

(No Model.)

A. SPENCE.

FURNACE FOR WATER HEATERS.

No. 380,297.

Patented Mar. 27, 1888.

Fig. 2.

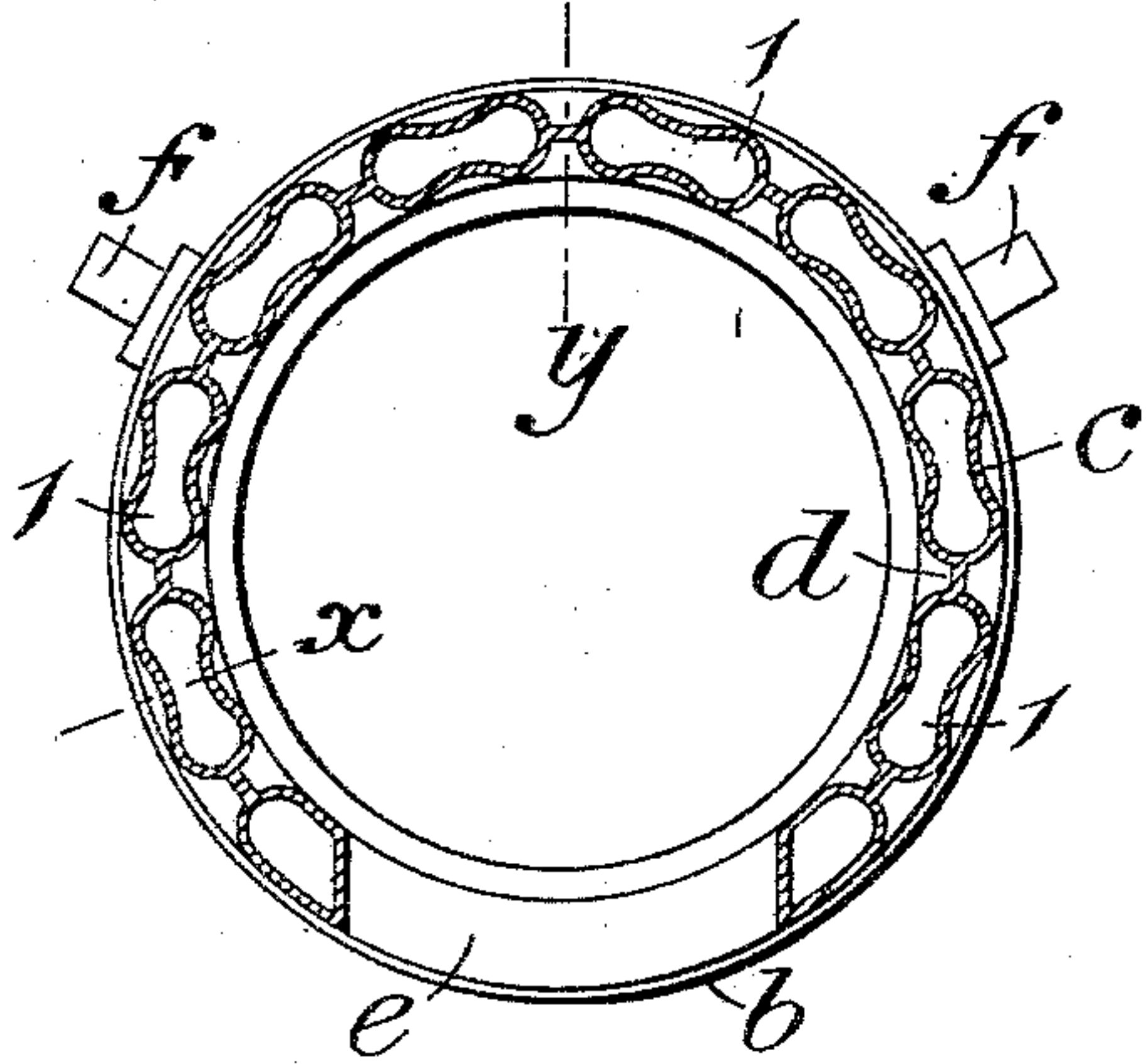


Fig. 1.

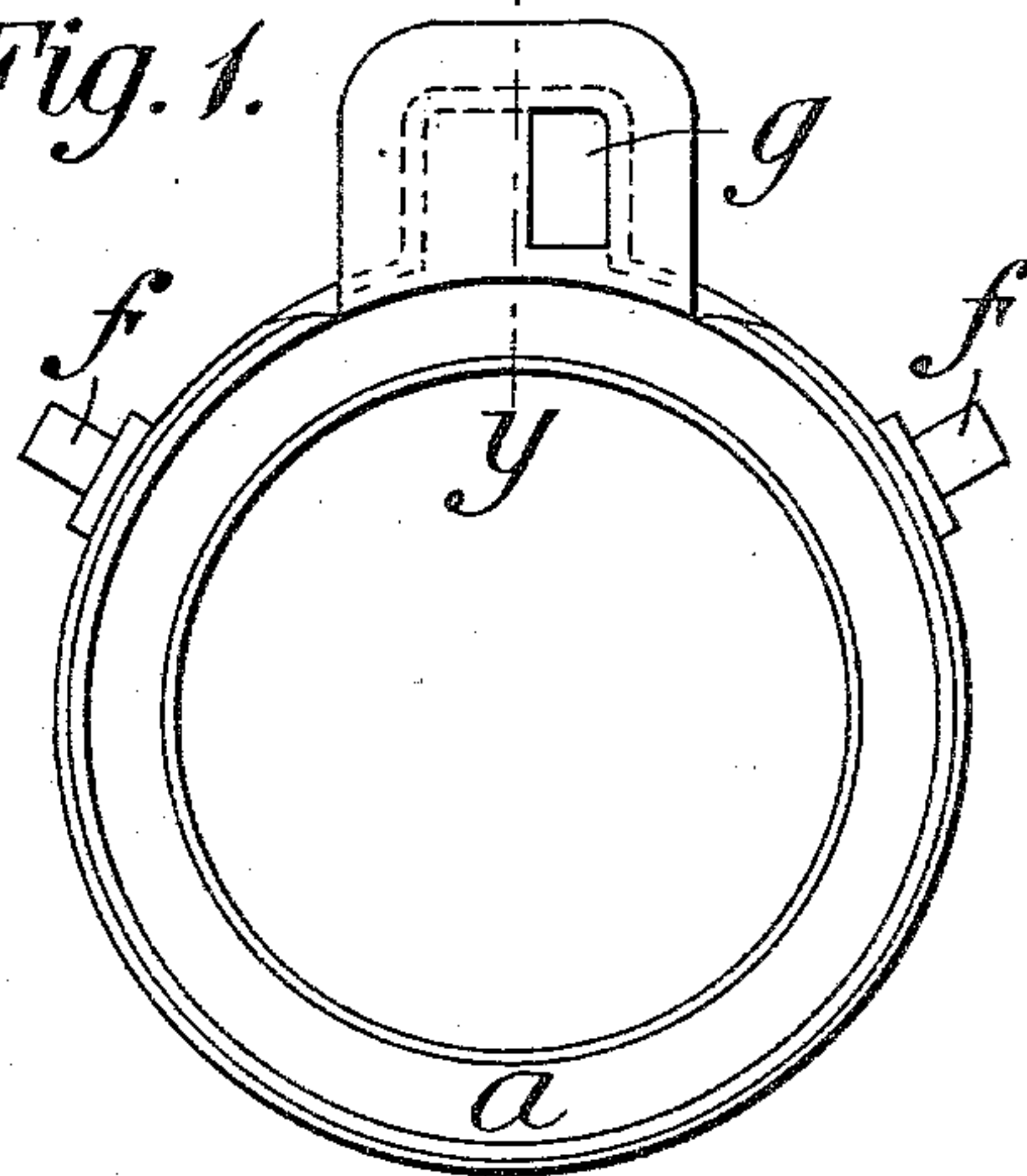


Fig. 3.

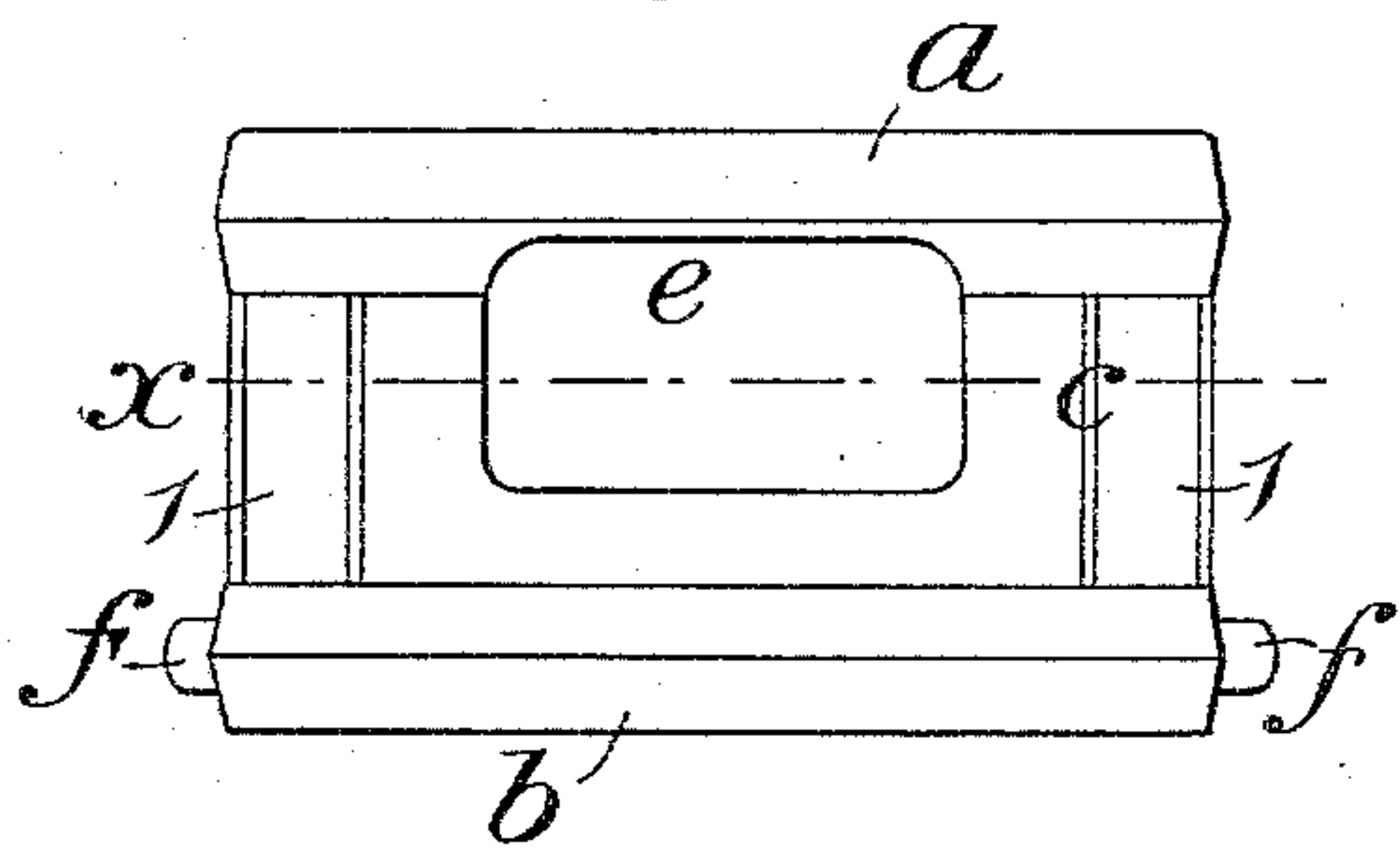


Fig. 4.

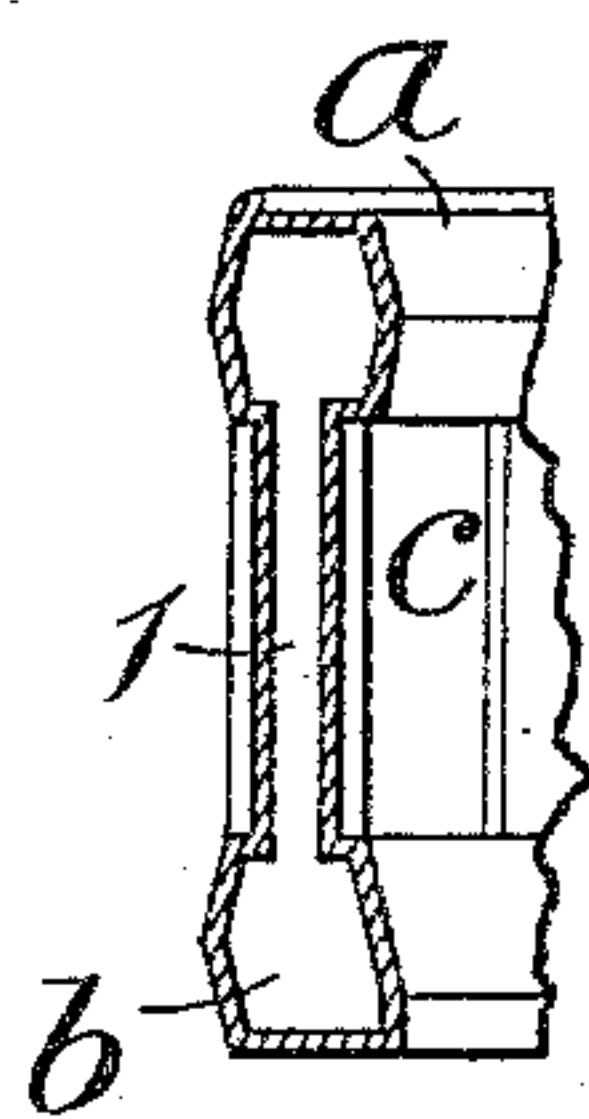
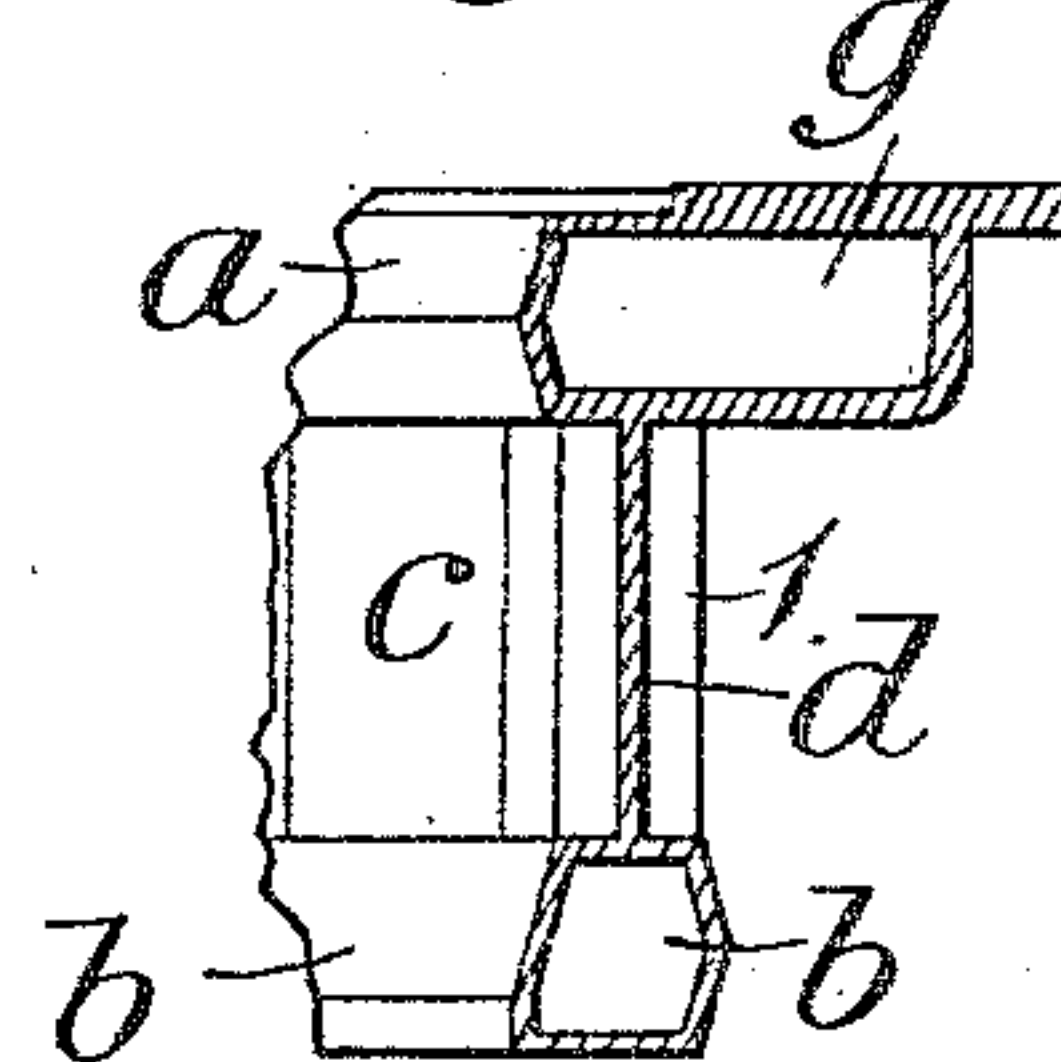


Fig. 5.



Witnesses:-

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Inventor,

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By his Attorney

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UNITED STATES PATENT OFFICE.

ARCHIBALD SPENCE, OF MONTREAL, QUEBEC, CANADA, ASSIGNOR TO THE
NATIONAL HOT WATER HEATER COMPANY, OF BOSTON, MASSACHU-
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FURNACE FOR WATER-HEATERS.

SPECIFICATION forming part of Letters Patent No. 380,297, dated March 27, 1888.

Application filed January 31, 1888. Serial No. 262,539. (No model.)

To all whom it may concern:

Be it known that I, ARCHIBALD SPENCE, a
subject of the Queen of Great Britain, residing
at the city of Montreal, in the district of Mon-
treal and Province of Quebec, Canada, have
invented new and useful Improvements in Fur-
naces for Water-Heaters; and I do hereby de-
clare that the following is a full, clear, and
exact description of the same.

This invention has reference to the construc-
tion of furnaces for water-heaters, and, as shown
in the drawings, is particularly adapted to the
water-heater invented by me, for which Let-
ters Patent of the United States were granted
8th day of March, A. D. 1887, No. 359,105.

The object of the present invention is to pro-
duce water-spaces (round or about the fire)
having extended surface almost equal to the
amount of surface for the fire to act upon when
formed by circular tubes, without the neces-
sity, as in the case where circular tubes are
used, of having an outer casing to prevent the
products of combustion from passing out be-
tween the tubes; thereby also a saving in the
cost of construction is effected, and a form of
water-casing is given which is remarkably ex-
empt from becoming cracked or broken by
unequal expansion.

In the drawings hereunto annexed similar
letters of reference indicate like parts.

Figure 1 is a plan of a furnace embodying
my invention. Fig. 2 is a section on line *x x*
in Fig. 3. Fig. 3 is a front elevation of the
furnace shown in Fig. 1. Fig. 4 is a section
on line *x*, Fig. 2. Fig. 5 is a section on line *y*
in Fig. 1, which is the same in position as line
y in Fig. 2.

The furnace in this case consists of a top hol-
low ring, *a*, and a bottom hollow ring, *b*. These
are cast integral with a central tubular part,
c. The tubular part *c* consists of tubes of the
double tubular form shown at 1 in Fig. 2. By
making them in this form a considerable sav-
ing is effected in the labor of molding, while

they give an almost equal amount of surface
acted upon by the fire that circular tubes would
give. The tubes 1 are connected together by
short bridge-pieces *d*. By making these bridge-
pieces short the heat that is imparted to them
by the fire is, nearly all of it, by conduction
through the metal, imparted to the water in
the tubes, the whole forming a complete cas-
ing not requiring any other outer casing to
prevent the products of combustion from es-
caping.

Another advantage in constructing the cen-
ter part, *c*, composed of the double tubular
form 1 and bridges *d*, is that by practical use
it is found that this form is very remarkably
exempt from becoming cracked by the une-
qual expansion of the metal (caused by the
fire acting unequally on various portions of it)
as compared with the other forms of furnaces
at present in use.

e is the fire-hole opening, *f* are the inlet wa-
ter pipes to the bottom ring, *b*, and *g* is the
outlet by which the water circulates or passes
from the furnace-casing above described to the
desired sections of water-heater situated above
the fire.

Although, as above described and as shown
in the drawings, the furnace-casing is a circu-
lar one, yet it will be readily understood that
my invention may be equally well applied to
angular casings.

What I claim, and wish to secure by Letters
Patent, is as follows:

The combination, in a fire-box casing, of the
upper and lower rings of hollow form and
having inlet and outlet, with the central tubu-
lar portion composed of the double tubular
form and bridge-pieces, the whole substan-
tially as described.

ARCHIBALD SPENCE.

Witnesses:

CHARLES G. C. SIMPSON,
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