose names are hereto written.

JOHN MAC CORMACK.
HARRY L. VAN ZILE.

Witnesses:

CHARLES S. BRINTNALL,
W. E. HAGAN.