F. A. COLEMAN.

GAS MIXER.

APPLICATION FILED JAN. 28, 1918.

1,293,041.

Patented Feb. 4, 1919

2 SHEETS—SHEET 1.

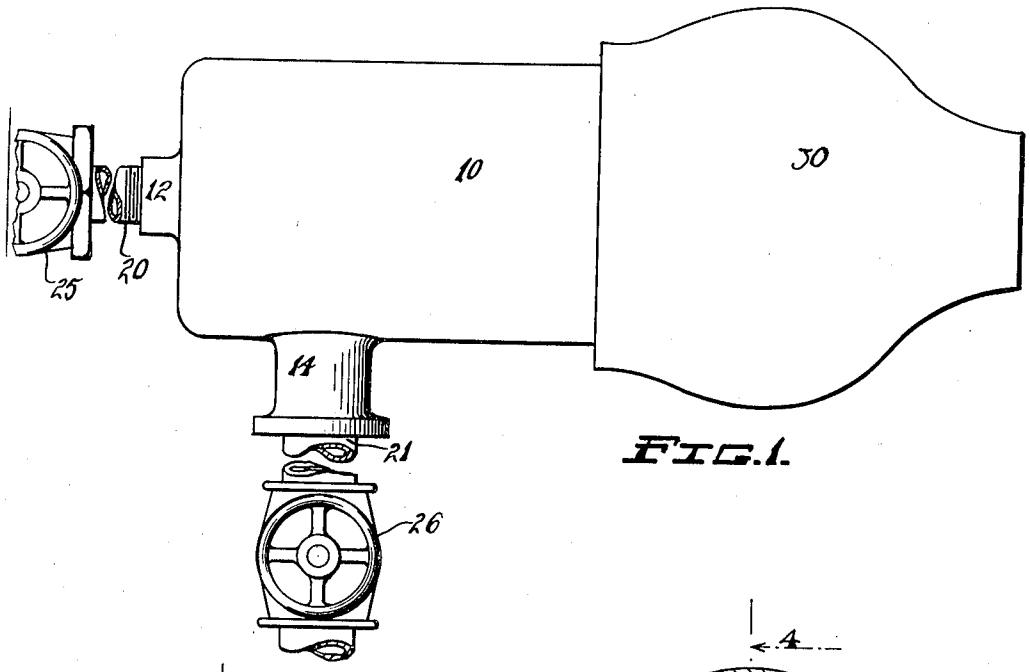


FIG. 1.

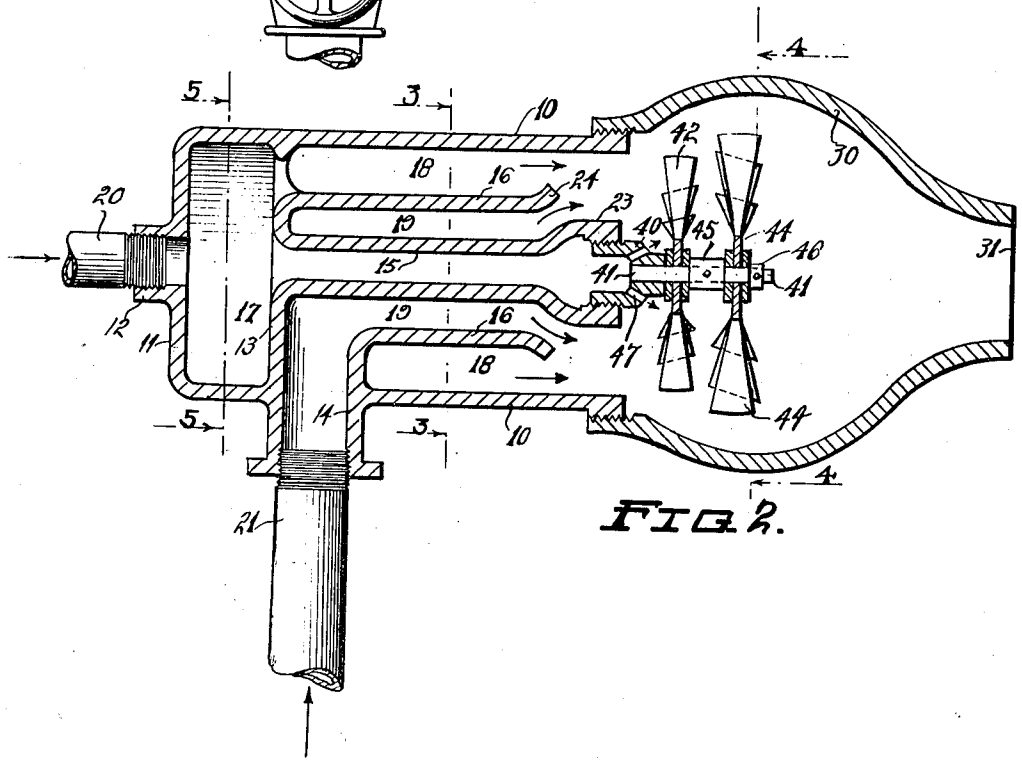


FIG. 2.

INVENTOR,

Frederick A. Coleman,

BY, Baker Mocklin, ATTYS

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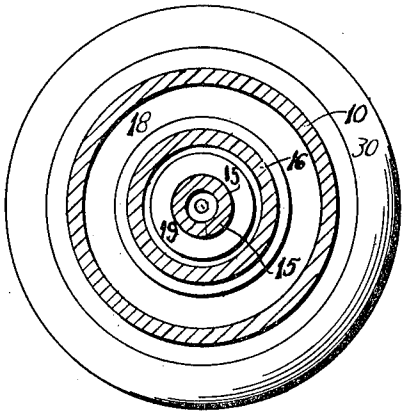


FIG. 3.

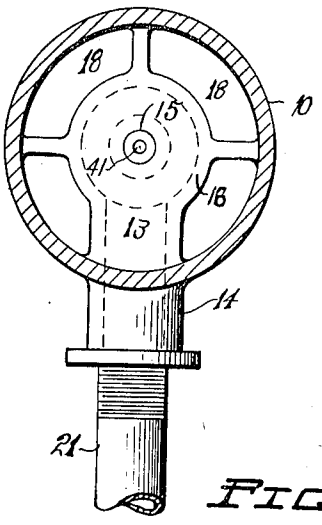


FIG. 5.

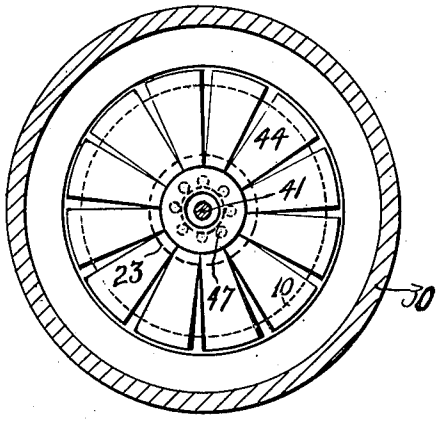


FIG. 4.

INVENTOR

Frederick A. Coleman,

By Baker Macklin

ATTYS.

UNITED STATES PATENT OFFICE.

FREDERICK A. COLEMAN, OF CLEVELAND HEIGHTS, OHIO, ASSIGNOR TO THE FOUNDRY EQUIPMENT COMPANY, OF CLEVELAND, OHIO, A CORPORATION OF OHIO.

GAS-MIXER.

1,293,041. Specification of Letters Patent. Patented Feb. 4, 1919.

Application filed January 28, 1918. Serial No. 214,075.

To all whom it may concern:

Be it known that I, FREDERICK A. COLEMAN, a citizen of the United States, residing at Cleveland Heights, in the county of Cuyahoga and State of Ohio, have invented a certain new and useful Improvement in Gas-Mixers, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings.

The object of this invention is to provide a very simple and effective device for thoroughly mixing combustible gas with air. The invention is particularly well adapted for embodiment in a blast nozzle adapted to receive gas and air, and direct and discharge a proper mixture thereof, under considerable velocity, to a point of ignition, such as are used in melting and reducing furnaces of various types.

To accomplish the thorough mixture desired, I provide a casing with which gas and air pipes communicate, and in the interior of the casing are two concentric annular passageways, one for the gas and the other for the air, and coaxial of the two passages I locate propellers revolved by the passing fluid and serving to thoroughly mix the gas and air.

My invention is hereinafter more fully explained in connection with the accompanying drawings, and the essential characteristics are set out in the claims.

In the drawings, Figure 1 is a side elevation of my mixing device embodied in a blast nozzle; Fig. 2 is a vertical central section thereof; Figs. 3, 4 and 5 are cross sections on the correspondingly numbered lines on Fig. 2.

In the drawings, 10 indicates a substantially cylindrical outer wall of a casing which is closed at the rear end by a head 11 except for an intake pipe 20 which screws into a threaded boss 12 in the end. This pipe 20 may convey air to the interior of the casing, the pipe communicating with a space 17 between the end 11 and a skeleton partition 13 extending across the casing.

Extending into the casing at the side thereof is a tubular passageway 14 which is adapted to receive the pipe 21 which may convey gas to the casing.

Formed at the axis of the casing is a tubular portion 15 surrounded by a concentric annular wall 16, both carried by the partition 13. The space 17 in the head of the casing is in communication with the central tube 15 and with the annular space 18 between the wall 16 and the outside wall 10 of the casing, by the passages through the partition 13. The intake 21 communicates with the annular space 19 between the outside of the central tube and the surrounding concentric wall 16. As shown the central tube 15 has a flared head 23 and the concentric wall 16 flares outwardly at its free end 24. Accordingly the passage 19 formed thereby flares outwardly at its discharge end with a resulting tendency to direct the fluid in this passage-way into close union with the fluid coming through the passage way 18.

30 indicates a bulbous hollow head screwing onto the cylindrical casing 10 and forming a mixing chamber having a discharge orifice 31 for the blast of mixing air and gas.

To thoroughly mix the gas and air within the mixing chamber I provide a plurality of propellers revolving in relatively opposite directions. These are carried by the stationary central member 15. As shown in Fig. 2 a plug 40 screws into the head 23 and closes it. This plug carries a stud 41 on which is journaled a pair of propellers 42 and 44. The propeller 42 revolves in one direction under the force of passing gas and air, while the propeller 44 has its blades so inclined that it revolves in the opposite direction. These propellers are held on the stud in any convenient manner, as for example, by the collars 45 and 46 held to the stud by set screws.

The plug 40 is made hollow and through it are a series of openings 47 directing air outwardly toward the center of the adjacent fan or propeller 42.

With such a construction as described, if air and gas be supplied to the pipes 20 and 21 respectively, then when the regulating valves 25 26 are opened, air flows forcibly through the outer annular passageway 18 through the intermediate annular passageway 19, these fluids commingling as they leave their respective passages. The force of the passing fluids causes the propeller blades to revolve in opposite direction, and, as they thus revolve, the fluids are intimately commingled. The mixed fluid tends to spread outwardly under the influence of the propellers and is allowed to do so by the bulb-

shaped head 30. The travel of the fluid within the contracted portion of the mixing chamber causes it to converge toward an axis which further commingles the gas and air, with the result that when the fluid discharges through the opening 31 it is thoroughly mixed.

Having thus described my invention what I claim is:

1. In a mixing device, the combination of a casing having a central tubular portion surrounded by an annular wall distant from it, a head on the tubular portion, a stud carried by the head, a propeller mounted on the stud, and gas and air passageways, one communicating with the annular space between the central tube and the annular wall mentioned, and the other communicating with the annular space between said annular wall and the casing, there being an opening through the head of said central tubular portion adapted to discharge fluid to the propeller.

2. The combination of a substantially cylindrical casing open at one end and substantially closed at the other, a central intake passageway into the closed end, a central tubular support and an annular wall supported within the casing some distance beyond the opening through the end, a lateral opening through the side of the casing communicating with one of the interior annular spaces, the space at the head of the casing communicating with the other annular space within the casing, a stud carried by the end of the central support, there being a passageway from the central support to the space around the stud, a plurality of propellers mounted on the stud, and a mixing chamber having a wall screwing onto the open end of the casing and having a reduced discharge opening.

3. The combination of a substantially cylindrical casing open at one end and substantially closed at the other, a central intake passageway into the closed end, a central tubular member and an annular wall supported within the casing some distance beyond the opening through the end, a lateral opening through the side of the casing communicating with the annular space between the central member and the annular wall, the space at the head of the casing communicating with the annular space between the annular wall and the casing, a plug screwing into the end of the central tubular member and having openings for the passage of fluid, a stud carried by the plug, a plurality of propellers mounted on the stud, and a bulbous mixing chamber having a wall screwing onto the open end of the casing and having a reduced discharge opening.

In testimony whereof, I hereunto affix my signature.

FREDERICK A. COLEMAN.