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D. J. ARCHER.

GAS AND AIR MIXER.

APPLICATION FILED JULY 11, 1902.

NO MODEL.

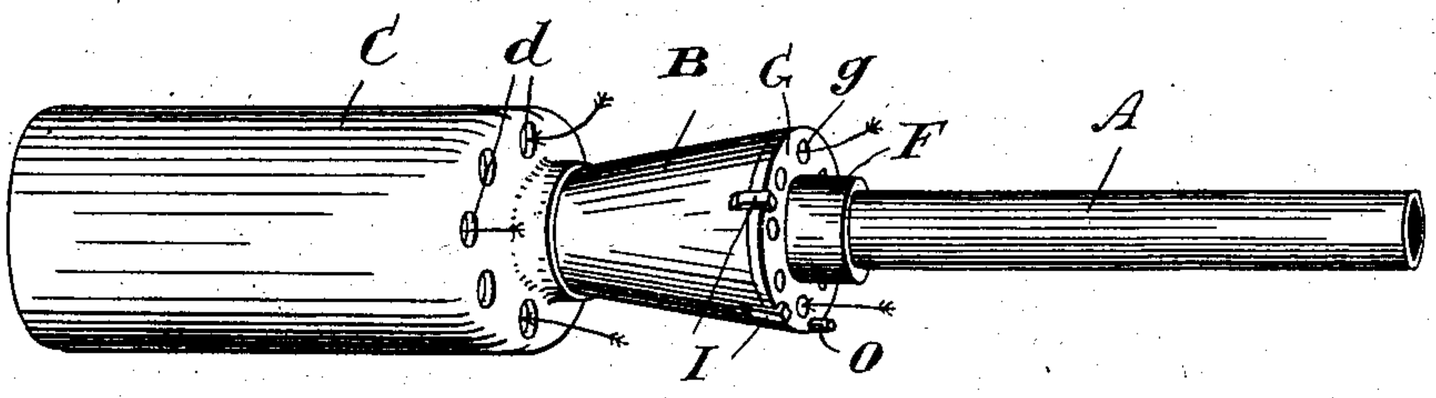

Fig. 1.

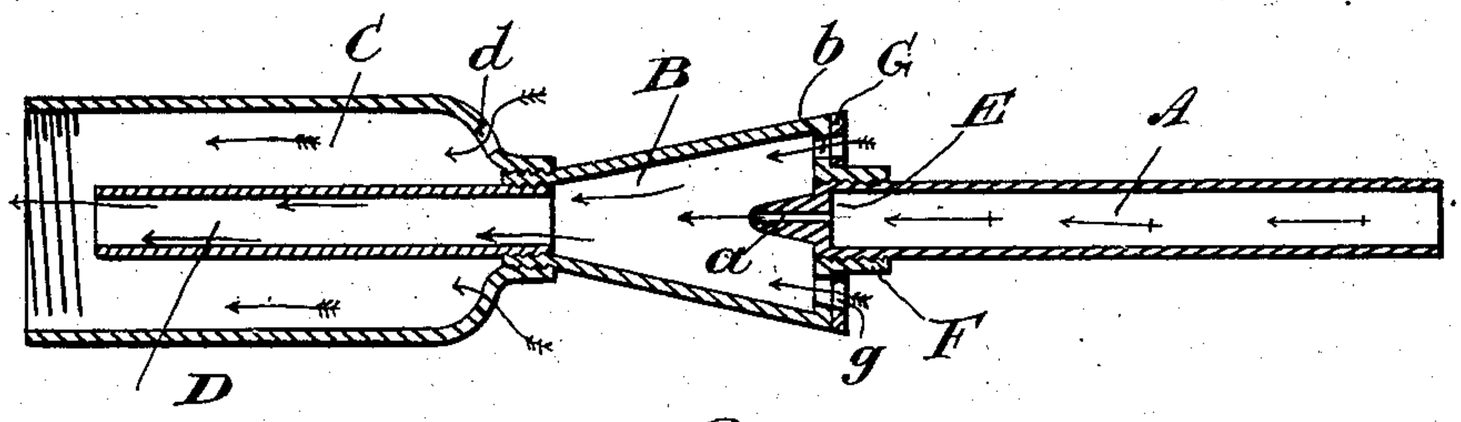

Fig. 2.

Witnesses.
W. H. Smith
J. M. E. Winting

Inventor.
D. J. Archer,
by Egerton R. Case,
Atty.

UNITED STATES PATENT OFFICE.

DAVID JOHN ARCHER, OF TORONTO, CANADA.

GAS AND AIR MIXER.

SPECIFICATION forming part of Letters Patent No. 726,238, dated April 28, 1903.

Application filed July 11, 1902. Serial No. 115,212. (No model.)

To all whom it may concern:

Be it known that I, DAVID JOHN ARCHER, inventor, a subject of the King of Great Britain, and a resident of the city of Toronto, county of York, and Province of Ontario, Canada, have invented certain new and useful Improvements in Gas and Air Mixers, of which the following is a specification.

My invention relates to improvements in gas and air mixers; and the object of my invention is to design a device of this class in which complete mixture of air and gas is effected, so as to get as complete combustion as possible, and thus consume the minimum amount of gas. My gas and air mixer is designed to be used in connection with gas-stoves and in connection with the ordinary incandescent mantle for illuminating purposes.

The device consists, essentially, of a mixing-chamber which holds the gas-conduit and an air-chamber separated from said mixing-chamber but connected thereto, a mixing-conduit extending from the discharge end of said mixing-chamber into said air-chamber, and other details of construction, as hereinafter more particularly explained.

Figure 1 is a general perspective view of my gas and air mixer. Fig. 2 is a longitudinal vertical section through Fig. 1.

In the drawings like letters of reference indicate corresponding parts in each figure.

A is a gas-conduit, by means of which the gas is fed into the mixing-chamber B. The inner end of the gas-conduit extends a sufficient distance into the mixing-chamber B, so as to introduce the gas-well into this mixing-chamber through its small passage-way *a*, so that there will be no possibility of the gas escaping from the series of air-holes *b* in the end of the mixing-chamber B. The mixing-chamber B is preferably constructed tapered, as shown, as by so constructing the said mixing-chamber I find it facilitates the delivery of air and gas therefrom.

C is the air-chamber, which, as shown in the drawings, preferably screws over the reduced end of the mixing-chamber B. If convenient, I may of course cast these two chambers in one piece. Extending within the air-chamber C and fixed in the end of the mixing-chamber B is a mixing-conduit D. If convenient, this mixing-conduit may be formed an integral part of mixing-chamber B. It will be seen from Fig. 2 that the mixing-conduit D is of uniform diameter throughout and of the same size as the tapered end of the mixing-chamber B. I wish it to be understood, however, that I do not confine myself to particularly constructing the mixing-chamber D with a uniform diameter, although I preferably do so. It will be seen from the drawings that the passage-way *a* is very much smaller in diameter than the main passage-way within the conduit A and that the said main passage-way terminates in the square end E.

In manufacturing my gas-conduit it must be understood that although I preferably terminate the main passage-way of same in the square end I do not confine myself to so constructing said passage-way, but essentially provide the inner end of same with a small passage-way, as described. The gas (shown by arrows with crossed tails) rushes in a strong current into the mixing-chamber B and in its passage therethrough mingles with the air therein, and this mixture of air and gas (shown by plain arrows) rushes on through the mixing-conduit D, where they are further mixed. By means of the holes in the end of the air-chamber C adjacent to the mixing-chamber B air (shown by arrows with tails) passes into said air-chamber, and as the mixing-conduit D does not extend as far as the exit end of said air chamber the current of air and gas passing from the mixing-conduit D is further mixed with air. It will be noticed that the holes *b* are quite small. These small holes, taken together with the preferred tapered formation of the mixing-chamber B and the construction of the delivery end of the gas-conduit A, create strong currents of air and gas, which as the particles of air and gas are violently agitated mix quickly, but not in the requisite proportions in order to create perfect combustion. Therefore to this end I find that I get better results if I construct the air-chamber C larger than the mixing-chamber B and its holes *d* larger than the holes *b*, so that the currents of air passing into this air-chamber are comparatively slow in movement and the resultant current from said air-chamber is quite mild.

As the air-chamber C is separated from the mixing-chamber B, no pure gas can possibly enter said air-chamber. This air-chamber is combined with the mixing-chamber B and mixing-conduit D for the purpose of providing a body of pure air through which the air and gas current from the mixing-conduit D must pass before delivery to the gas-burner, (which gas-burner, although not shown is connected in any suitable way to the open end of said air-chamber,) and thus become further mixed with additional pure air in the proper proportion, so as to produce the complete combustion I get by this device. In case the supply of gas passing through the gas-conduit A is reduced I can also reduce supply of air passing into the mixing-chamber B in proportion to the reduced supply of gas. Fitting over the collar F of the mixing-chamber B and adjacent the enlarged end of said mixing-chamber is a regulator G, provided with a series of holes *g*, corresponding in number and size with the holes *b* and designed to register with same as desired. By means of this regulator it will be seen that the supply of air into said mixing-chamber can be regulated to a nicety. This regulator is held in place by any suitable lugs I, as shown, secured to the mixing-chamber B, and for convenience of moving same I provide same with a small pin O.

I do not confine myself to using a regulator. When I do use a regulator, I do not confine myself to using any particular kind. It will of course be understood that the several parts of my air and gas mixer must be properly proportioned in order to get the best results. As far as lies in my power I have shown the proper proportion of the several elements to my air and gas mixer in the drawings forming part of this application.

What I claim as my invention is—

A gas and air mixer comprising a mixing-chamber tapered toward its delivery end, and being provided with small fixed air-apertures in larger end of same; a gas-conduit, provided with a small passage-way in its delivery end, secured in said mixing-chamber so as to introduce the gas thereinto beyond said small fixed air-apertures of same, the construction of these parts causing strong currents of air and gas to pass into said mixing-chamber where they are mixed imperfectly; a mixing-conduit secured in the delivery end of said mixing-chamber and extending into an air-chamber, the said mixing-conduit providing an additional chamber for further mixing of said air and gas, and an air-chamber, larger than said mixing-chamber, secured over the reduced end of said mixing-chamber and provided with fixed air-apertures which deliver air thereinto behind the discharge end of said mixing-conduit, these fixed air-apertures being larger than the fixed air-apertures in said mixing-chamber, the said air-chamber, constructed as described, providing a mild resultant current of pure air with which the imperfectly mixed air and gas, passing from said mixing-conduit, is thoroughly mixed so as to provide complete combustion, as set forth and described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

DAVID JOHN ARCHER.

Witnesses:
W. H. SMITH,
EGERTON R. CASE.