L. H. BERGMAN.

PULVERIZED FUEL BURNER.

APPLICATION FILED JULY 18, 1915.

1,213,822.

Patented Jan. 30, 1917.

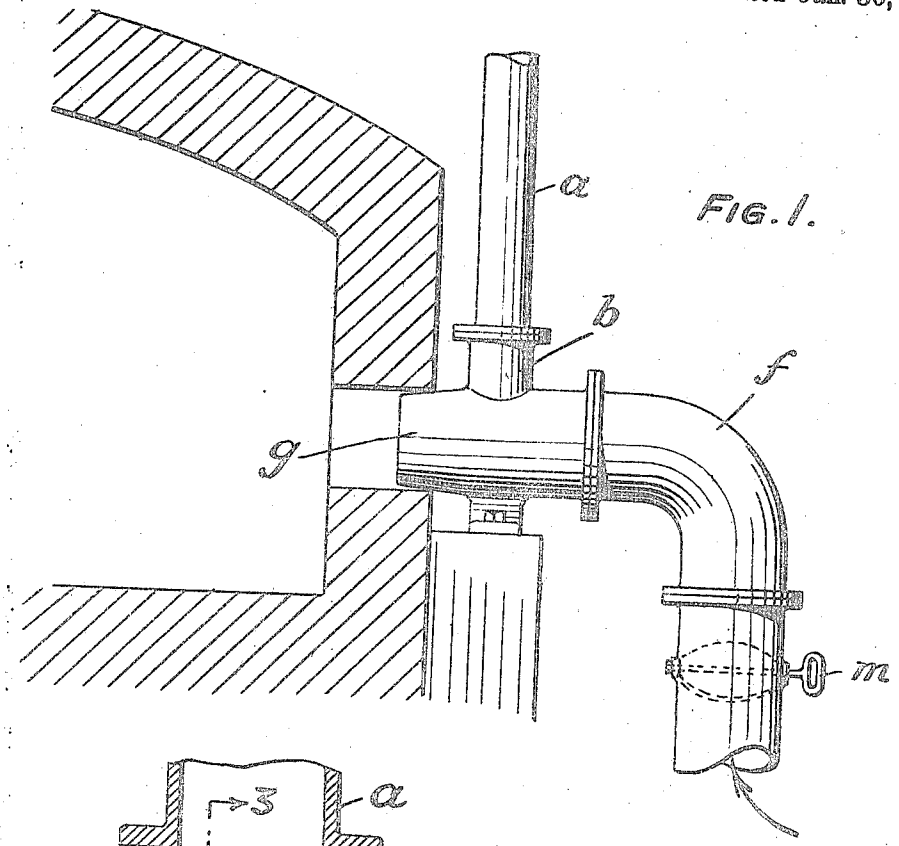


FIG. 1.

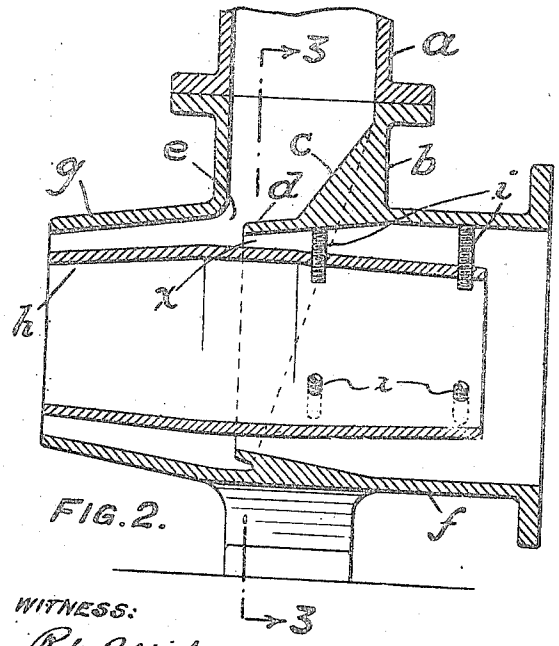


FIG. 2.

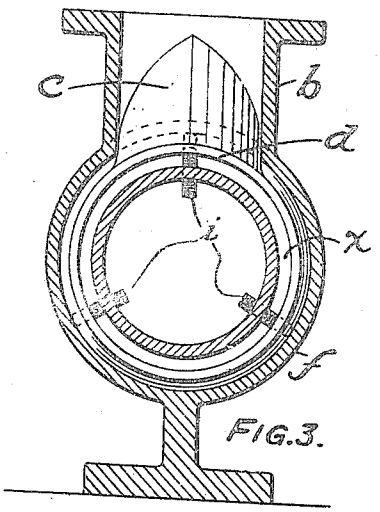


FIG. 3.

WITNESS:

Robt. R. Mitchell.

INVENTOR

Lars H. Bergman

BY

Frank S. Busser

ATTORNEY.

UNITED STATES PATENT OFFICE.

LARS H. BERGMAN, OF PHILADELPHIA, PENNSYLVANIA.

PULVERIZED-FUEL BURNER.

1,213,822. Specification of Letters Patent. Patented Jan. 30, 1917.

Application filed July 16, 1915. Serial No. 40,174.

To all whom it may concern:

Be it known that I, LARS H. BERGMAN, a subject of the King of Sweden, residing at Philadelphia, county of Philadelphia, and State of Pennsylvania, have invented a new and useful Improvement in Pulverized-Fuel Burners, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, which form a part of this specification.

The invention relates to pulverized fuel burners for furnaces, boilers and kilns wherein air is employed both to atomize and propel the fuel and to effect combustion.

The main object of the invention is to so construct the burner as to require only one source of air supply. This object is effected by a construction in which the common supply of air is so divided that part thereof used for combustion is supplied either on the outside or on the inside of the stream of air employed for atomizing and carrying the fuel.

In this patent there is set forth and specifically claimed an embodiment of the invention, wherein air of comparatively low pressure is used and wherein the combustion air takes a path centrally within the stream of fuel atomizing and carrying air. In an application of even date herewith, Serial No. 40,173, there is set forth and specifically claimed a construction wherein air of comparatively high pressure is used and wherein the combustion takes a path centrally within the stream of fuel atomizing and carrying air, such application also claiming the subject matter common to it and this patent. In another application of even date herewith, Serial No. 40,172, there is set forth and specifically claimed a construction wherein the combustion air takes a path surrounding the passage for the fuel and atomizing and carrying air; the last-named application also claiming the subject-matter common to all arrangements.

In the drawings, which show a preferred embodiment of the invention, Figure 1 is an elevation, and Fig. 2 a vertical section through the burner and fuel hopper, and Fig. 3 a section on line 3—3 of Fig. 2.

The main pipe *f* of the burner has an inlet or hopper *b* connected to a pipe *a*, through which the fuel, fed thereinto in proper and uniform amount by any known means, drops by gravity. The rear wall *c* of the hopper, which presents a convex surface, is inclined downwardly and forwardly to distribute fuel over the cone *d;* the face of this cone *d* being located at a suitable distance to the rear of the vertical front wall of the hopper, forming a fuel delivery mouth *e*.

Pipe *f* is connected with a source of air supply provided with a damper *m* whereby the volume of air within the burner may be regulated. The forward part *g* of pipe *f* is shown conical, but may be of any other contracted form, giving the fuel and air leaving the burner a contracted shape, preventing the combustion from taking place too near the burner nozzle. The inner pipe *h* dividing up the common source of air supply is made in a separate piece and is preferably shaped conical at each end. The inside face of cone *d* extends for some distance toward the rear of the burner, affording, in connection with the conical shape of the rear of pipe *h*, a gradually contracting passage for the atomizing and propelling air before it reaches the fuel delivered from the hopper, thereby causing the air at the forward end of cone *d* to build up a slightly higher pressure, insuring a maximum speed of air through the opening *x*. This opening is located at such a distance behind the front of the coal inlet *e* that a slight suction is created within the hopper, the fuel being partly dropped and partly drawn into the flow of air by the latter's inducing effect. The burner pipe *h* is adjustable and held in desired position by means of set screws *i* so located that they do not obstruct the flow of the fuel carried by the atomizing air. By adjusting the pipe *h* the area admitting the atomizing air may be increased or decreased, thus increasing or decreasing the volume of atomizing air to suit the consumption on each particular furnace.

From the foregoing description it will be understood that the pulverized fuel is dropped through pipe *a* and hopper *b* and air of comparative low pressure from a common source of supply is divided by means of inner pipe *h* into two streams; one the fuel atomizing and propelling air passing within the annular space between inner pipe and cone *d*, this space being so located in relation to fuel hopper *b* that the fuel is partly dropped and partly drawn into the air which conveys the fuel toward the discharge end of cone *g;* while the other stream—the combus-

tion air—goes through pipe *h*, entering the furnace in the center of the fuel carried by the atomizing air.

Having now fully described my invention, what I claim and desire to protect by Letters Patent is:

1. A pulverized fuel burner comprising an outer pipe, an inner pipe inclosing a combustion air passage and affording between it and the outer pipe a passage for fuel and for fuel atomizing and conveying air, an inlet for air common to both pipes, a fuel hopper communicating with the space between said pipes, said pipes being arranged to form a forwardly contracting annular passage, back of said fuel inlet, whose mouth is located to the rear of the front wall of the hopper.

2. A pulverized fuel burner comprising an outer pipe, a fuel hopper, an inner pipe inclosing a combustion air passage and affording between it and the outer pipe a passage for fuel and for fuel atomizing and conveying air, and an inlet for air common to both pipes, the outer pipe having a conical portion whose front edge terminates back of the front wall of the hopper.

3. A pulverized fuel burner comprising an outer pipe, a fuel hopper, an inner pipe inclosing a combustion air passage and affording between it and the outer pipe a passage for fuel and for fuel atomizing and conveying air, and an inlet for air common to both pipes, the outer pipe having a conical portion whose front edge terminates back of the front wall of the hopper and also a conical portion in front of the fuel hopper to give the fuel and air leaving the burner a contracted or converging shape.

4. A pulverized fuel burner comprising an outer pipe having between its ends a conical portion, a fuel hopper whose front wall is forward of the front edge of said conical portion, an inner pipe inclosing a combustion air passage and affording between it and the outer pipe a passage for fuel and for fuel atomizing and conveying air, part of the inner pipe back of the front edge of said conical portion of the outer pipe converging rearwardly and affording a forwardly contracting passage for the passage of air toward the fuel inlet, and an inlet for air common to both pipes.

5. A pulverized fuel burner comprising an outer pipe, a fuel hopper, an inner pipe inclosing a combustion air passage and affording between it and the outer pipe a passage for fuel and for fuel atomizing and conveying air, and an inlet for air common to both pipes, the outer pipe having a conical portion whose front edge terminates back of the front wall of the hopper, the opposite front end portions of both pipes converging toward the common axis of said pipes.

In testimony of which invention, I have hereunto set my hand, at Philadelphia, on this 14th day of July, 1915.

LARS H. BERGMAN.