

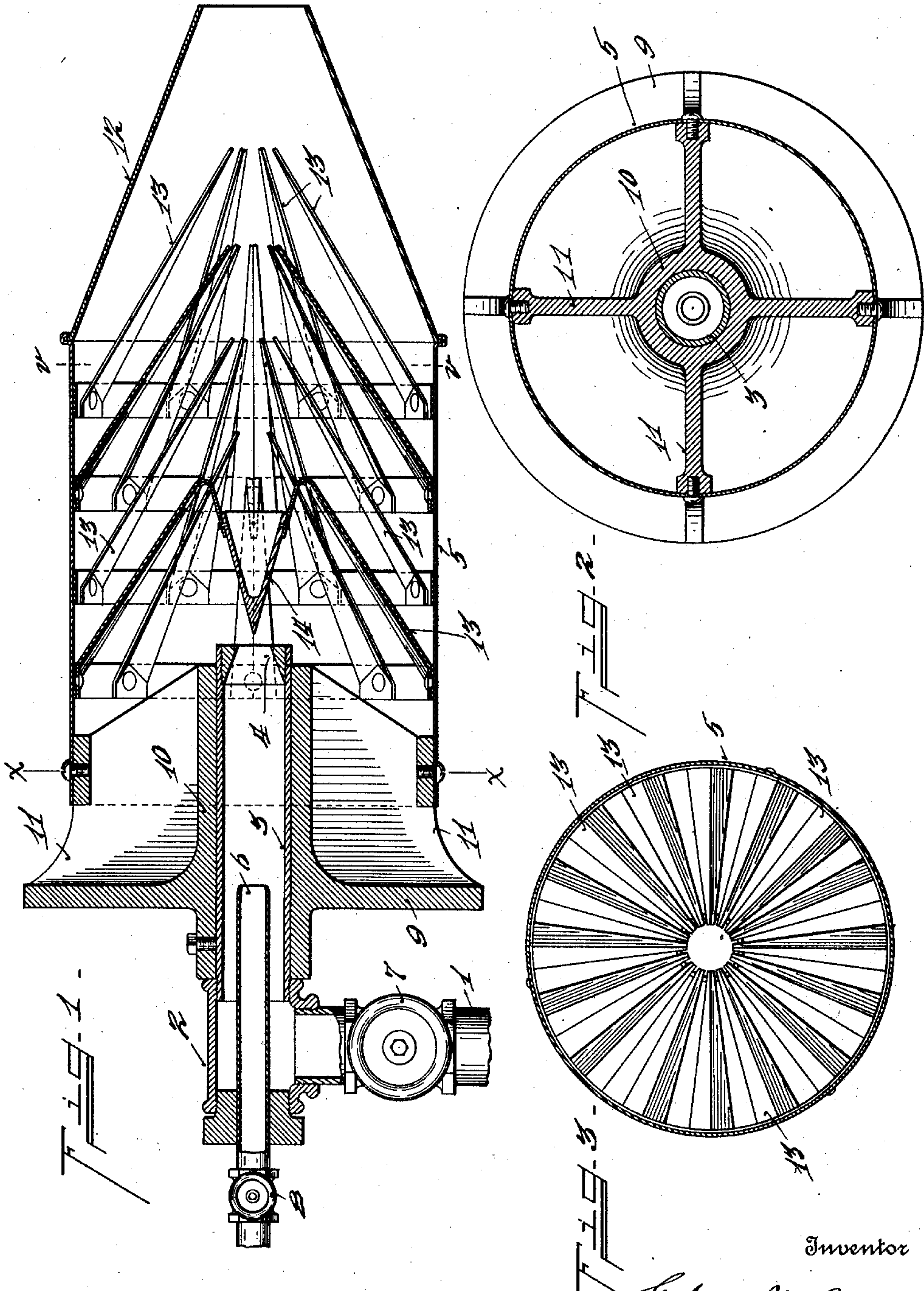
E. McARDLE.

GAS MIXER.

APPLICATION FILED SEPT. 15, 1910.

998,297.

Patented July 18, 1911.



Witnesses

*Oliver B. Haines*  
*Edmund*

Inventor

*Edmund McArdle*

By *Wood & Wood*

Attorneys



# UNITED STATES PATENT OFFICE.

EDWARD McARDLE, OF CINCINNATI, OHIO, ASSIGNOR OF ONE-HALF TO GEORGE C. SCHNEIDER, OF CINCINNATI, OHIO.

## GAS-MIXER.

998,297.

Specification of Letters Patent.

Patented July 18, 1911.

Application filed September 15, 1910. Serial No. 582,202.

*To all whom it may concern:*

Be it known that I, EDWARD McARDLE, a citizen of the United States, residing at Cincinnati, in the county of Hamilton and State of Ohio, have invented certain new and useful Improvements in Gas-Mixers, of which the following is a specification.

My invention relates to an improvement in gas mixers primarily adapted for use in connection with furnaces for boilers or the like.

The object of my invention is to provide a mixer preferably formed cylindrical, open at each end thereof, with a series of deflector plates within said cylinder angularly disposed toward the medial line thereof, of a nozzle leading into the mixer, and conical deflector means with its apex alined with the center of said nozzle, whereby the gaseous vapor is thrown outwardly upon entrance into the mixer, and the air drawn into the mixer conveyed toward the center thereof.

Another object of my invention is to provide a mixer of nozzle formation with a gas injector centrally disposed therein, and provided with an annular baffle-plate adjacent to the nozzle of the mixer and directing air-currents in a right-angled path into the mixer, and a series of vaned deflectors within the mixer converging medially, the vanes of one deflector arranged staggeredly to that of its next adjacent deflector, and means for diverging the gaseous vapors at their entrance into the mixer.

Another object of my invention is to provide a mixer with a centrally disposed injector, or Bunsen element, extended therein, baffling means adjacent to the mouth end of the mixer, and serial staggered vaned deflectors converging medially, and means for diverging the gaseous vapors initially counter to the drawn in air-currents.

Another object of my invention is to provide a mixer with a centrally disposed injector, baffling means adjacent the mouth end of the mixer to prevent counter exterior currents of air and directing the air currents into the mixer in a right-angled path.

The features of my invention are more fully set forth in the description of the accompanying drawings, forming a part of this specification, in which:—

Figure 1 is a central section of my injector and mixer. Fig. 2 is a section on line

*x, x*, Fig. 1. Fig. 3 is a section on line *v, v*, Fig. 1, with the deflector vanes in elevation.

The combined injector and mixer in practice is supported a slight distance from a port opening leading into the combustion chamber of the furnace with the combustion taking place entirely within the furnace, and no flame or heat coming in contact with the injector and mixer. Compressed air, steam, or the like, is employed to create a blast materially assisting in drawing atmospheric air into the mixer.

1 represents the gas supply pipe tapping into the T-coupling 2, and 3 represents a tubing connected to the coupling 2 at one end, its opposite end being contracted to provide a jet 4 and extended into the mixer cylinder 5.

6 represents a jet or nozzle within the tubing 3 and terminating in rear of the nozzle 4.

7 and 8 represent valves for controlling the vapor or fluid passing through the pipes 1 and 6, respectively.

The air blast injected into the tube 3 is created in any suitable manner, by blower or the like, not shown, and this form of injecting air or fluid under pressure within the gas supply nozzle is more or less a common expedient.

9 represents a baffle plate annularly projected from the sleeve 10 and secured to the tubing 3, and is provided with a series of radially extended baffling lugs 11, in the drawings four being shown, to which the mixer cylinder is secured with an air passage provided between the edge of the mixer cylinder and baffling plate 9. The lugs 11 and baffling plate 9 prevent counter currents exterior of the cylinder, which counter currents are apt to create rearward suction through the mixer, permitting gas to escape through the air passages, causing what is termed back flash. This, however, cannot occur, as such counter currents are broken by the lugs 11 and directed into the mixer.

The mixing cylinder is provided with the funnel-shaped nozzle end 12 for directing the gaseous mixture into the combustion chamber of the furnace.

13 represents a series of vanes annularly disposed within the mixing cylinder 5 and converging angularly toward the medial line of the cylinder 5, and preferably are secured upon a ring, and also as shown, the



vanes are preferably concave to assist in directing the air currents. Further, a multiple series of vanes are provided and preferably set staggered relative to each other, to break up the currents and produce a uniform mixture.

14 represents a conical deflector, with its apex alined with the center of the nozzle 4, and as illustrated, is secured and supported to several of the vanes of the first set of the series. Thus, the incoming charge of gas or mixture under pressure is diverged outwardly toward the interior periphery of the cylinder and in a forward direction passing between the staggeredly set vanes, and with the incoming atmospheric air, cross currents are had, thereby causing the products to be greatly intermixed, preliminarily to being injected within the furnace.

The employment of a multiple series or sets of vanes with one series staggeredly disposed to the adjacent series causes broken air-currents to be converged toward each other medially, around the inner periphery of the mixer and through the entire length thereof, and likewise directing the diverging gas currents to be directed in broken lines in similar paths, causing a thorough mixing. This practically provides a series of zigzag paths as contra distinguished from a straight path, thereby causing more or less a whirling action of the products.

I have termed, for the sake of brevity, the main gas nozzle and air nozzle within the gas nozzle as a Bunsen element in the claims.

Having described my invention, I claim:—

1. A gas mixer, comprising a Bunsen element, a chamber into which said Bunsen element centrally projects, baffling means adjacent to the mouth of the chamber to prevent exterior counter air currents and direct the air into the chamber, a multiple

series of vane deflectors converging medially within said chamber with the vanes of one series staggeredly disposed relative to its adjacent series, and means axially disposed with said Bunsen element within said chamber to diverge the products initially.

2. A gas mixer comprising a Bunsen element, a chamber having an open inlet and tapering outlet, said Bunsen element projecting centrally into said chamber, a baffle plate adjacent to the inlet of the mixer provided with a series of radially extended baffle lugs, to prevent exterior counter air currents and direct the air into the chamber in right-angled paths, means axially disposed with said Bunsen element within said chamber to diverge the products initially, and a series of staggeredly disposed vane deflectors converging medially within said chamber.

3. A gas mixer comprising a Bunsen element, a chamber having an open inlet and tapering outlet, said Bunsen element projecting centrally into said chamber, a baffle plate adjacent to the inlet of the mixer provided with a series of radially extended baffle lugs, to prevent exterior air currents and direct the air into the chamber in right-angled paths, means axially disposed with said Bunsen element within said chamber to diverge the products initially, and a multiple series of vane deflectors within said chamber with the vanes of one series staggeredly disposed relative to its adjacent series, all converging medially within said chamber.

In testimony whereof, I have hereunto set my hand.

EDWARD McARDLE.

Witnesses:

OLIVER B. KAISER,  
EMMA SPENER.