

No. 746,493.

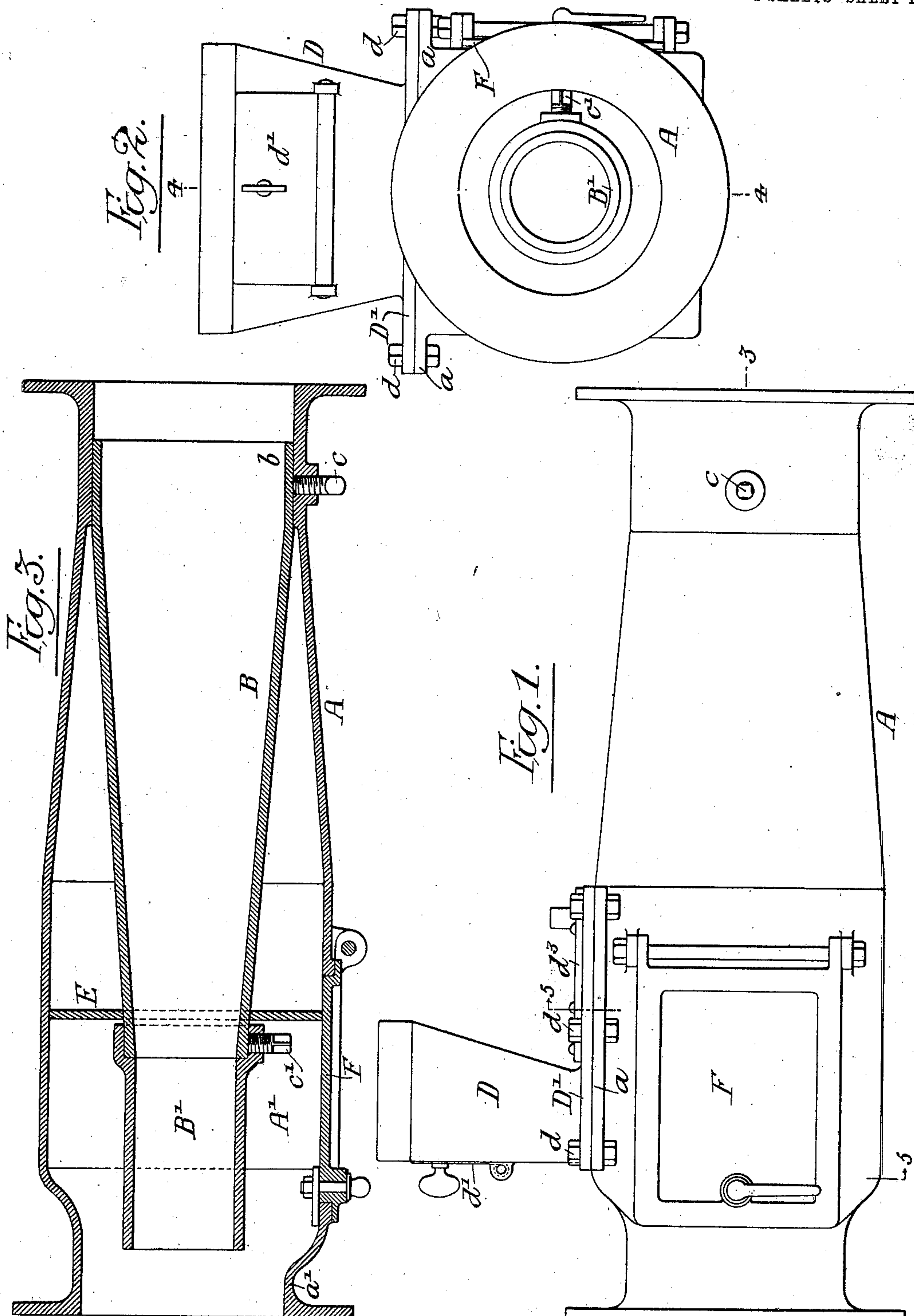
PATENTED DEC. 8, 1903.

C. H. GIFFORD.
APPARATUS FOR INJECTING PULVERIZED FUEL INTO
COMBUSTION CHAMBERS.

NO MODEL,

APPLICATION FILED FEB. 19, 1903.

2 SHEETS—SHEET 1.



Witnesses: { Hamilton D. Turner
Titus H. Jones.

Inventor: Charles H. Gifford,
by his Attorneys: Himm & Himm

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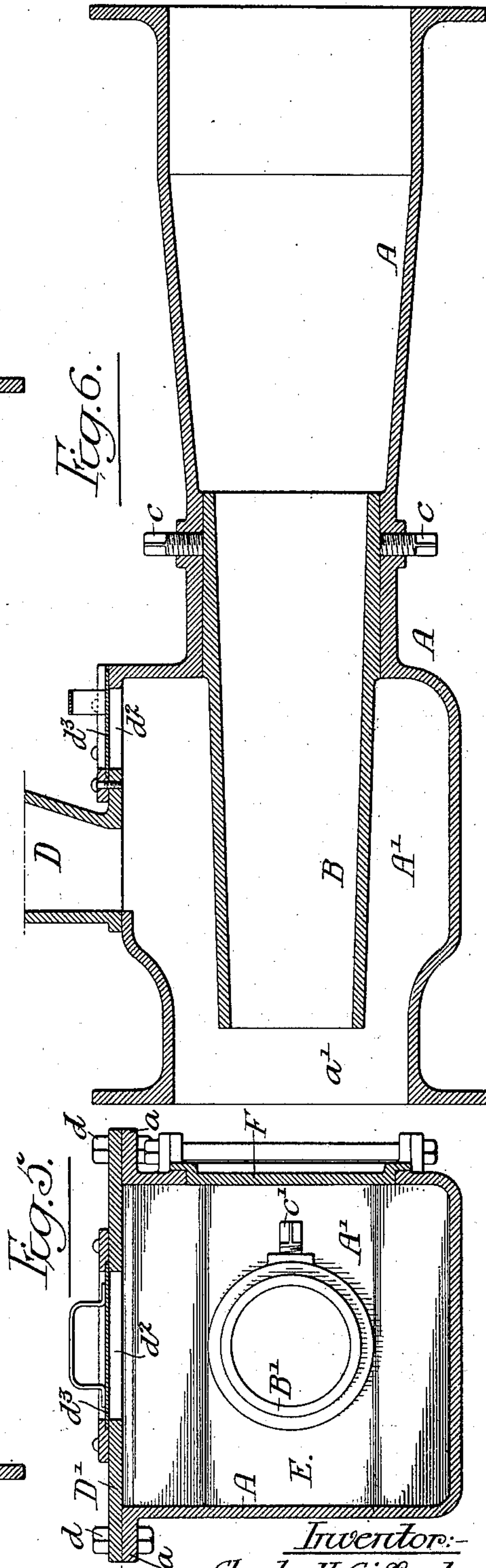
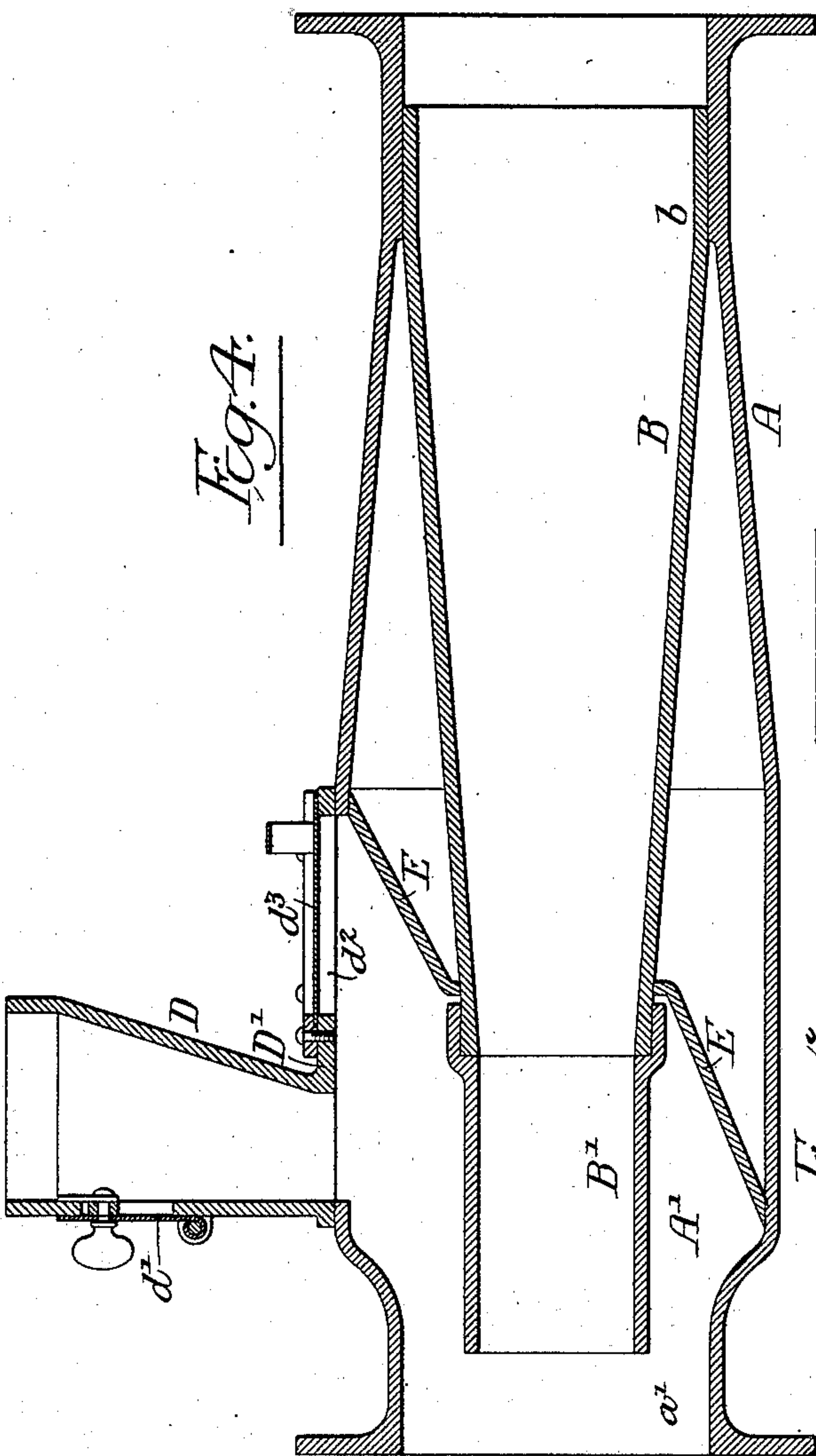
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UNITED STATES PATENT OFFICE.

CHARLES H. GIFFORD, OF HADDONFIELD, NEW JERSEY.

APPARATUS FOR INJECTING PULVERIZED FUEL INTO COMBUSTION-CHAMBERS.

SPECIFICATION forming part of Letters Patent No. 746,493, dated December 8, 1903.

Application filed February 19, 1903. Serial No. 144,074. (No model.)

To all whom it may concern:

Be it known that I, CHARLES H. GIFFORD, a citizen of the United States, residing in Haddonfield, New Jersey, have invented certain
5 Improvements in Apparatus for Injecting Pulverized Fuel into Combustion-Chambers, of which the following is a specification.

The object of my invention is to simplify and improve the construction of apparatus
10 for injecting pulverized fuel into combustion-chambers.

My invention is particularly adapted for use in connection with kilns for calcining cement; but it may be used in connection
15 with any furnace using pulverized fuel.

In the accompanying drawings, Figure 1 is a side view of my improved apparatus for injecting pulverized fuel. Fig. 2 is an end view. Fig. 3 is a longitudinal sectional plan
20 view on the line 3 3, Fig. 1. Fig. 4 is a longitudinal sectional elevation on the line 4 4, Fig. 2. Fig. 5 is a transverse sectional view on the line 5 5, Fig. 1; and Fig. 6 is a view of a modification of my invention.

25 A is the casing of the apparatus, flanged at both ends, one flange being secured to the casing of the combustion-chamber and the other flange being secured to the flange of an air-pipe. The air-pipe may be connected to
30 a fan or to any apparatus supplying air under pressure. A chamber A' is formed in the forward end of the casing A, and a nozzle-section B is mounted in the casing and has a portion b fitting snugly into the rear end
35 thereof. This nozzle is adjustably secured to the casing by means of set-screws c.

D is a hopper containing pulverized coal. This hopper has a flanged base D' and is secured by means of bolts d to the flanges a on
40 the casing A. The hopper communicates with the chamber A' and is provided with a door d', so that access may be had to the interior thereof.

The nozzle-section B has a removable extension B', which is flanged and fits over the
45 end of the nozzle-section B and is secured thereto by means of a set-screw c'. The extension B' projects through the chamber A' and into the neck a, so that the device acts
50 on the injector principle.

A partition-plate E is diagonally arranged within the casing and forms the back of the

chamber A'. The nozzle B extends through an opening in this partition-plate. The partition may be made so as to aid in supporting
55 the end of the nozzle B.

In the side of the casing A is an opening closed by a door F, and the opening is of such a size that access can be had to the chamber A', and the nozzle extension B' can
60 be detached and removed when necessary through this opening. An opening d² is also made in the top of the casing, and this opening is closed by a door d³.

I preferably provide several nozzle extensions differing in diameter, as the size of the nozzle will depend considerably upon the fuel used and the air-pressure. The nozzle shown in the drawings is a medium nozzle, but in
65 some cases the nozzle may be larger at the extreme end than at the point where it joins the casing A or it may have a contracted outlet. The entire nozzle can be adjusted longitudinally within the casing on releasing
70 the set-screws c, and by making the nozzle extension detachable I provide an apparatus
75 which will inject the pulverized fuel into the combustion-chamber in a very satisfactory manner.

It will be noticed in Figs. 1 to 5, inclusive,
80 that the casing has a reverse taper to the taper of the nozzle and is consequently larger at the forward end than at the rear, and the enlarged portion of the chamber is divided by the partition forming the back of the cham-
85 ber A' for the fuel.

In some instances the partition may be dispensed with and the casing may form the back of the chamber, as in Fig. 6, and the nozzle may be made in one piece, as shown
90 in said figure, instead of in two pieces, without departing from the main features of my invention.

I claim as my invention—

1. The combination of a casing increasing
95 in area of cross-section from its rear to its forward end and having a reduced portion forming a neck adjacent to said forward end, a nozzle formed of diminishing area of cross-section from its rear to its front end and held
100 within the casing and a detachable extension on the nozzle projecting into the neck, substantially as described.

2. The combination of a casing increasing

in area of cross-section from its rear to its front end, a hopper communicating with said casing, a nozzle within the casing tapering from its rear to its front end and a partition-plate in that portion of the casing of maximum area of cross-section and directly back of the hopper-opening, said nozzle extending through the partition-plate, substantially as described.

10 3. The combination of a casing, a hopper communicating with the forward end thereof, a nozzle within the casing, with a partition-plate for the casing placed directly back of the hopper-opening, said nozzle extending
15 through said plate and having a detachable extension in front of the same, substantially as described.

20 4. The combination of a casing, a tapered nozzle mounted within the casing, the casing being tapered in a reverse direction to that of the nozzle forming an enlarged chamber at the forward end, the nozzle extending through the chamber, a hopper communicating with

the said chamber, and a partition-plate forming the back of the chamber, substantially as described. 25

5. The combination of a casing larger at the forward end than at the rear end and forming a chamber at the forward end, the extreme forward end of the casing being reduced to form a neck, a nozzle having a detachable extension, the extension passing through the said chamber and into the reduced portion of the casing, the nozzle being longitudinally adjustable, with a partition-plate forming the back of the chamber, a hopper mounted on the casing and communicating with the chamber, substantially as described. 30 35

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses. 40

CHARLES H. GIFFORD.

Witnesses:

WILL. A. BARR,
JOS. H. KLEIN.