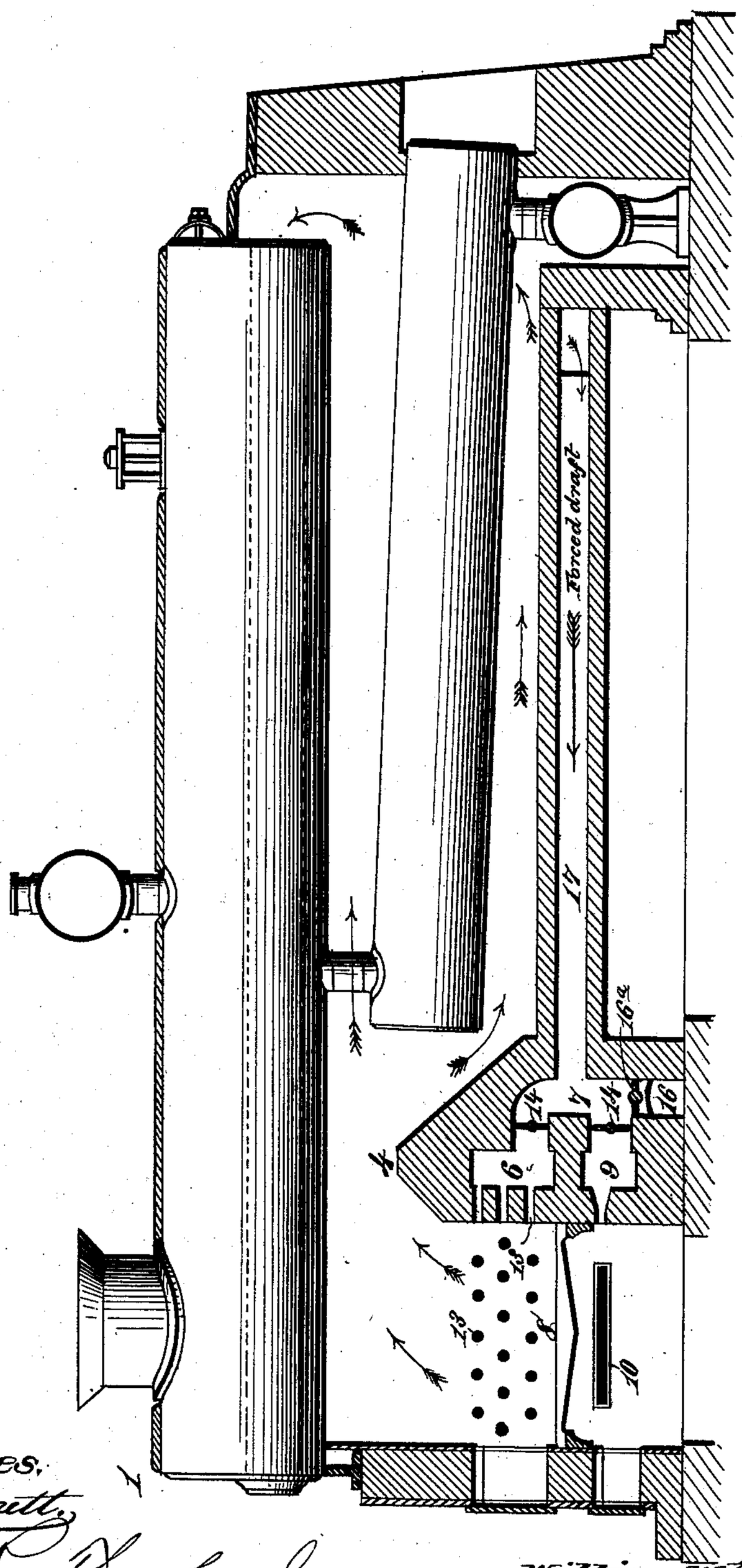
(No Model.) 3 Sheets—Sheet 1.

W. W. SUTCLIFFE.

BOILER FURNACE.

No. 389,773. Patented Sept. 18, 1888.



Witnesses.
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J. A. Rutherford.

Inventor.
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By James L. Norris Atty.

(No Model.) 3 Sheets—Sheet 2.

W. W. SUTCLIFFE.

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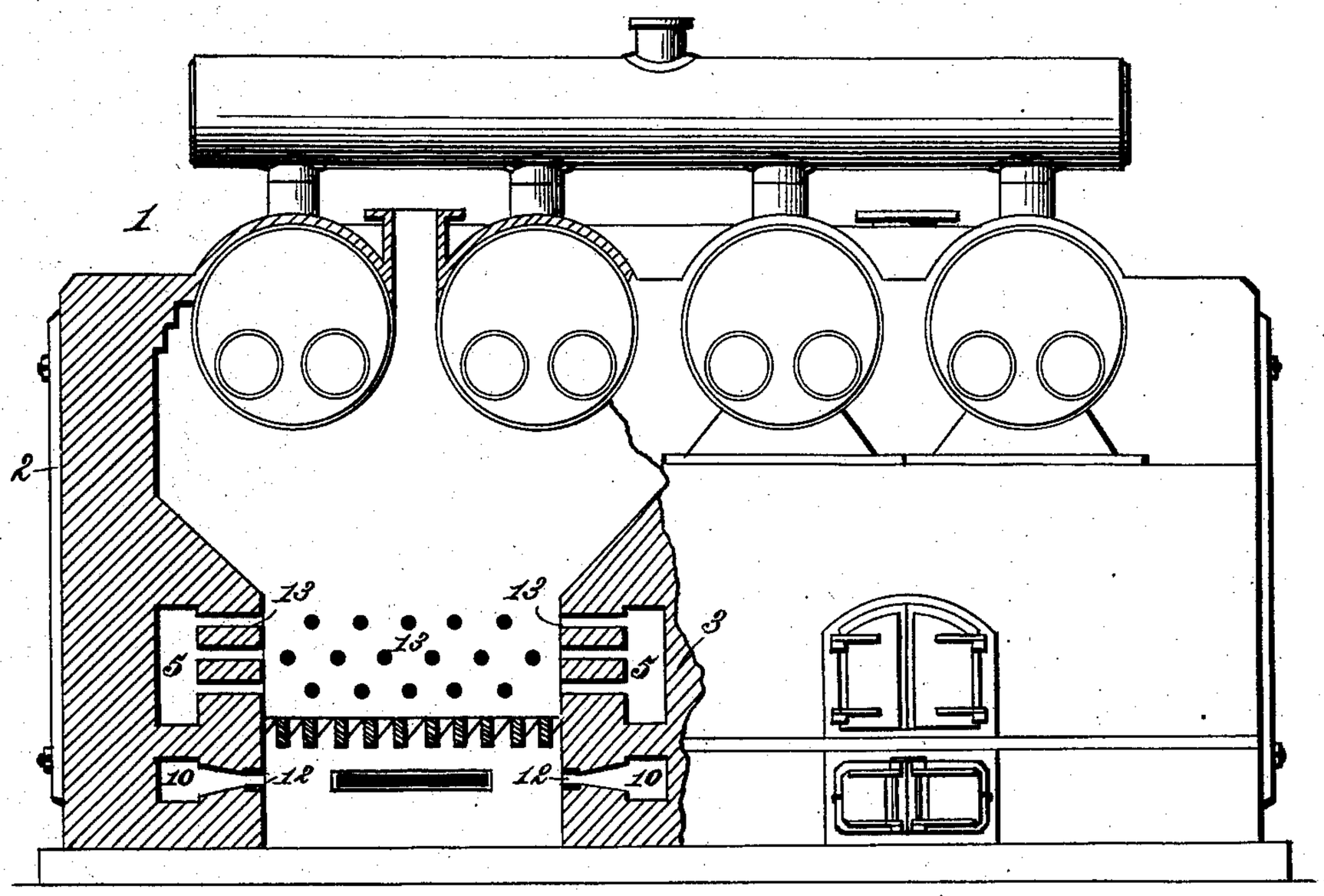
Fig. 2.



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(No Model.) 3 Sheets—Sheet 3.

W. W. SUTCLIFFE.

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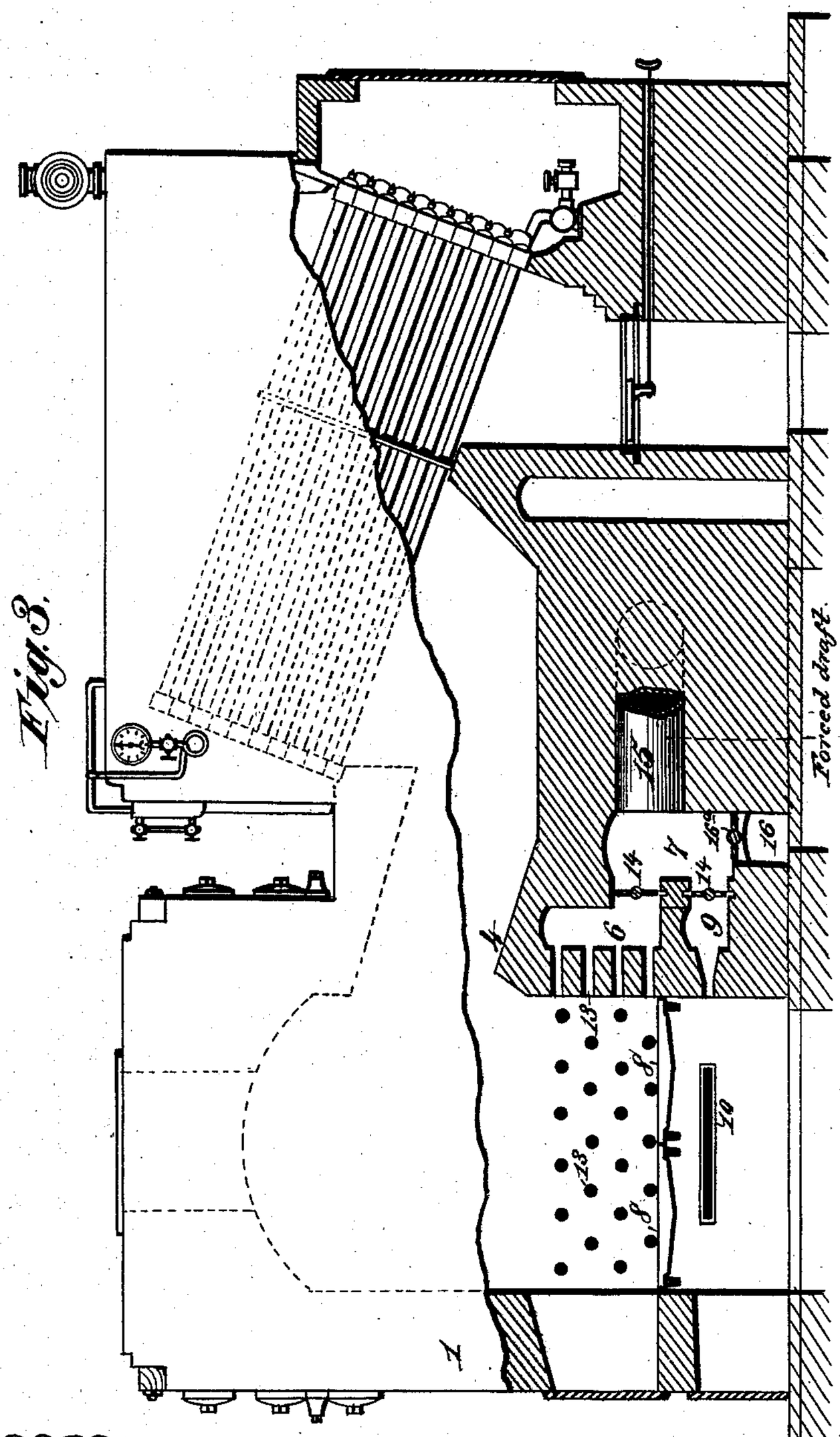

Fig. 3.

Witnesses.
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UNITED STATES PATENT OFFICE.

WILLIAM W. SUTCLIFFE, OF NEW ORLEANS, LOUISIANA.

BOILER-FURNACE.

SPECIFICATION forming part of Letters Patent No. 389,773, dated September 18, 1888.

Application filed March 21, 1888. Serial No. 268,010. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM WILSON SUTCLIFFE, a citizen of the United States, residing at New Orleans, in the parish of Orleans and State of Louisiana, have invented new and useful Improvements in Boiler-Furnaces, of which the following is a specification.

My invention relates to boiler-furnaces, and more particularly to that class of furnaces designed for the combustion of wet fuel, such as the bagasse employed in the furnaces of sugar-houses.

It is my purpose to provide a furnace adapted to the combustion of bagasse or other wet fuel, as well as fuel of other kinds, and to combine therewith independent air-flues having regulating dampers or gates, and having communication with air-tuyeres above and below the grate-bars, said tuyeres obtaining their air-supply from independent air-flues controlled by means of damper-gates, the said tuyeres being constructed in the bridge-wall and side walls, the air-flues being supplied with air either from a common air-chamber supplied with a hot-blast blower or from the atmosphere, or from both combined. It is my further purpose to so construct and organize the parts as to provide for a simple and perfect regulation of air-supply and the admission of the same, either above or below the grate-bars, or both, as may be desired.

The invention consists in the several novel features of construction and new combinations of parts hereinafter fully described, and then definitely pointed out in the claims.

In the accompanying drawings, Figure 1 is a longitudinal vertical section of the furnace with a set of boilers in place. Fig. 2 is a front elevation of Fig. 1, part of the front of the furnace being broken away. Fig. 3 is a longitudinal vertical section showing the furnace combined with the multitubular boiler.

In the said drawings, the reference-numeral 1 designates the furnace, having a set of boilers of any approved form. I have shown in this case a double furnace having side walls, 2, and a central dividing-wall, 3, a bridge-wall, 4, being located in rear, substantially in accordance with the known construction. In the side walls, 2, and central wall, 3, are air-flues 5, extending to and communicating with a similar air-flue, 6, in the bridge-wall 4, in which is also formed a common air-chamber, 7, having communication with the air-flue 6, which lies above the grate-bars 8, and also communicating with a second air-flue, 9, formed in the bridge-wall below the grate-bars. The lower air-flue, 9, communicates with flue-openings 10 in the side walls and central dividing-wall, having tuyeres or blast-openings 12, supplying air beneath the grate-bars. The air-flues 5 and 6 are also supplied with blast-openings 13, opening into the furnace above the grate-bars. In the communicating passages between the common air-chamber 7 and the upper and lower air-flues, 6 and 9, in the bridge-wall are dampers or gates 14.

The common air-chamber 7 is supplied with air from an air-conduit, 15, in rear of the bridge-wall, a damper being placed between said chamber and a draft-passage, 16, by which air may be supplied independently of the said air-conduit or in conjunction therewith.

The dampers in the two passages leading from the air-chamber 7 to the upper and lower series of air-flues being closed, the fire is started in the furnace in the ordinary manner, and when well under way cane-bagasse or other fuel used is supplied to the furnace through hoppers or otherwise in any suitable or known manner, and the damper between the air-chamber and the upper series of flues is opened, supplying heated air to the furnace above the grate-bars and promoting increased combustion. If greater heat is required, the lower damper, 14, between the air-chamber and the lower set of air-flues, may also be opened, introducing heated air beneath the grate-bars as well as above. In like manner the lower series of flues may be employed alone, if desired, the air for both being supplied either by the draft-passage 16 or by the air-conduit 15, which is supplied by a blower in any ordinary manner.

In place of forming the air-conduit 15 as a pipe, as shown in Fig. 3, to connect with a blower, I can employ the air-conduit 17, lying in the fire-bed of the boilers and absorbing heat, as in Fig. 2, and the air passing through the same may be supplied either by natural draft or by a blower.

By this invention the heating-power of the furnace may be very greatly increased and at the same time kept under perfect control. Moreover, a marked economy in the consump-

tion of fuel is secured by reason of the more complete consumption of the products of combustion caused by the introduction of the hot-blast in the manner described.

What I claim is—

1. A furnace having its side walls and bridge-wall provided with separate air-flues, arranged both above and below the grate-bars, and having tuyeres or blast-openings above and below said bars, said air-flues being independently opened and closed by dampers, substantially as described.

2. A furnace having side walls and bridge-wall provided with two separate air-flues having tuyeres opening above and below the grate-bars, and provided also with an air-chamber common to both flues, with dampers located in the passages leading to each series, and a draft-passage and air-conduit having communication with the common chamber, substantially as described.

3. In a furnace having separate air-flues in the side walls and bridge-wall, provided with blast-openings or tuyeres leading into the space above and below the grate-bars, a hot-air conduit lying in the fire-bed of the boilers and communicating with an air-chamber in the bridge-wall common to both sets of flues, independent dampers being placed between the air-chamber and said flues to permit them to act separately or in unison, substantially as described.

4. A furnace having its side walls and bridge-wall provided with air-flues opening separately above and below the grate-bars, said flues having communication with a common air-chamber in the bridge-wall, a hot-air conduit lying in the fire-bed in rear of the bridge-wall and communicating with the common air-chamber, and an air-conducting draft-passage supplying air either separately or in conjunction with the conduit, substantially as described.

5. The combination, with a boiler, of a furnace having its side walls and bridge-wall provided with separate but valved air-flues having tuyeres or blast-passages opening therefrom both above and below the grate-bars, a common air-chamber in the bridge-wall communicating with air-flues, and a draft-passage and air-blast conduit, both having communication with said chamber for the purpose of burning moist bagasse and other wet fuels and utilizing the heat thereof for generating steam in the boiler, substantially as described.

6. The combination, with a boiler, of a furnace having its side walls and bridge-wall provided with separate valved air-flues having tuyeres or blast-passages opening above and below the grate-bars, an air-chamber in the bridge-wall common to all the flues, a hot-air conduit in the fire-bed of the boiler, and a draft-passage supplying air to the air-chamber either separately or in conjunction with the conduit, for the purpose stated and substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

WM. W. SUTCLIFFE.

Witnesses:

JNO. S. MOORE,

CHAS. G. JOHNSEN.