(No Model.)

J. F. MORRISON & J. GRIPP.

STEAM GENERATOR.

No. 485,291. Patented Nov. 1, 1892.

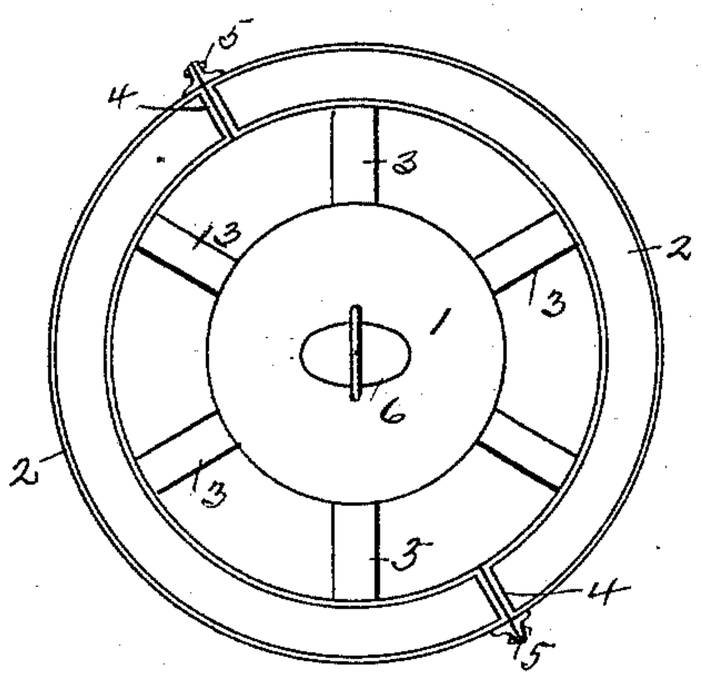

Fig. 1.

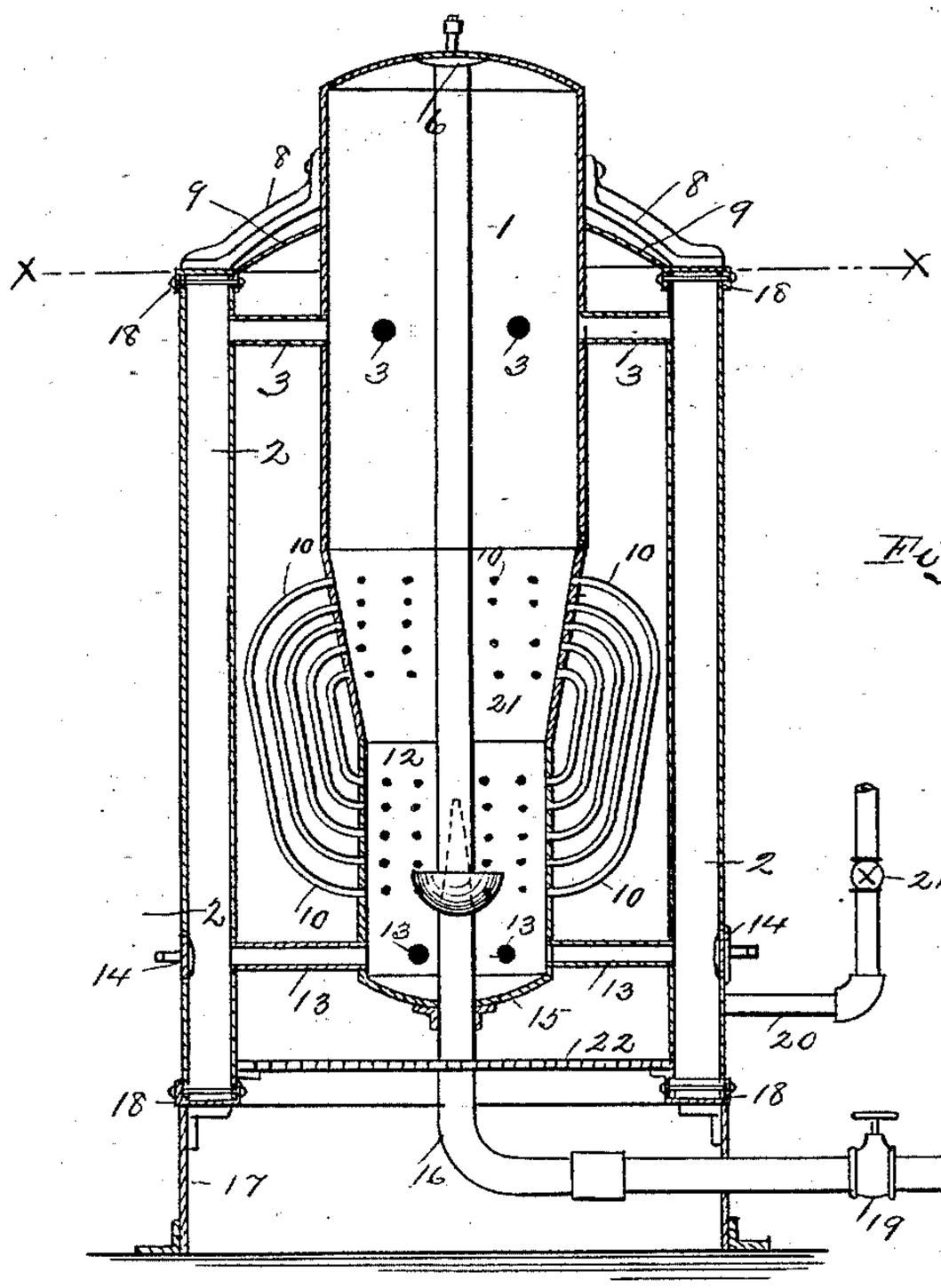

Fig. 2.

Witnesses:
I. A. Carline
R. V. Mahaffey

Inventors.
James F. Morrison
Jacob. Gripp
Per. C. D. Lewis
Atty.

UNITED STATES PATENT OFFICE.

JAMES F. MORRISON AND JACOB GRIPP, OF PITTSBURG, PENNSYLVANIA.

STEAM-GENERATOR.

SPECIFICATION forming part of Letters Patent No. 485,291, dated November 1, 1892.

Application filed December 26, 1891. Serial No. 416,223. (No model.)

To all whom it may concern:

Be it known that we, JAMES F. MORRISON and JACOB GRIPP, citizens of the United States, residing at Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Steam-Generators; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification.

Our invention relates to an improved apparatus for generating steam; and it consists in certain details of construction and combination of parts, as will be fully described hereinafter.

In the accompanying drawings, Figure 1 is a sectional plan view of our improved steam-generator, which is constructed in accordance with our invention. Fig. 2 is a central sectional front elevation of the same.

To put our invention into practice, we provide a cylindrical boiler 1 of a suitable size and arrange the same in a vertical position and having a lower extension 12 of a less diameter, from which a drain-pipe 16 is conducted provided with a valve or gate 19. Connecting these two sections 1 and 12 and arranged radially about the same are a series of tubes 10, which are placed in a vertical position and so arranged that any one or part of the series may be removed without interfering with the others. The upper section of the boiler 1 is provided with a manhole 6 for the purpose well known to the art. Surrounding this last-described apparatus is an annular jacket 2, consisting of an inner and outer casing, leaving an annular water-space divided into two parts and riveted at 5 firmly together. Connecting this jacket 2 and the upper and lower sections of the boiler 1 and 12 together are two series of horizontal tubes 3 and 13, which serve to establish a communication between the inner portion of the apparatus and the surrounding jacket.

The upper connecting-tubes 3 are secured to the jacket 2 by means of a screw-thread and the inner ends of the said tubes attached to the boiler 1 by expanding the same. The lower series of tubes 13 are passed through openings 14 and attached to the section 12 by a screw-thread and the outer ends by expanding the same.

The central portion of the apparatus is supported by means of suitable brackets 8, riveted to the boiler 1 and resting on the caps 18 of the jacket 2, and the space between jacket and boiler inclosed at the top by a covering 9, said covering serving to obstruct the free passage of the products of combustion from the space between the jacket and boiler, or, in other words, confining in a measure the products of combustion within said space; but it is obviously formed with an opening or openings to permit the products of combustion to escape in sufficient quantity to give room for that rising from the fire. This jacket 2 is provided at a point near its base with a water-inlet pipe 21 and the said jacket supported above the floor by means of a suitable frame 17. Beneath inner boiler is a fireplace or chamber having grate-bars 22, in which a fire may be placed to generate steam.

In operation the water is introduced into the jacket 2 through the pipe 20 and after becoming heated rises upward, passes through the tubes 3 into the boiler 1 and 12, and circulating through the small tubes 10 and 13. By this construction of a steam-generator a great amount of heating-surface is obtained, thereby generating steam quickly.

Having thus described our invention, what we claim, and desire to secure by Letters Patent, is—

1. In a steam-generator, the combination of the boiler, a series of external tubes connecting the upper and lower portions of said boiler, an annular jacket encircling said boiler, and tubes connecting the upper and lower portions of said jacket with the upper and lower portions of said boiler, with a grate adjacent to the lower end of said boiler, a cap covering the space between the top of said jacket and the sides of the boiler, brackets supporting said boiler from said annular jackets, a feed-water connection to said jacket, and a drain-pipe connection from said boiler.

2. The herein-described steam-generator, consisting of a boiler having a reduced extension, tubes connecting said boiler and extension, an annular jacket encircling said boiler

and extension and extending to a lower plane than the bottom of said extension, tubes connecting said jacket with said boiler and extension, a feed-water connection to said jacket, a drain-pipe connection to said boiler, the covering 9, connecting the upper end of the jacket with the upper or main portion of the boiler, brackets supporting said boiler from said jacket, and a grate supported below the lower end of said extension and encircled by said jacket, all substantially as shown and described.

In testimony that we claim the foregoing we hereunto affix our signatures this 28th day of November, A. D. 1891.

JAMES F. MORRISON. [L. S.]
JACOB GRIPP. [L. S.]

In presence of—
CHARLES LARGE,
M. E. HARRISON.