No. 695,437. Patented Mar. 18, 1902.

C. H. BJÖRCKNER.

AIR MIXER AND HEATER FOR GAS BURNERS FOR BLAST FURNACE STOVES.

(Application filed Feb. 9, 1900. Renewed Dec. 30, 1901.)

(No Model.)

Fig. 1.

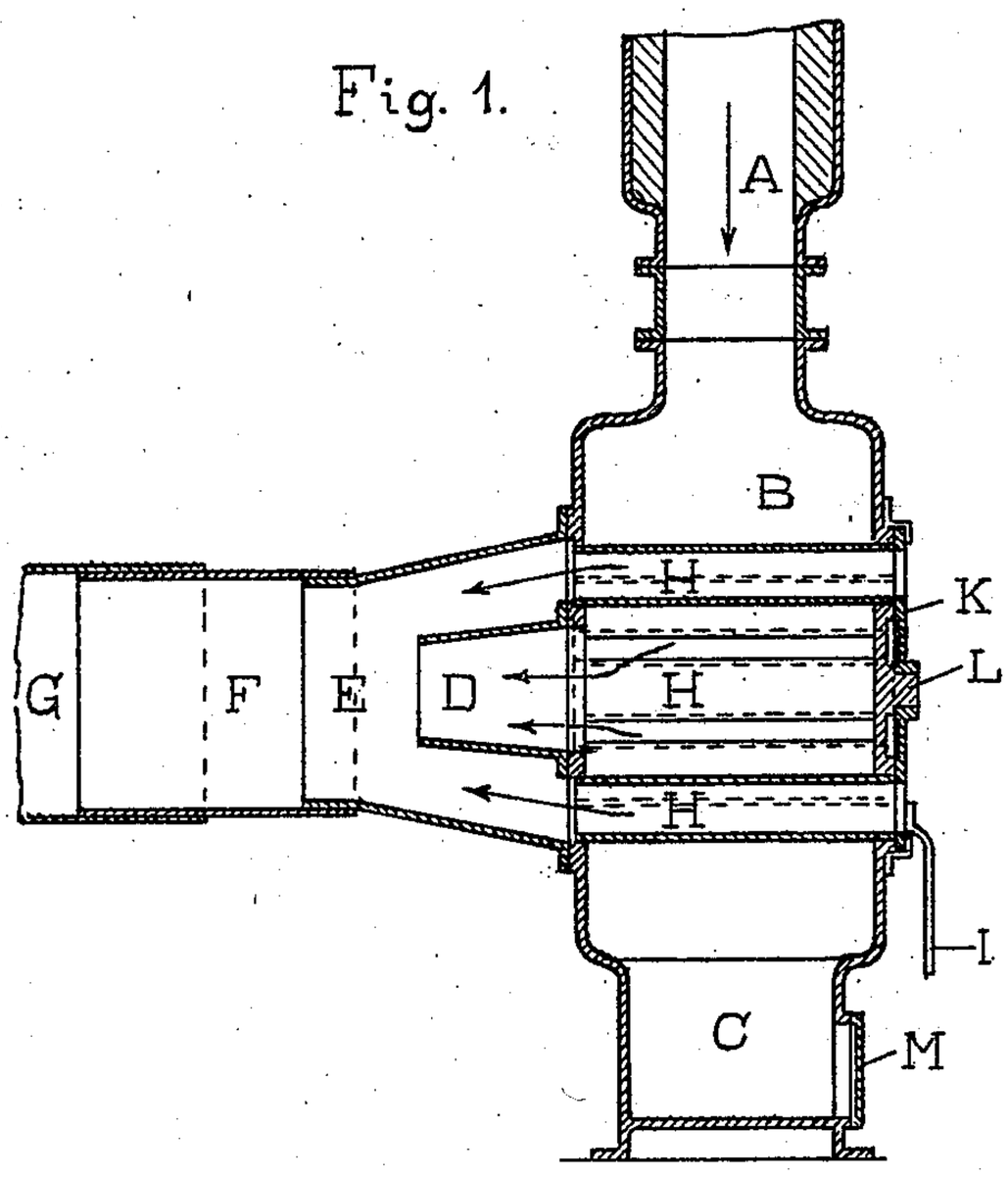


Fig. 2.

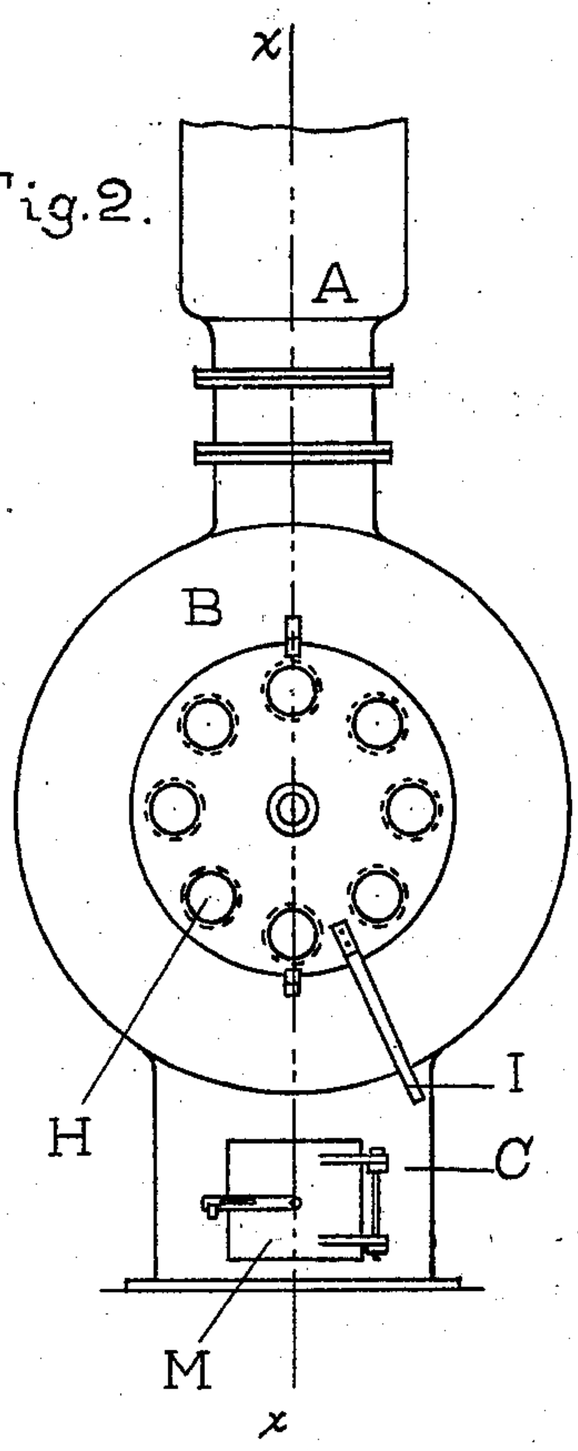
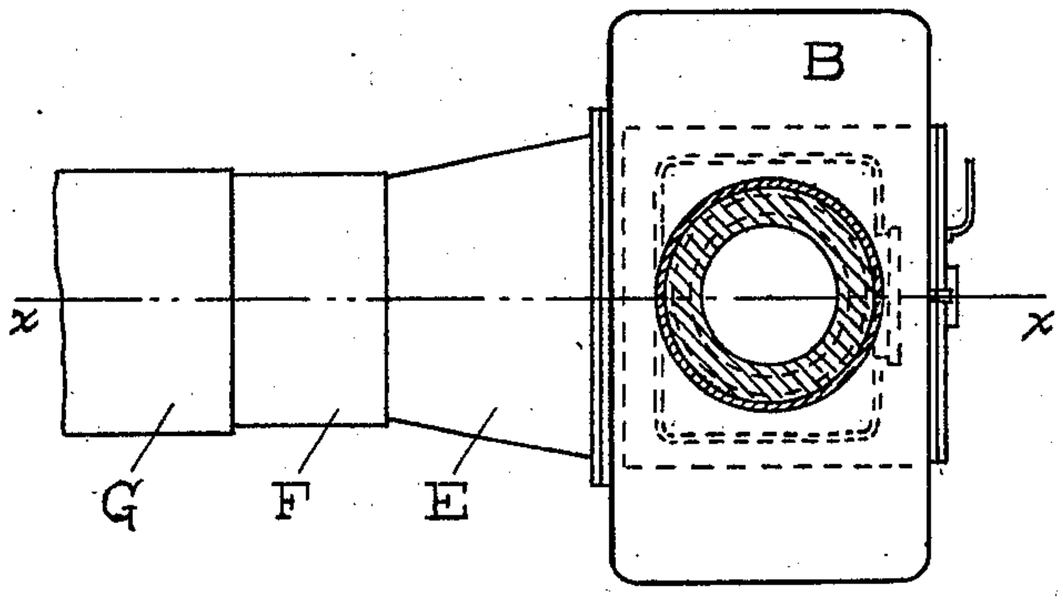


Fig. 3.



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UNITED STATES PATENT OFFICE.

CHARLES H. BJÖRCKNER, OF LORAIN, OHIO.

AIR MIXER AND HEATER FOR GAS-BURNERS FOR BLAST-FURNACE STOVES.

SPECIFICATION forming part of Letters Patent No. 695,437, dated March 18, 1902.

Application filed February 9, 1900. Renewed December 30, 1901. Serial No. 87,688. (No model.)

To all whom it may concern:

Be it known that I, CHARLES HENRY BJÖRCKNER, a citizen of the Kingdom of Sweden, residing at Lorain, in the county of Lorain and State of Ohio, have invented a new and useful Air Mixer and Heater for Gas-Burners for Blast-Furnace Stoves, of which the following is a specification.

My invention relates to improvements in air mixers and heaters in gas-burners for blast-furnace stoves, in which gas and air are mingled together before combustion takes place; and the objects of my improvement are, first, to provide a burner in which the air will be heated to a high temperature before being mixed with the gases from the furnace; second, to provide cones so constructed as to mix the air and gases intimately before combustion takes place, and, third, provide a device for controlling the quantity of air admitted as desired, and thereby produce more complete combustion than has been possible under the constructions and arrangements heretofore known. I attain these objects by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a longitudinal sectional view of Fig. 2 in the broken line *x x*. Fig. 2 is a front elevation of my device, and Fig. 3 is a plan top view of same.

Similar letters refer to similar parts throughout the several views.

A represents a broken sectional pipe leading from the gases in the furnace to the heating-chamber B of my device, which chamber is made, preferably, of cast-iron of any suitable size and form. On the lower side of this chamber B is formed or attached a receptacle C, in which the dust from the gases may settle, which receptacle C is provided with a clean-out door M. To the rear or back side of the heating-chamber B is attached and secured a cone-shaped pipe E, the outer end of which may be attached to or united with the pipe F, leading to the gas-stoves. To the outer end of the pipe F may be attached an adjustable collar for the purpose of lengthening the pipe, if desired. Surrounding the center of the rear or back plate or wall of the heating-chamber B is attached the cone-shaped tube D, and through this back plate or wall of the heating-chamber and opening into this tube D is a suitable opening or hole of size sufficient to permit the escape of the gases from the chamber B, and thence through the cone E into the pipe F. Extending through the interior of chamber B and through the walls thereof there are arranged air tubes or pipes H, with the opening of the inner end of each of said pipes through the walls of said chamber B intermediate of said nozzle E and nozzle D and the outer end of each of said pipes opening through the walls of said chamber B outside of said nozzle D. These pipes may be arranged as shown in the drawings or in any other suitable manner, so the outside opening will be outside of the nozzle D and the inner end within the nozzle D and outside of the nozzle E. These tubes are for the purpose of providing for the free admission of air into the cone E and from thence into the pipe F, where, meeting the gases from the furnace at the mouth of the tubular cone D, they mingle together in such proportion as may be desired. The heated gases entering the chamber B from the furnace pass around the tubes or air-pipes H, which are thereby heated and in turn communicate their heat to the air which passes through them.

K represents a movable regulating-plate provided with openings corresponding to the number and size of the tubes H, which regulating-plate is constructed to turn on a pivot at its center and may be adjusted in such a manner that the openings in the plate will be opposite the openings in the tube H and permit of the free admission of air.

I represents a handle or bar for turning the plate K as desired, and thereby entirely or partly closing the holes in the tubes H, thereby controlling as desired the admission of air through the tubes H.

The operation of my invention is as follows: The heated gases from the furnace enter the chamber B through the pipe A, heating the tubes H, and the heavy particles of dust drop down and settle in the receptacle C, and the said gases pass out from said chamber through the opening in the rear plate or wall of same through the cone D. The air entering through the tubes H is heated by passing through same and thence into the conical tube E, near the outer end of which it meets and

unites or mingles with the gases coming out of the end of the tube D, which are both at nearly the same temperature, and thence pass on mixed through the pipe F to the blast-furnace stoves. The admission of air in proper proportions may be regulated by the adjustment of the regulating-plate K, as is obvious. Dust collecting in the receptacle C may be removed through the door M.

Having fully described my invention, what I claim, and desire to secure by Letters Patent of the United States, is—

1. A substantially cylindrical chamber having a gas-inlet and provided with a centrally-arranged discharge-nozzle projecting from one end thereof and with an outer conical nozzle surrounding the former nozzle and spaced therefrom, a series of air-tubes extending through said cylinder from end to end and intermediate of the two nozzles and a mixing-tube into which said nozzles discharge substantially as described.

2. A gas-chamber having a gas-inlet and provided with a centrally-arranged discharge-nozzle projecting from one end thereof with an outer nozzle surrounding the former nozzle and spaced therefrom, a series of air-tubes extending through said cylinder and opening intermediate of the two nozzles and the mixing-tube into which said nozzles discharge, substantially as described.

CHARLES H. BJÖRCKNER.

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