(No Model.)

F. S. DURAND.

GAS OR OIL BURNER.

No. 438,840. Patented Oct. 21, 1890.

Fig. 1.

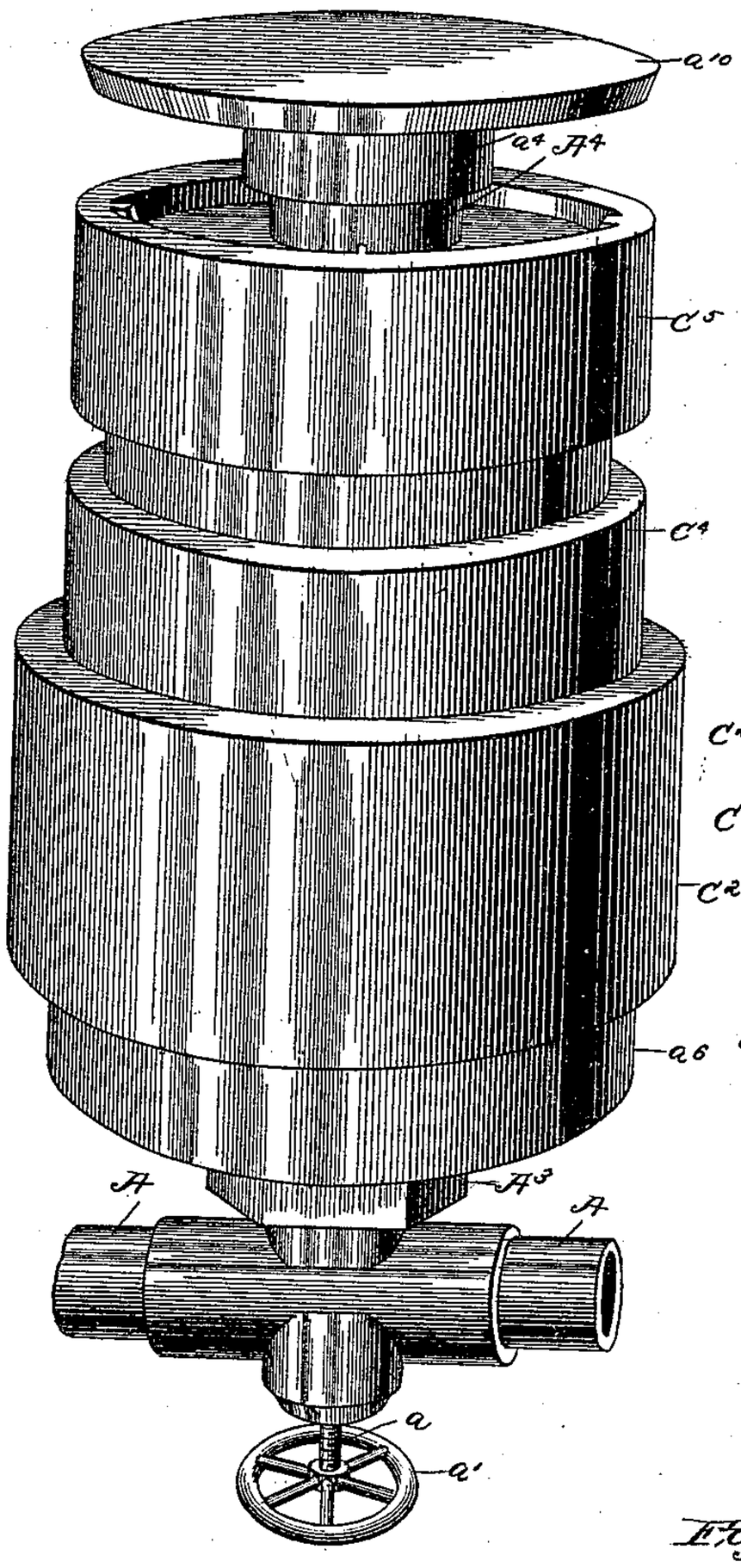


Fig. 2.

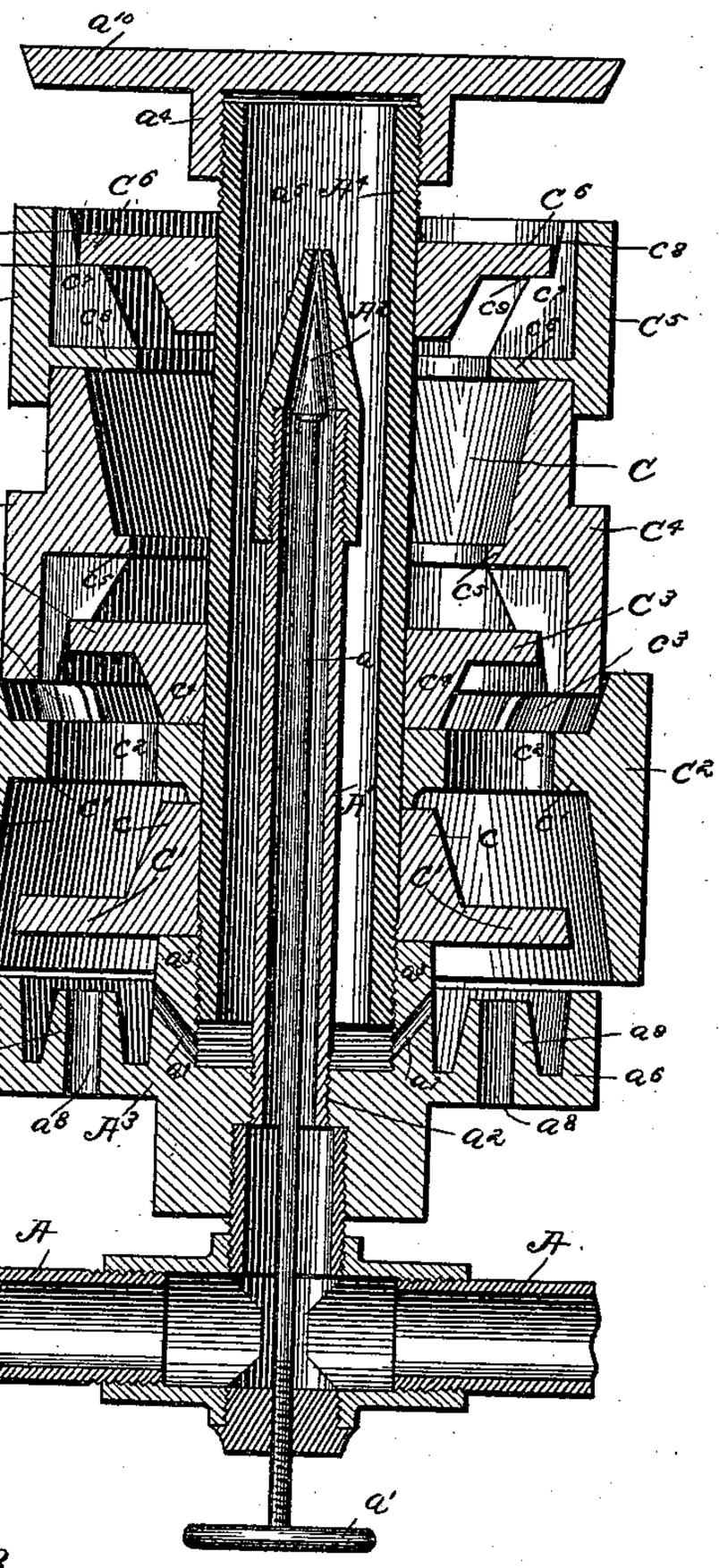
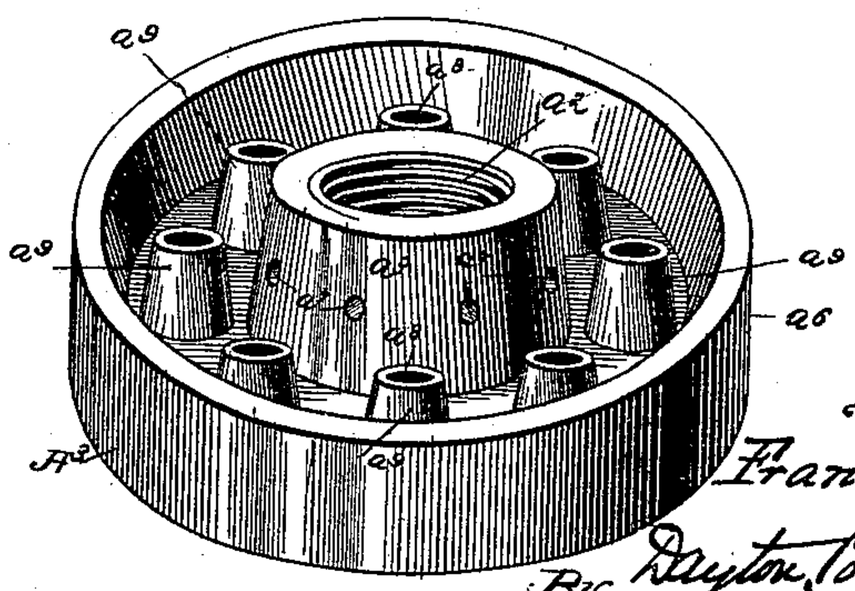


Fig. 3.



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UNITED STATES PATENT OFFICE.

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GAS OR OIL BURNER.

SPECIFICATION forming part of Letters Patent No. 438,840, dated October 21, 1890.

Application filed August 20, 1889. Serial No. 321,403. (No model.)

To all whom it may concern:

Be it known that I, FRANK S. DURAND, of Peoria, in the county of Peoria and State of Illinois, have invented certain new and useful Improvements in Gas or Oil Burners; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates to a novel construction in burners.

The invention consists in the features of construction and combination of parts hereinafter fully described, and pointed out in the appended claim.

In the accompanying drawings, Figure 1 is a perspective view of a device constructed in accordance with my invention. Fig. 2 is a central vertical sectional view of the same. Fig. 3 is a detail perspective view of the base or fire-pot of the burner.

In said drawings, A indicates a main supply-pipe for supplying gas or a volatile oil to the burner. Said pipe A is provided with a branch pipe A′, having its end located within the burner and provided with a needle-valve A^2, the stem a of which is provided with a hand-wheel a', by means of which it can be operated.

A^3 indicates a fire-pot or base of the burner provided with a central aperture a^2, preferably screw-threaded. The said fire-pot is located upon the branch pipe A′ by having the aperture therein placed around the said branch pipe and connected therewith by a screw-threaded joint. The said base-piece A^3 is provided with an uprising annular collar or flange a^3, having a diameter considerably larger than that of the branch pipe A′. The said flange a^3 is screw-threaded internally in its upper portion, and a tube or pipe A^4 is connected therewith by a screw-threaded joint. The said tube A^4 thus surrounds the branch pipe A′, extends some distance above the same, and is closed at its upper end by a cap-piece a^4, hereinafter referred to. It will thus be seen that a chamber a^5 is provided around the branch pipe, and said chamber will be termed a "heating-chamber." The said base A^3 is provided along its periphery or outer edge with an upturned rim or flange a^6, which, in conjunction with the flange a^3, forms an open-topped annular receptacle or fire-pot.

a^7 a^7 indicate a plurality of passages or small openings leading from the heating-chamber a^5 to the fire-pot, said passages being so located and inclined that they lead from the bottom of the heating-chamber to a point considerably above the bottom of said fire-pot. A plurality of holes or openings a^8 a^8 for the admission of air are formed in the bottom of said fire-pot, and said openings are provided with surrounding uprising walls a^9 a^9, which prevent any fluid that may be in the said open-topped receptacle from running out through said holes a^8 a^8.

The mixing or combustion chamber C of the burner surrounds the heating-chamber a^5 and is composed of separate pieces so arranged one upon the other as to form a circuitous passage through them. The said parts composing the combustion-chamber are arranged in the following manner: A deflecting-plate C′, having a central aperture of a diameter equal to that of the tube A^4 is passed over said tube and rests upon the flange a^3 of the base-piece. The said plate extends outwardly to a point just above the outer side of the fire-pot and a considerable distance above the same. The said plate C′ is also provided with an upwardly-extending hub portion c. C^2 is a cylindric section or casing having a partition or diaphragm c', which is provided with a central aperture adapted to fit around the tube A^4, so that said diaphragm rests upon the hub c. The said diaphragm is provided with a plurality of passages or openings c^2 c^2, arranged in the form of a circle around the central aperture, and so located that they are nearer the center of the tube A^4 than the periphery of the plate C. The said casing C^2 extends below the plate C′ to a point about even with the upper end of the flange a^6 of the fire-pot and a slight distance outwardly from the same, so as to form a small passage for air. The said casing also extends above the diaphragm c', and is provided interiorly with radial ribs c^3 c^3, said ribs having their upper edges somewhat below the upper edge of the casing.

C^3 indicates another deflecting-plate hav-

ing a central aperture and a downwardly-extending hub c^4, which rests upon the diaphragm and sustains the said plate C^3 above the same. The said plate C^3 is about the same diameter as the plate C', and extends outwardly over the openings c^2 in the diaphragm of the casing C^2.

C^4 indicates another casing-section forming part of the outer walls of the mixing-chamber, having its lower end adapted to fit within the upper end of the casing-section C^2, and rest upon the ribs c^3 c^3 therein. The said casing-section C^4 is of a smaller diameter in its upper part than in its lower part, and is provided between its upper and lower portions with an inwardly-extending partition c^5, having a central opening of a diameter considerably less than the diameter of the plate C^3.

C^5 indicates an additional casing-section having an internal diameter equal to the external diameter of the upper part of the casing-section C^4, over which it fits. The said section C^5 is provided interiorly a little distance above its lower end with an upwardly-extending partition c^6, having an internal diameter about the same as that of the partition c^5. The said casing-section C^5 is placed over the upper end of the section C^4, and the partition rests upon said upper end and sustains the casing-section.

c^7 c^7 indicate radial ribs located upon the inner walls of the casing C^5 and above the partition c^6. Said ribs are each provided with a vertical face c^8, which stands some distance out from the inner wall of the said casing and with a horizontal face c^9.

C^6 indicates another deflecting-plate having an external diameter considerably less than the internal diameters of the casing C^5. Said plate C^6 is adapted to rest upon the horizontal faces c^9 of the ribs c^7, and to be held in a central position by the vertical faces or edges c^8. The cap-piece a^4, before referred to and which closes the upper end of the heating-chamber a^5, is provided with an outwardly-extending horizontal flange or top deflecting-plate a^{10}, having a diameter about equal to the external diameter of the casing-section C^5.

The parts of my invention being constructed and arranged, as described, the operation is as follows: It will be understood that the form of burner can be used equally well to burn either gas or oil. In operation the gas or oil passes from the supply and branch pipes through the needle-valve into the heating-chamber a^5. It escapes from the said heating-chamber into the fire-pot by means of the holes a^7 a^7. When gas is used, it is ignited at this point and the flame passes up into the mixing-chamber, thereby creating a draft which draws in the outside air through the openings a^8 a^8 in the fire-pot, and also through the space between the upper end of the flange a^6 thereof and the lower end of the casing C^2. The mixed gas and air pass up through the mixing-chamber and are thoroughly intermixed by being deflected from one side to the other by the deflecting-plates and partitions in an obvious manner. The flame passing around the heating-chamber a^5 brings it to a very high temperature and heats the gas before it emerges therefrom, so that its combustive properties are increased. In passing through the mixing-chamber the flame, smoke, and air are very thoroughly mixed and refined, and issuing from the top of said mixing-chamber burn around the edge of the top deflecting-plate a^{10}. In burning oil the operation is somewhat different. The oil issues from the branch pipe and flows first into the fire-pot, as is obvious. The oil is then ignited and the flame combining with the air, as before described, passes through the mixing-chamber, and thereby brings the heating-chamber to a high temperature, which has the effect of vaporizing said oil in the heating-chamber, so that it issues therefrom in a gaseous form and burns with the mixed air in the manner before described. The flame which issues from the top of the burner around the top deflecting-plate is a blue flame and of an exceedingly high temperature.

It is obvious that the size of the burner can be increased or diminished by removing or adding the casing-sections or deflecting-plates, as desired, said parts being so constructed that they fit upon each other and can be built up as desired.

I claim as my invention—

A burner of the kind specified comprising a tubular heating-chamber, a supply-pipe located within and extending partially through said heating-chamber, a valve located near the upper end of said supply-pipe, a plurality of circumferential rings located one above the other constituting an outer casing, each of said rings being provided with an annular partition or flange extending inwardly in the space between said outer casing and said heating-chamber, which constitutes the mixing-chamber, there being passages a^7, leading from the lower end of the heating-chamber to the mixing-chamber, the said mixing-chamber being open at its lower end and communicating with the atmosphere, a plurality of circumferential deflecting-plates surrounding said heating-chamber and extending outwardly into the mixing-chamber alternately with the said partitions, whereby a circuitous passage is formed in said mixing-chamber, and a spreader or top plate secured to the upper end of the heating-chamber above the exit at the upper end of the mixing-chamber, substantially as and for the purpose specified.

In testimony that I claim the foregoing as my invention I affix my signature in presence of two witnesses.

FRANK S. DURAND.

Witnesses:
F. H. TICHENOR,
E. P. GRIER.