

No. 744,220.

PATENTED NOV. 17, 1903.

A. NEU.
FUEL BURNER.

APPLICATION FILED APR. 10, 1903.

NO MODEL.

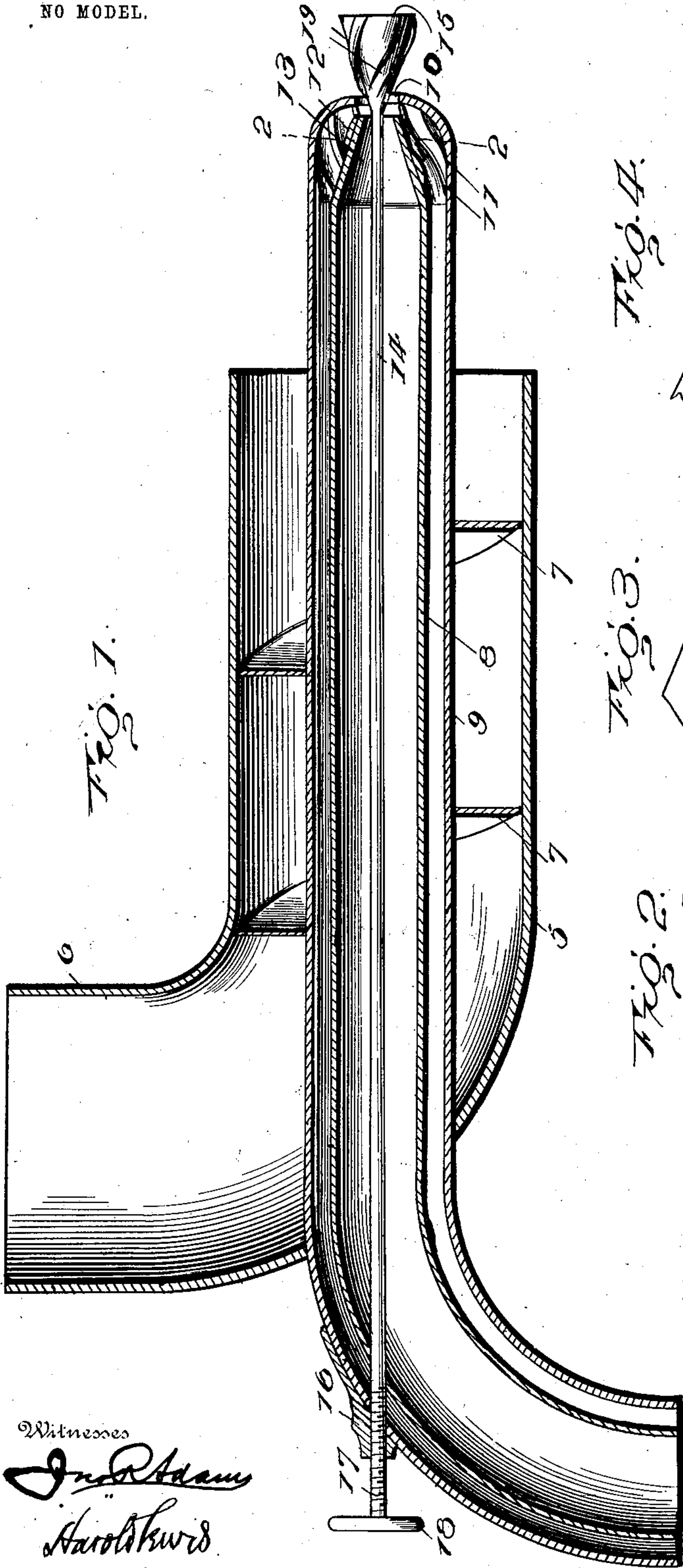


Fig. 4.

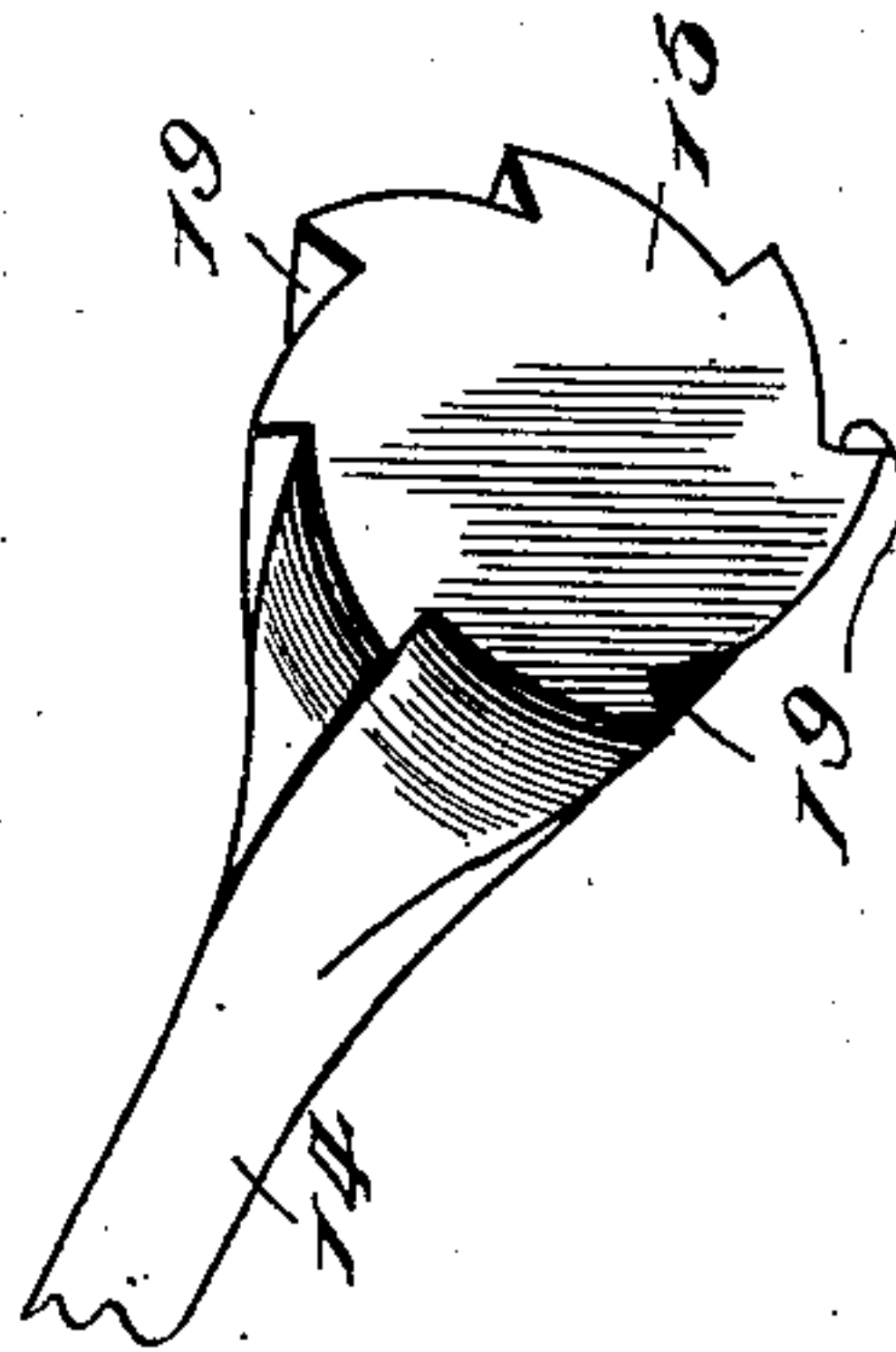


Fig. 3.

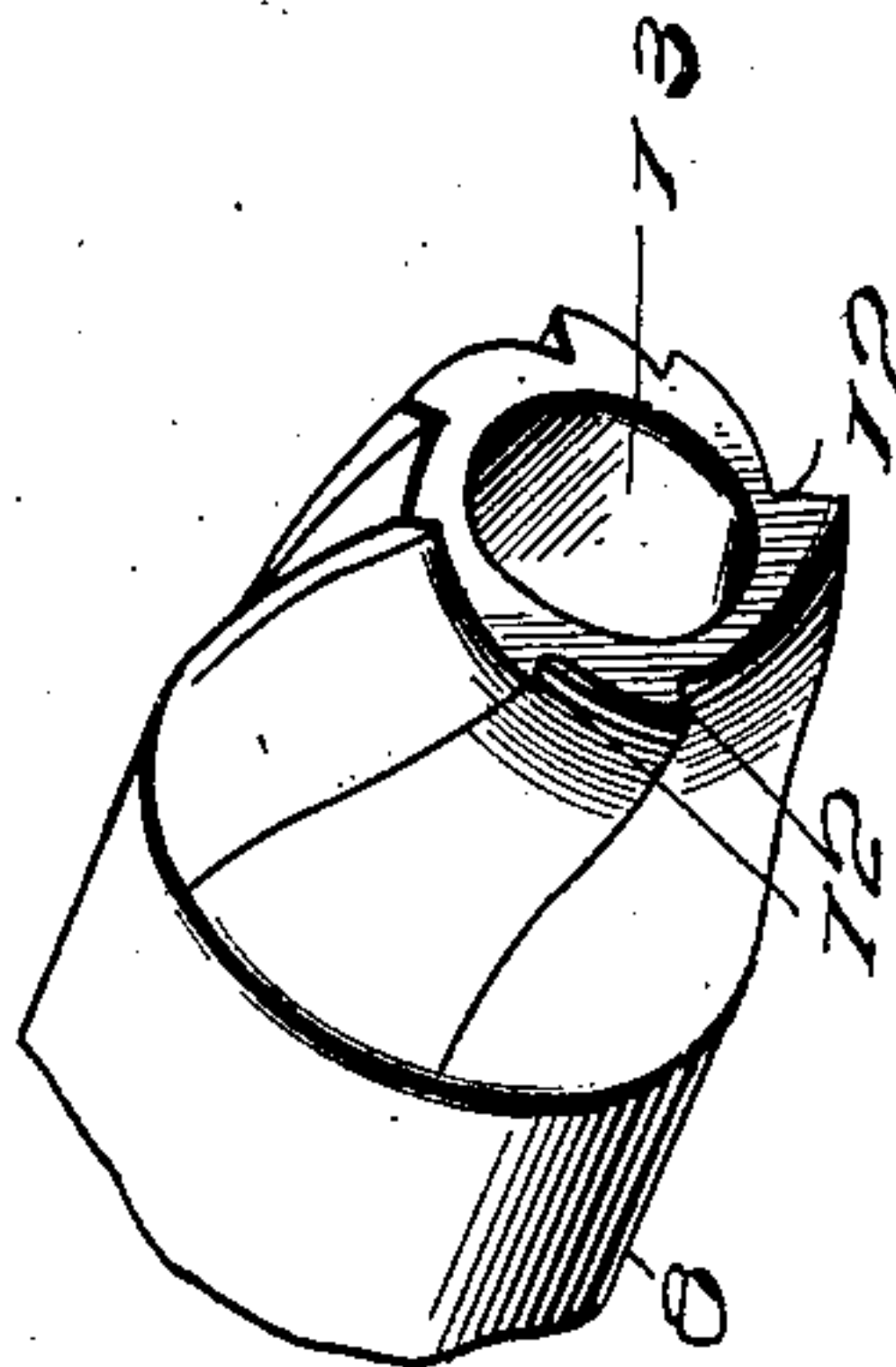
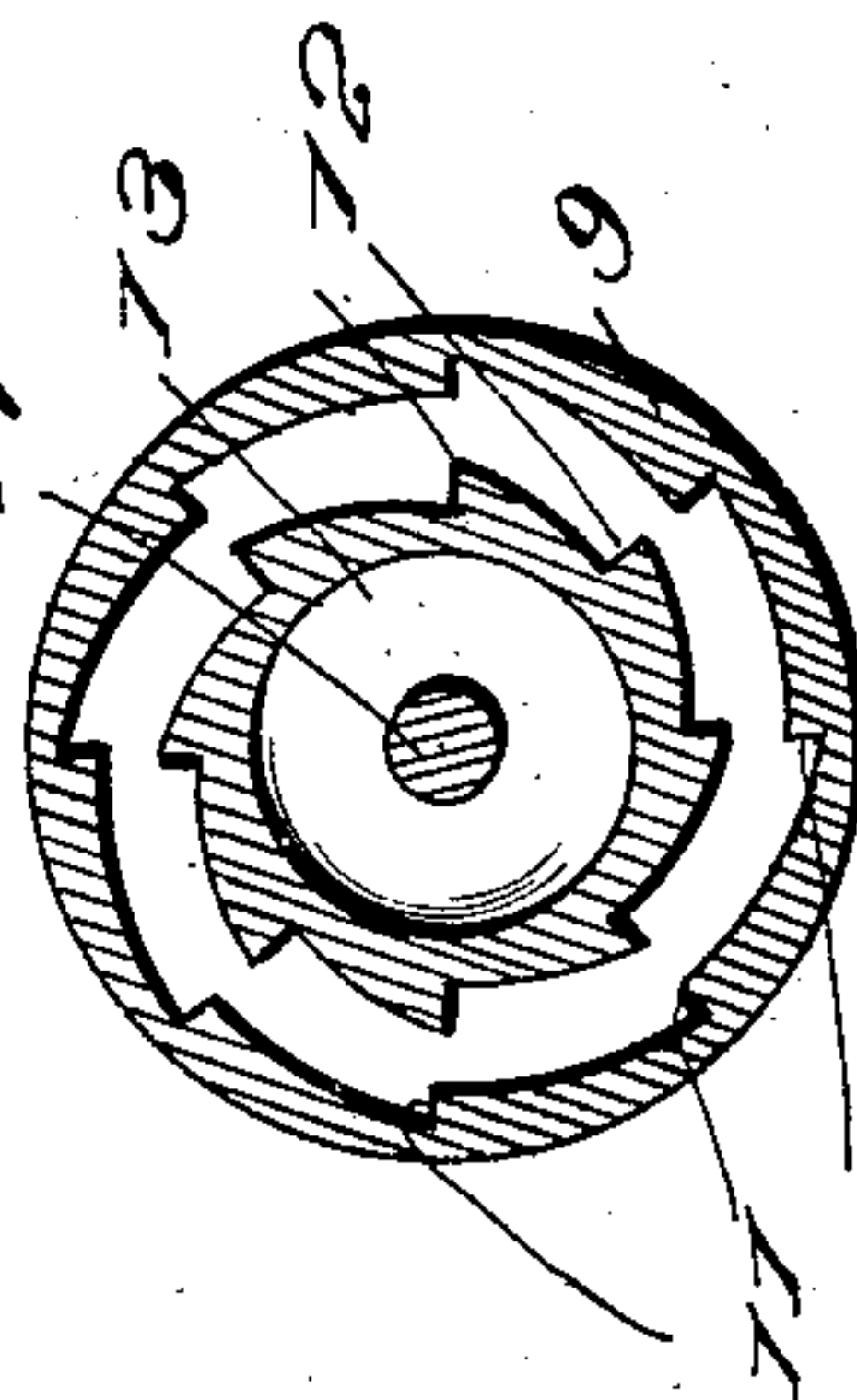


Fig. 2.



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UNITED STATES PATENT OFFICE.

ADOLF NEU, OF COLTON, CALIFORNIA, ASSIGNOR TO E. DURYEE, OF COLTON, CALIFORNIA.

FUEL-BURNER.

SPECIFICATION forming part of Letters Patent No. 744,220, dated November 17, 1903.

Application filed April 10, 1903. Serial No. 152,054. (No model.)

To all whom it may concern:

Be it known that I, ADOLF NEU, a citizen of Germany, and a resident of Colton, in the county of San Bernardino and State of California, have invented certain new and useful Improvements in Fuel-Burners, of which the following is a specification.

My invention relates generally to fuel-burners, but more particularly to burners for use with rotary kilns.

There are two difficult conditions to be met in operating rotary cement-kilns, namely: First, the lining at the lower or hot end of the kiln is apt to burn out quickly, thus necessitating a stoppage of the kiln for repair to the lining every four to eight weeks; second, the cement while in the zone of highest heat is in a semi-used condition and is apt to flux and eat away the lining at certain points and to agglutinate in rings and coat over the lining at other points, thus making rings inside the kiln that dam back the burning cement, thereby interfering with the proper operation of a kiln, decreasing the output, and making the product inferior in quality.

The object of my invention is to overcome the difficulties above set out and to produce a cheap, simple, and efficient burner of this character; and with these and minor objects my invention consists of the parts and combination of parts, as will be hereinafter more fully set out.

In the drawings, Figure 1 is a vertical longitudinal section of a burner embodying my invention. Fig. 2 is a vertical section on the line 2 2, Fig. 1. Fig. 3 is a perspective view of the fuel-pipe, parts being broken away. Fig. 4 is a perspective view of the needle-valve, parts being broken away.

5 represents the air-pipe, having an elbow 6 connected with a blower of either the fan or compressor type. (Not shown.) The air-pipe is provided with a spiral rib 7, secured within its straight portion, as shown in Fig. 1, said spiral being adapted to give the air a rotary or gyratory motion. Within the air-pipe I secure a fuel-pipe 8 and a steam-pipe 9 between the spiral flange 7, said fuel and steam pipes being arranged concentrically with each other and concentric with the air-pipe. The steam-pipe 9 is closed or tapered

down at its forward end and provided with an orifice 10, the closed end being provided with a series of spirally-disposed furrows or channels, (more clearly shown in Fig. 2,) all of said channels converging toward the opening 10. The outer end of the fuel-pipe 8 is tapered and provided with a series of spiral furrows or channels 12, converging toward the opening 13 of said pipe.

14 is the stem of the needle-valve 15, the rear end of said stem being seated in a lug 16, formed integral with the steam-pipe 9 and provided with a screw-threaded opening, within which the screw-threaded portion 17 of said stem operates, the stem being provided with a suitable handle 18. The needle-valve 15 is conical and provided with a series of spirally-disposed furrows or channels 19, all converging toward the base of the valve, the base of the valve being positioned in the opening 10 of the steam-pipe 9.

The furrows or spirals on the exterior surface of the pipe 8 are so arranged as to be opposite the corresponding furrows 11 on the interior of the pipe 9. The spiral furrows or channels of the air-blast and steam pipes give the air, steam, and oil or other fuel (as ground coal) a rotary motion, which produces the most intimate mixing and atomizing of the fuel with the steam and air, while the placing of the end of the burner in the heat of the furnace makes it act as a gas-generator and vaporizes the fuel as it leaves the burner. The total length of the burner-pipe is sufficient to permit of the exit end being kept hot enough by the radiating heat from the furnace to make it act as a gas-generator, and thus effect a great economy in the consumption of fuel and maintaining a uniformly high temperature.

The quantity of fuel required for any desired degree of heat is accurately gaged by adjusting the conical valve 15, said valve being adapted to completely shut off the oil and steam.

It will be understood that each pipe of the burner is fitted with an ordinary valve (not shown) outside of the burner.

In the usual operation of the burner the fuel is passed through pipe 8, while the steam passes through pipe 9; but, if desired, it is

obvious that this arrangement may be reversed and the steam passed through the pipe 8, while the fuel passes through the pipe 9. The air delivered from a blower of either the fan or compressor type passes through the elbow 6 into the pipe 5, where it is given a gyratory motion by means of the spiral 7. The zone of the highest heat in the flame may be changed by the operator by moving the conical valve toward or from the orifice 10 on the burner, thus enabling the operator to burn away an incipient ring of semivitrified cement material that may threaten to cause a stoppage of the kiln. It will thus be seen that I am enabled to focus or scatter the heat by means of a conical valve 15. This valve may be elliptical, spherical, or diamond shape outside of the burner. The air having been given a gyratory motion by means of the spiral 7 encircles the end of the burner and the conical valve, where it is mingled with the steam and oil or other fuel, the steam having been given a gyratory motion by means of the spiral furrows or channel 11 in the pipe 9 and the furrows or channels 12 on the end of the pipe 8 mingles with the oil or other fuel in the orifice 10 and at the same time imparts to the fuel a gyratory motion and thoroughly atomizes or commingles therewith. The mingled fuel and steam passing through the orifice 10 contacts with the conical valve 15, where the combined product is given a further gyratory motion by means of the spiral grooves or furrows 19 at the same time thoroughly commingling and atomizing with the gyratory column of air from the pipe 7. The combined product of air, steam, or other fuel is focused toward a certain point of the furnace or scattered throughout the furnace, according to the po-

sition of the conical valve relative to the end of the burner-orifice 10.

Having thus described my invention, the following is what I claim as new therein and desire to secure by Letters Patent:

1. In a burner, the combination with the burner-tube having spiral furrows or channels in one of its ends, an exit-orifice in the center of said spiral channels, of a spirally-grooved conical valve positioned outside the tube in line with said orifice.

2. In a burner, the combination with the steam-pipe, having an exit-orifice, spiral channels arranged around said orifice, a fuel-pipe within the steam-pipe having a conical end, spiral channels on the exterior of the conical end, and a valve-stem provided with a conical valve positioned outside of the burner in line with the said orifice and tapering toward the orifice, and spiral channels on the conical valve.

3. In a burner, the combination with the steam-pipe having an exit-orifice, spiral channels arranged around said orifice on the interior of said pipe, a fuel-pipe within the steam-pipe having a conical end, spiral channels on the exterior of said conical end, and a valve-stem provided with a conical valve positioned outside of the burner in line with the said orifice and tapering toward the orifice, spiral channels on the conical valve, of an air-blast pipe secured around the burner, a spiral in said pipe.

The foregoing specification signed this 1st day of April, 1903.

ADOLF NEU.

In presence of—
M. A. BAGLEY,
J. B. HANNA.