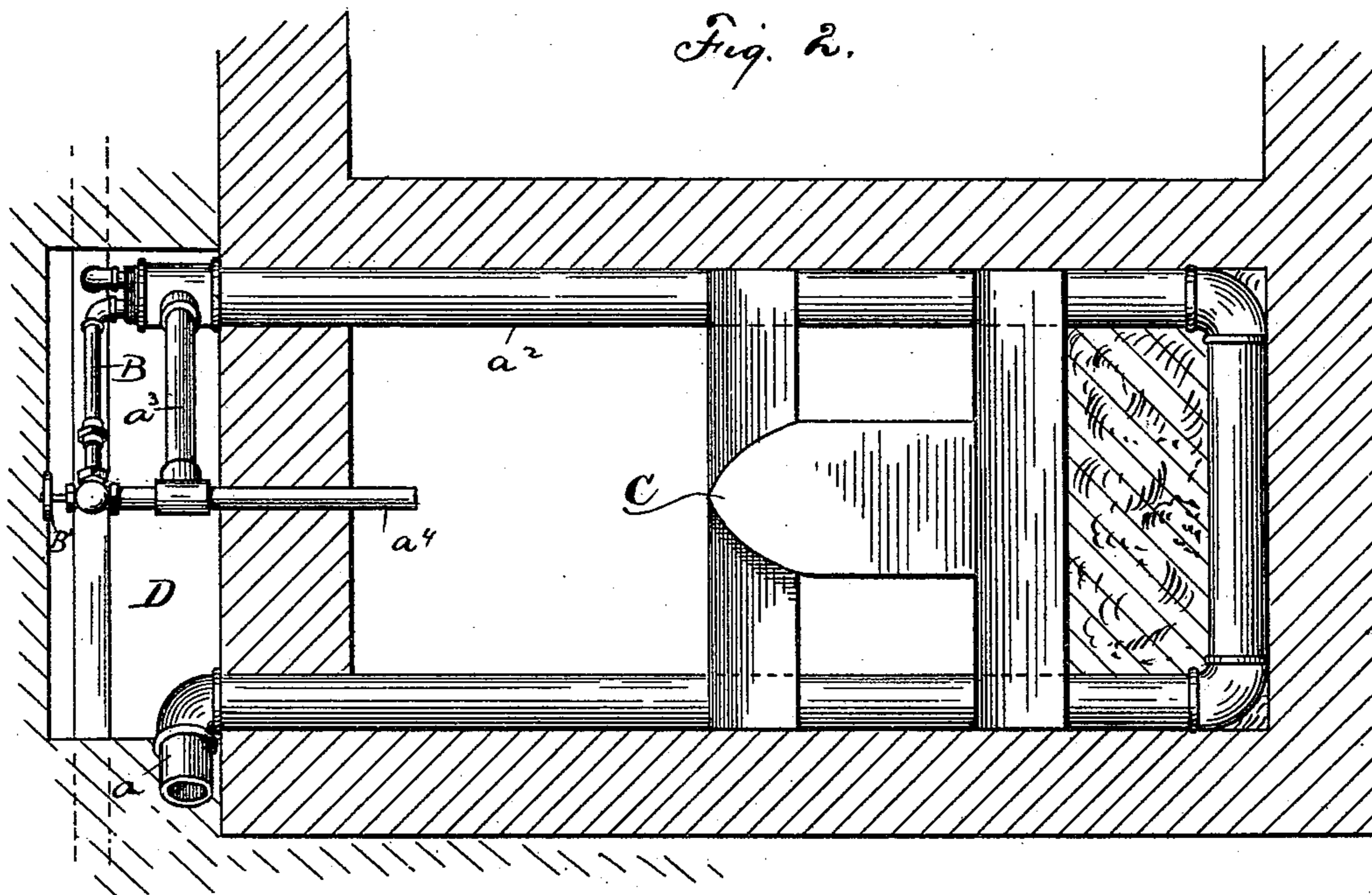
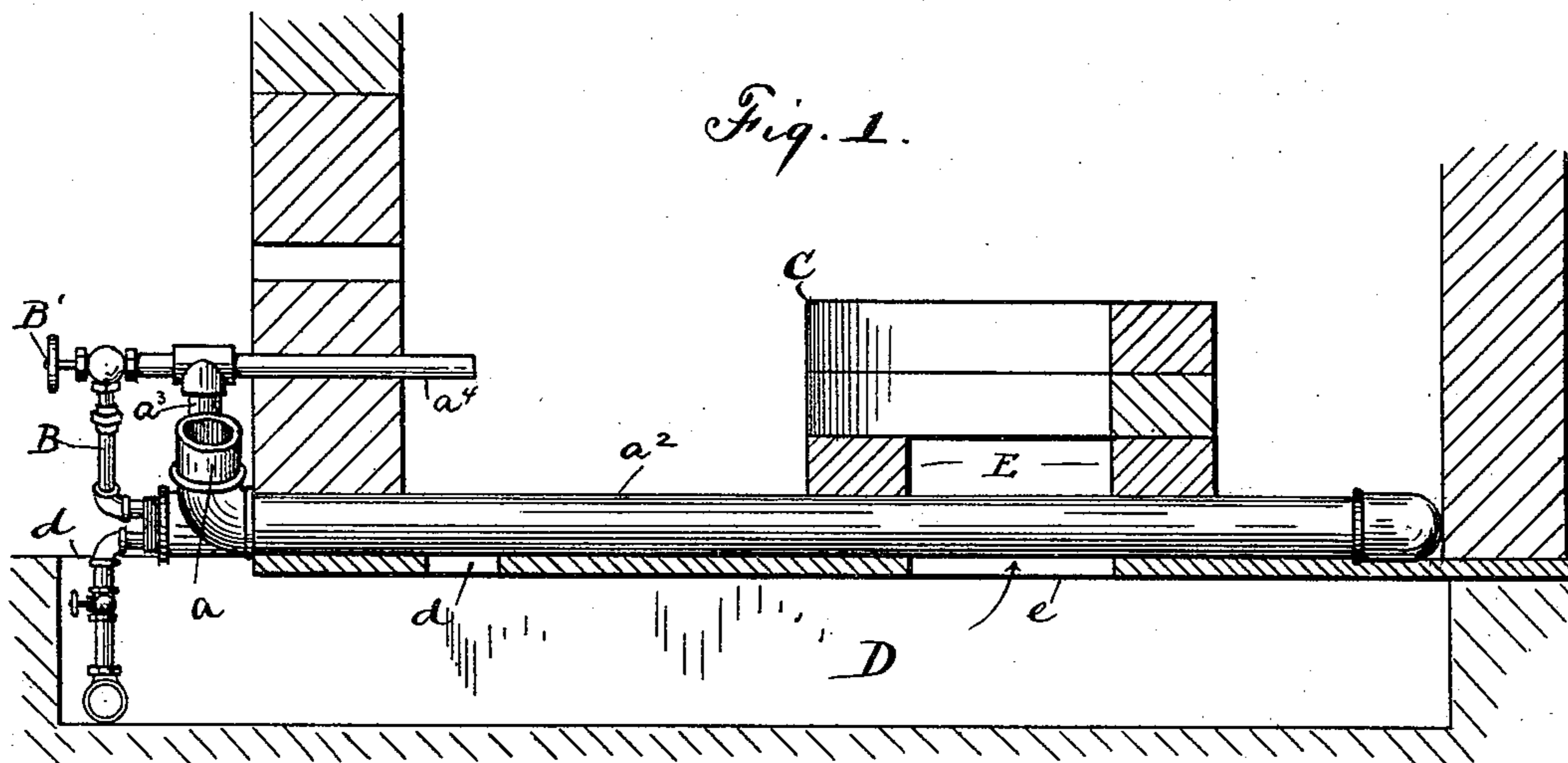


2 Sheets—Sheet 1.

No. 475,277.

Patented May 17, 1892.



Witnesses;
E. Byron Gilchrist
Ex parte

Inventor.
Frank Hagelin
By Lyons & Lyons
Attorneys

(No Model.)

2 Sheets—Sheet 2.

F. HAGELIN.
HYDROCARBON OIL BURNER.

No. 475,277.

Patented May 17, 1892.

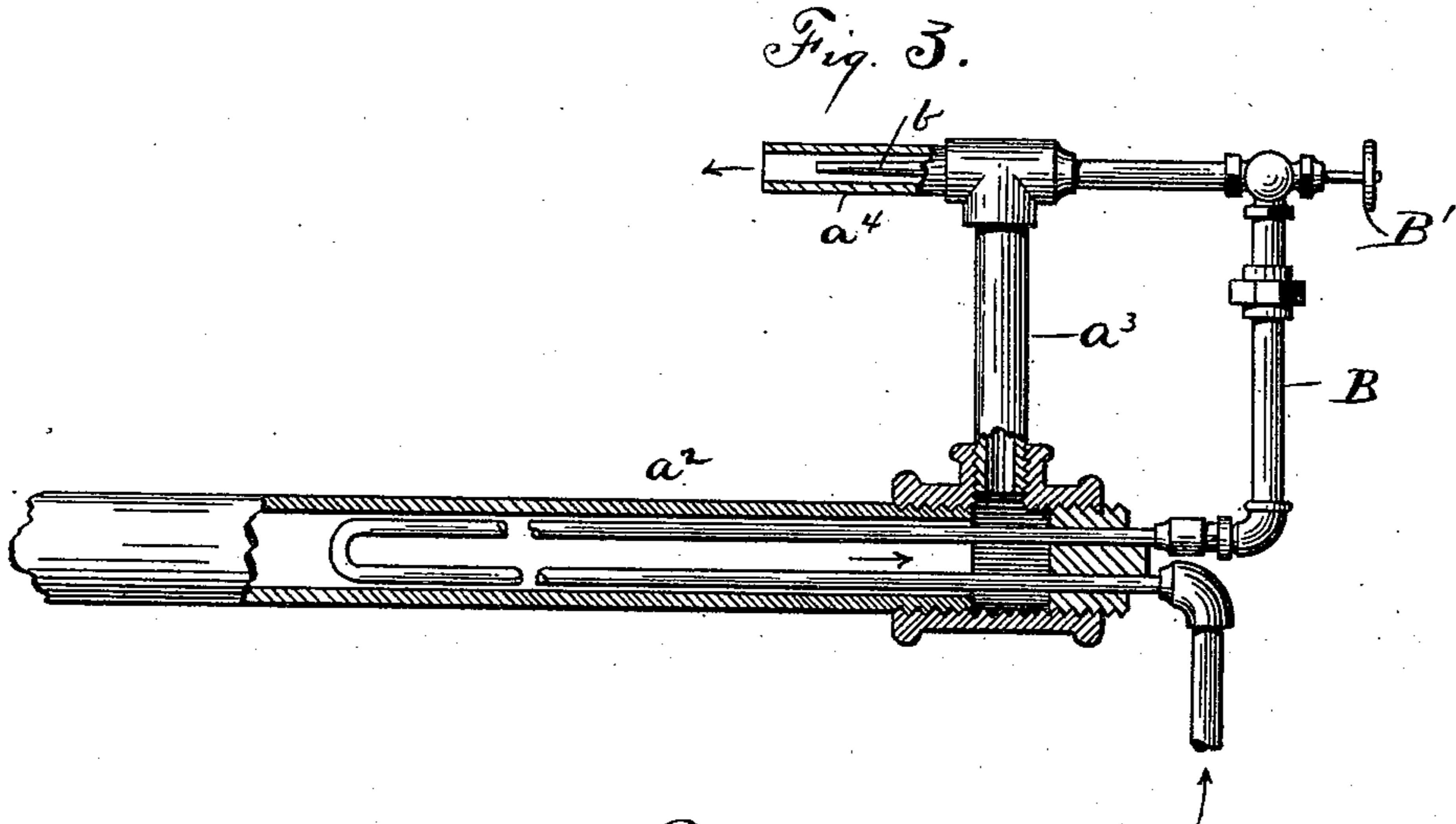
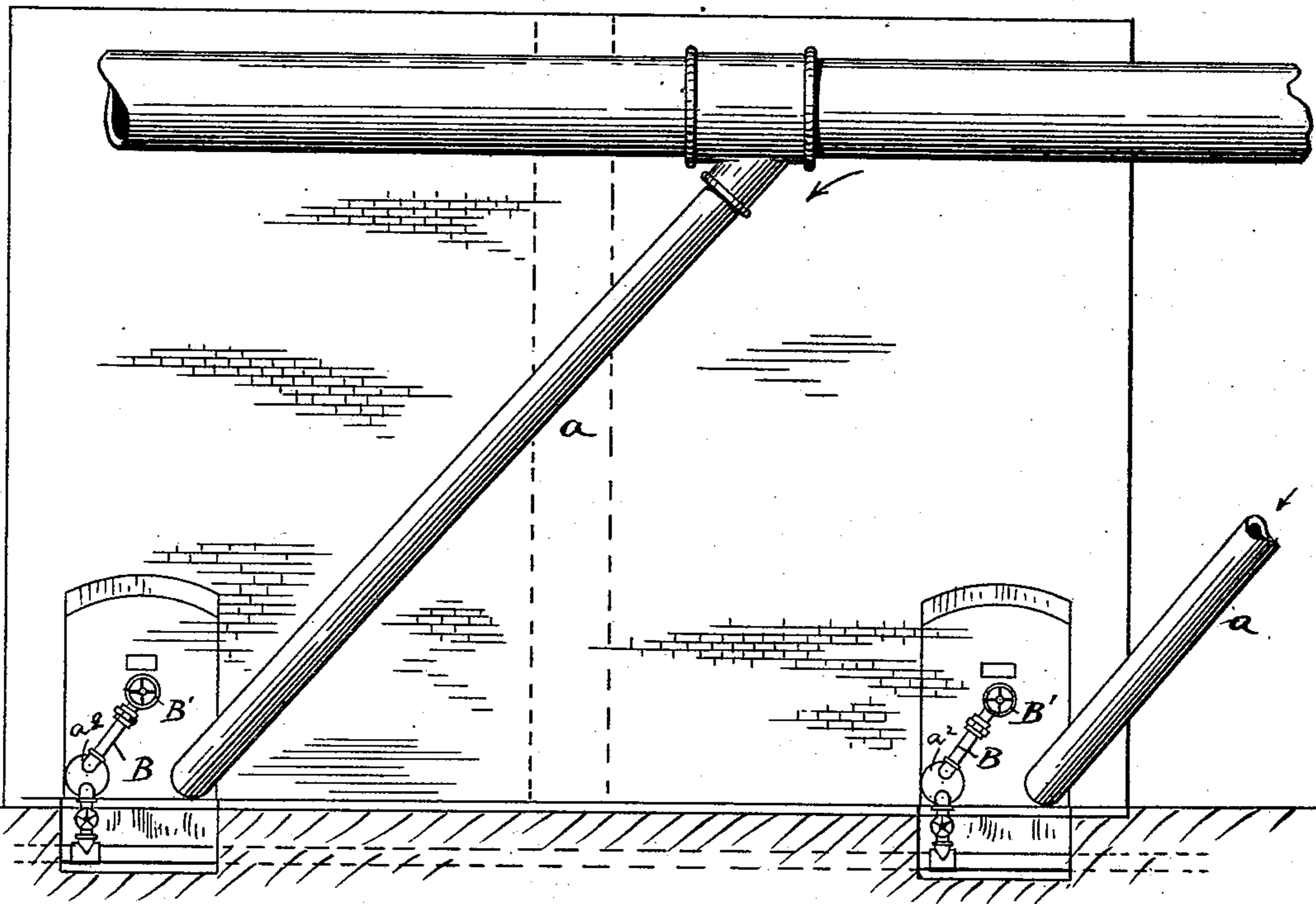


Fig. 4.



Witnesses.

E. Byron Gilchrist
E. B. Gilchrist

Inventor.

Frank Hagelin
By F. Hagelin

UNITED STATES PATENT OFFICE.

FRANK HAGELIN, OF CLEVELAND, OHIO.

HYDROCARBON-OIL BURNER.

SPECIFICATION forming part of Letters Patent No. 475,277, dated May 17, 1892.

Application filed April 6, 1891. Serial No. 387,770. (No model.)

To all whom it may concern:

Be it known that I, FRANK HAGELIN, of Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and
5 useful Improvements in Hydrocarbon - Oil Burners; and I 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
10 use the same.

My invention relates to improvements in hydrocarbon-oil burner for steam-generator; and it consists in certain features of construction and in combination of parts hereinafter described, and pointed out in the claims.

In the accompanying drawings, Figure 1 is a side elevation, and Fig. 2 is a plan, each showing the setting in section. Fig. 3 is a side elevation in section of the burner mechanism
20 detached. Fig. 4 is a front elevation taken outside the setting.

A represents a large-sized air-blast pipe extending along in front of the boiler or extending in front of a series of boilers, according as
25 the case may be, pipe A having a branch pipe *a* extending diagonally downward, as shown in Fig. 4, and entering the setting under the boiler. Pipe *a* extends along near to the one
30 latter and connects with a lateral section *a'*, that in turn connects with section *a''*, the latter extending forward along near the other side of the fire-box and at the forward end member *a''* connecting with the upwardly-in-
35 clined section *a'''*, that in turn connects with the discharging member *a''''*, the latter presenting rearward and being located under the lateral center of the boiler. The horizontal sections of the air-pipe within the fire-box are
40 located on about the same plane where the grates are usually located in ordinary boiler-settings—say about three feet more or less below the bottom line of the boiler.

B is the feed-pipe for the oil, this pipe entering the front end of sections *a''* of the air-pipe, the oil-pipe extending to the rear end of section *a''* and returning, from whence it extends diagonally upward opposite the discharge of the air-pipe and from thence rear-
50 ward, the rearward section thereof *b* extending centrally inside of member *a''* and dis-

charging just inside the latter. (See Fig. 3.) The discharge of the oil is therefore surrounded by the air-blast, by means of which the oil is instantly atomized and commingled
55 with the air and the united product is united just rearward of the discharge.

C is a deflector constructed, preferably, of fire-brick and resting on the bridge-wall E, the deflector having a rounded forward end located in line of the blast, and the flame impinging this deflector is diffused or scattered,
60 so as to fill the fire-box.

The horizontal section of the air-pipe within the fire-box is covered usually with a single layer of fire-brick laid flatwise, and after
65 the fire has been burning a short time this fire-brick covering and the air-pipes below become intensely heated, whereby the air-blast is heated to a high degree and the oil within
70 the feed-pipe coil becomes heated to substantially the same degree as the air, and in such equally-heated condition the air and oil are commingled and united. The conditions, therefore, are most favorable for perfect combustion, and this is had to such a degree that
75 after the fire is well under way no smoke is visible from the chimney.

D is a cold-air duct extending along where the ash-pit is usually located, the air-duct having an opening *d* about under the rearward or
80 discharging end of the burner.

Duct D connects with a large opening *e*, constructed in the low bridge-wall E, so that there is an air passage-way up on either side of the
85 deflector C, and as the flame is spread laterally by the deflector the upward current of air through opening *e* carries the flame up against the boiler. There is a damper (not shown) for controlling the cold-air draft, and of course
90 this damper is opened wide in starting the fire. The air-blast is usually supplied by a fan-blower, although any means for producing an air-blast will answer the purpose.

The device is simple, inexpensive, and easily
95 regulated, the oil-supply pipe being provided with a valve B' for controlling the flow of oil.

In starting a fire the air-blast and oil are of course introduced without heating, and under such conditions more or less smoke is formed
100 by the condensation of unconsumed gases; but in a short time the apparatus becomes heated,

and when well under way, as aforesaid, no smoke is formed.

What I claim is—

1. The combination, with a furnace, of an
5 injector having a hot-air blast-pipe and an oil-
supply pipe, a deflector, and an air-passage
each side of the same leading from the outside
to the inside of said furnace and arranged to
discharge therein an upward current of air
10 each side of said deflector, substantially as
described.

2. The combination of a furnace, an injector
formed with a hot-air blast-pipe and an oil-

supply pipe, a part of said air-pipe being lo-
cated within and on each side of said furnace, 15
and a deflector located in the back part of the
furnace and having inclined sides at its front
end and facing toward said injector, substan-
tially as described.

In testimony whereof I sign this specifica- 20
tion, in the presence of two witnesses, this 25th
day of February, 1891.

FRANK HAGELIN.

Witnesses:

ALBERT E. LYNCH,
C. H. DORER.