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O. BENDER.

NOZZLE FOR THE SUPPLY OF LIQUID OR GASEOUS FUEL TO FURNACES.

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Fig. 1

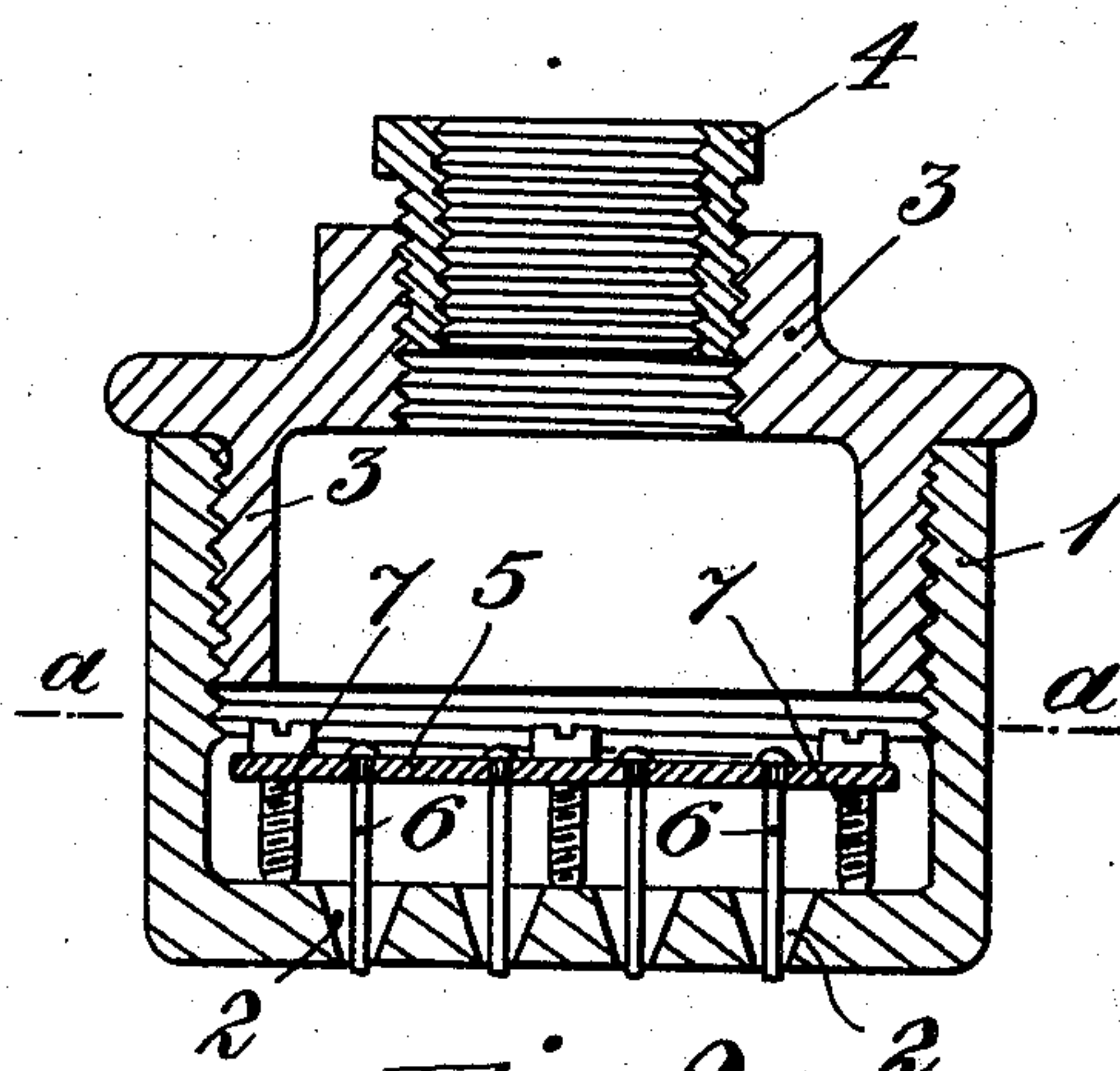
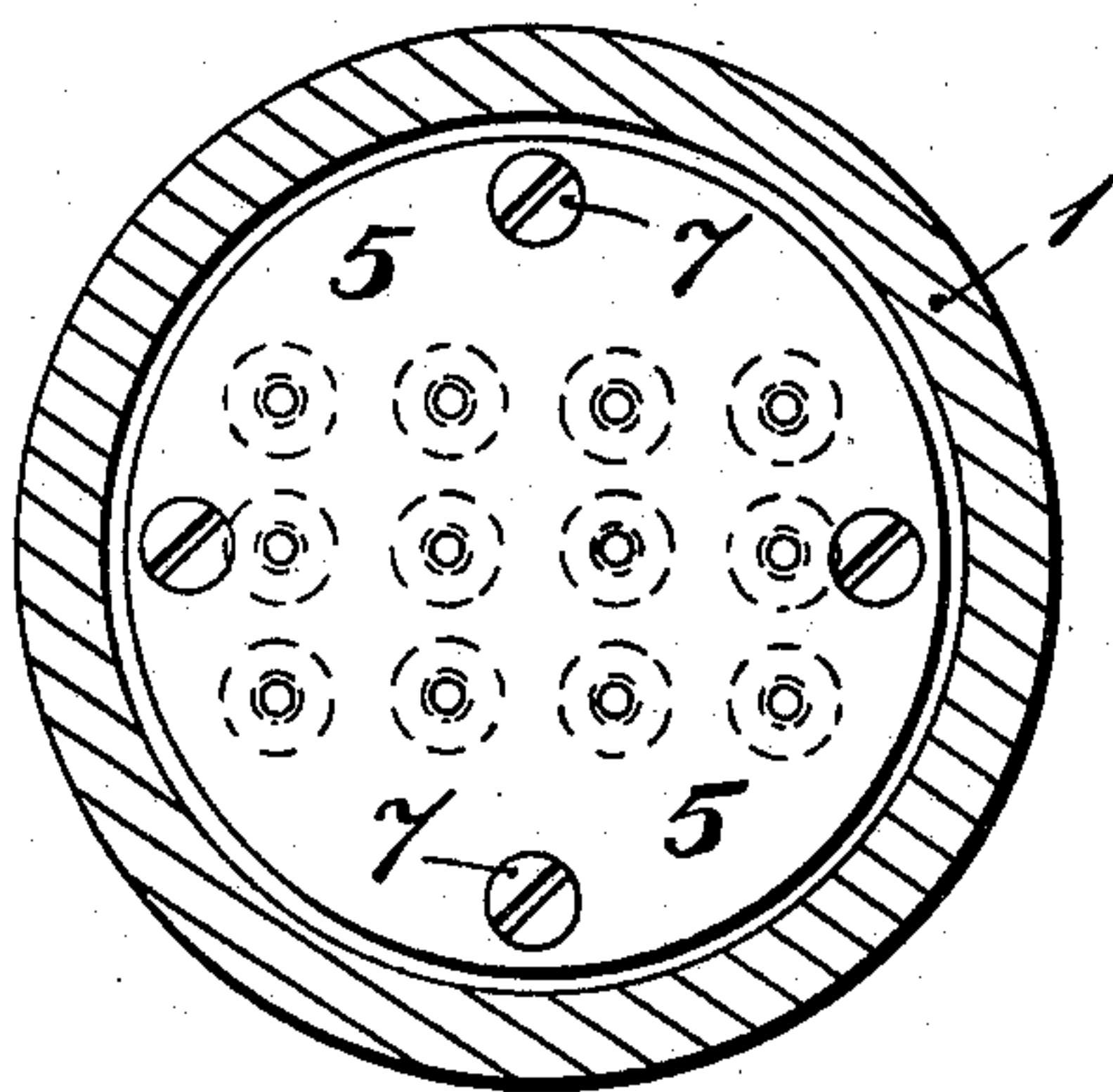


Fig. 2



Witnesses

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NOZZLE FOR THE SUPPLY OF LIQUID OR GASEOUS FUEL TO FURNACES.

No. 881,842.

Specification of Letters Patent.

Patented March 10, 1908.

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To all whom it may concern:

Be it known that I, OSCAR BENDER, engineer, of 12 Berlinerstrasse, Neu-Babelsberg, near Berlin, Kingdom of Prussia, Germany, have invented new and useful Improvements in a Nozzle for the Supply of Liquid or Gaseous Fuel to Furnaces, of which the following is a specification.

The present invention refers to a nozzle for the supply of liquid or gaseous fuel to furnaces, movable pins being provided in the openings of the nozzle.

The invention consists in the said pins being arranged on a bridge which can move in all directions and lies across the current of liquid or gas, the movement of said bridge being limited by suitably provided means.

This arrangement affords the important advantage in the supply of liquid or gaseous fuel, that by the pins being violently vibrated in the nozzle-holes the fuel is finely split up and distributed on passing through the nozzle. As the bridge carrying the pins, is arranged across the path of the fuel entering into the nozzle, it is violently and irregularly moved to and fro by the force (kinetic energy) of this substance. This movement of the bridge is quite certain to occur, as the supply of fuel through the nozzle must necessarily take place under a certain pressure in order to enable the nozzle fulfilling its purpose at all; and such pressure will always represent a certain velocity, which will suffice to produce the vibratory movement of the bridge and the pins. Besides the fine distribution of the fuel, the pins, which project with their points into the nozzle holes will keep these holes perfectly clean, as they will be constantly striking against the walls of these holes, and thus prevent dirt or the like from accumulating thereon.

Another important feature of the present invention consists in the movement of the bridge with the thereto attached pins being regulable, so as to allow of varying by this means the degree of distribution of the fuel. For this purpose the stroke of the movable bridge is made adjustable, so that the vibration must take place within a more or less limited space. Also the motion of the pins in the nozzle-holes is preferably made adjustable, by set-screws being provided to limit in an adjustable manner the approach of the pin-bridge to the nozzle-head containing the holes.

In the accompanying drawing the nozzle is exemplified, Figure 1 being a longitudinal section along the direction of the supply of fuel; Fig. 2 a transverse section along *a-a* in Fig. 1.

1 is the nozzle-cap, the face of which is provided with several holes 2 and which is closed at the back in a suitable manner, say by a lid 3. The latter may at the same time serve to receive the connection 4 for the supply of the substance to be conducted through the nozzle. Inside the nozzle a bridge 5 is arranged movable in all directions and of a section somewhat smaller than the inside section of the nozzle. Attached to this bridge and extending towards the face of the nozzle having the holes 2 are pins 6, the arrangement of which on the bridge is such that each pin projects into one of the nozzle-holes 2. The minimum distance between the bridge 5 and the inner nozzle face is fixed by set screws 7, adjustably arranged in the bridge and projecting against said nozzle face.

The backward movement of the bridge 5 from the inner nozzle face is limited by the lid 3 of the cap 1, which is screwed into the cap, said bridge or parts of it, when moving backward bear against the inner rim of said lid. By screwing the lid 3 more or less deep into the cap 1, the degree of the backward movement of the bridge may be diminished or increased. The nozzle holes 2 are conical, and the pins 6 of the bridge 5 are of a cylindrical shape, whereby the bridge 5, together with its pins, may move to and from the nozzle face and may also have a lateral movement, and the resulting movement of the bridge caused by the force of the current is a hurling movement. The pins of the bridge striking violently against the sides of the holes 2 increase the hurling movement of the bridge, and it may be easily regulated by screwing the lid 3 of the cap 1 more or less deeply into the cap 1, and by adjusting the set screws 7. If the cap 1 is sufficiently inclined with its nozzle face downward, the pins 6 when the nozzle is at rest will slide into the holes 2, and as the mouths of these holes are of nearly the same section as the pins, the latter will nearly close the mouths, so that the idle nozzle holes are prevented from becoming clogged with dirt.

Having now particularly described and ascertained the nature of my said invention

and in what manner the same is to be performed, I declare that what I claim is:

1. In a nozzle for the supply of liquids or gases to furnaces, a nozzle cap provided with
5 holes in its nozzle-face, a liquid or gas inlet arranged opposite to said nozzle-face, a bridge within said cap between said nozzle face and said inlet, pins attached to said bridge, said pins projecting into said holes,
10 said bridge and pins having free play within said cap to all sides thereof, set screws adjustably arranged in said bridge, said screws projecting against the inner nozzle face and limiting the minimum distance between said
15 bridge and said nozzle face.

2. A nozzle for the supply of liquids or gases to furnaces having a liquid or gas inlet, a nozzle cap provided with holes in the nozzle-face, a plate within said cap arranged be-
20 tween said face and said inlet, pins attached to said plate and projecting into said holes, said plate together with said pins having free play within said cap to all sides, a lid adjustably screwed into the nozzle cap, and an
25 inwardly projecting rim on said lid for limiting the backward movement of said plate.

3. A nozzle for the supply of liquids or gases to furnaces having a liquid or gas inlet, a nozzle cap provided with holes in the nozzle-
30 face, a plate within said cap arranged between said face and said inlet, pins attached to said plate and projecting into said holes, said plate together with said pins having free play within said cap to all sides, and set
35 screws adjustably arranged in said plate and projecting against the inner nozzle-face.

4. A nozzle for the supply of liquid or gaseous fuel to furnaces, a nozzle cap provided with holes in the nozzle-face, a liquid or gas
40 inlet opposite to said nozzle-face, a loose plate within said cap arranged between said fuel inlet and said nozzle-face, pins attached to said plate and projecting into said holes, said plate having free play within said cap to
45 permit of its being hurled by the force of the current of fuel, set screws in said plate projecting against the inner nozzle-face, and an

adjustable stop within said cap adapted to limit and regulate the backward movement of said plate.

5. A nozzle for the supply of liquid or gaseous fuel to furnaces, a nozzle cap provided with holes in the nozzle-face, a liquid or gas inlet opposite to said nozzle face, a bridge within said cap between said nozzle face and
55 said inlet, pins attached to said bridge and projecting into said holes, said bridge being perfectly loose within said cap, set screws adjustably arranged in said bridge, said screws projecting against the inner nozzle face, and
60 an adjustable stop within said cap adapted to limit and regulate backward movement of said bridge.

6. A nozzle for the supply of liquid or gaseous fuel to furnaces, having a liquid or gas
65 inlet, a nozzle cap provided with holes in the nozzle face, a perfectly loose bridge within said cap arranged between said nozzle face and said inlet, pins attached to said bridge and projecting into said holes, said bridge
70 together with its pins having free play within said cap to all sides, and stops attached to said bridge, said stops projecting against the inner face of the cap.

7. In a nozzle for the supply of liquid and
75 gaseous fuel to furnaces, the combination of a nozzle cap provided with holes in the face thereof, a loose bridge arranged within said cap, pins attached to said bridge and projecting into said holes, said bridge with its
80 pins having play within said cap, set screws adjustably arranged, in said bridge projecting against the inner nozzle face, a lid adjustably screwed into the cap to provide for the regulating of the resulting hurling movement
85 of said bridge and pins caused by the force of the current.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

OSCAR BENDER.

Witnesses:

HENRY HASPER,
WOLDEMAR HAUPT.