May 5, 1936. H. DE COSTER 2,039,890

BURNER

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Fig: 1

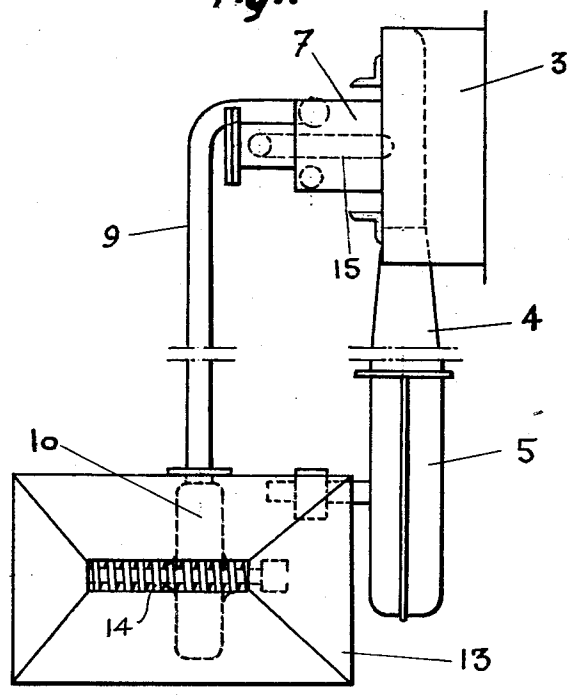
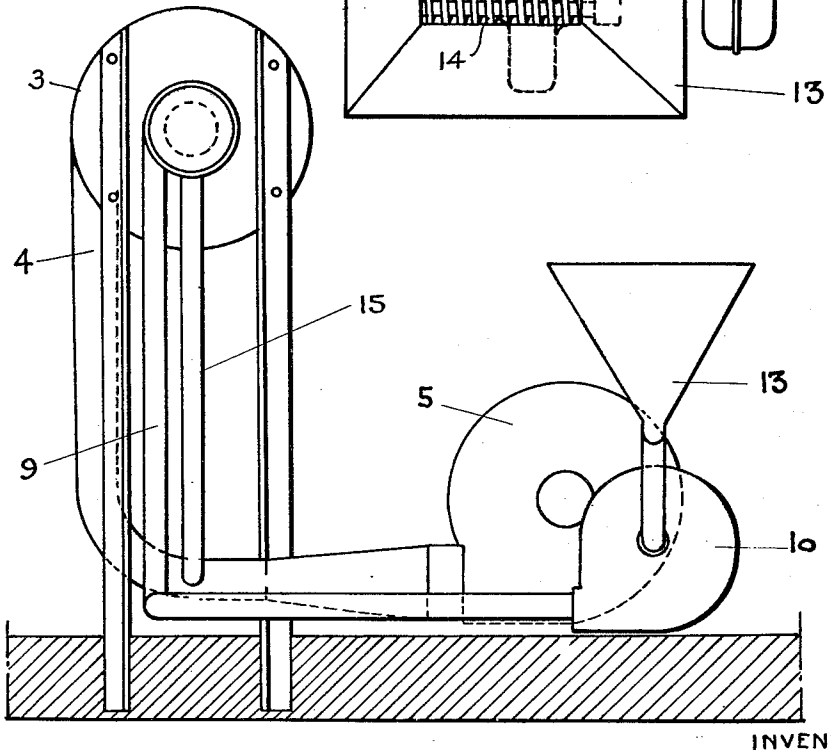


Fig: 2



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Fig: 3

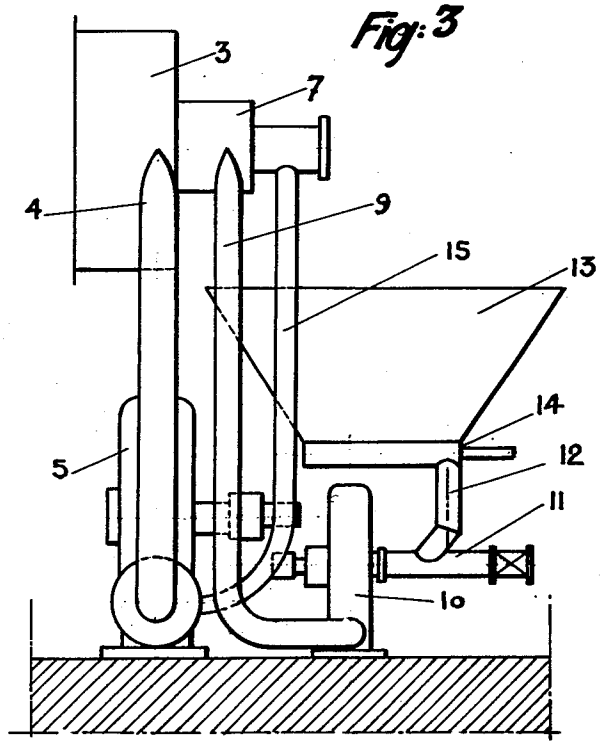


Fig: 4

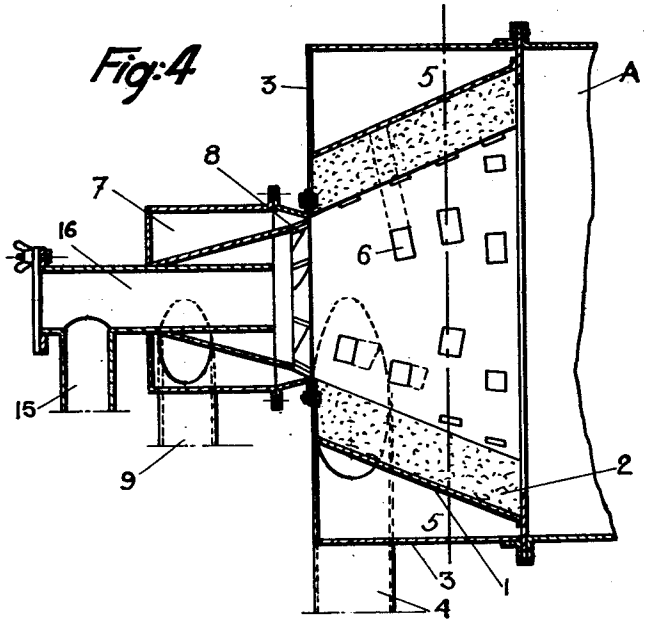
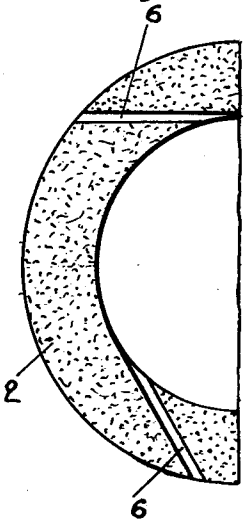


Fig: 5



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UNITED STATES PATENT OFFICE

2,039,890

BURNER

Henri de Coster, Paris, France

Application July 7, 1934, Serial No. 734,147

4 Claims. (Cl. 110—104)

This invention relates to an improvement in fuel burners in which the fuel is conveyed to the burner by air under pressure.

One of the objects of this invention is to supply secondary air by pressure about the exterior of the stream of air and fuel as well as primary air into the axis of said stream of air and fuel to thoroughly mix the air and fuel as it enters the burner.

This burner is characterized by the combination of a chamber of truncated cone form into which the combustible mixture enters tangentially so as to run through this chamber with a turbulent movement while meeting preferably tangential entries of secondary air—with an injection of primary air under pressure into the axis of this chamber.

This burner can employ pulverized, liquid, or gaseous combustible as desired.

In the attached drawings there is shown by way of non-limiting example an embodiment of the object of the invention.

In these drawings:

Fig. 1 is a plan view partially diagrammatic of a portion of a burner, together with the means for supplying fuel and air to the burner,

Fig. 2 is an end view of the structure shown in Fig. 1,

Fig. 3 is a side elevation of the structure shown in Fig. 1,

Fig. 4 is a vertical section through a portion of the burner and the fuel and air connections thereto, and

Fig. 5 is a partial sectional view of the lining of the mixing chamber on the line 5—5 of Fig. 4.

The burner is composed of a body 1 having a mixing chamber in the form of a truncated cone with its wall preferably lined with refractory material 2 mounted at the end of a combustion chamber A of any known type.

The burner body 1 is provided with a double casing 3 forming a secondary air chamber into which discharges tangentially a conduit 4 for the supply of secondary air under pressure delivered by a fan 5. This secondary air passes to the mixing chamber in the interior of the body 1 through orifices 6 likewise tangential, arranged in the refractory 2.

The small end of the truncated cone of the burner 1 communicates with a fuel and air chamber in an annular distribution box 7, comprising an outer cylindrical shell and an inner truncated cone shell, and located between the large end of the inner shell of the distribution box and the junction between the outer shell of the distribution box and the small end of the truncated cone of the burner, is a deflector 8 formed of a series of curved blades.

Connected tangentially to the distribution box 7 is a feed conduit 9 for delivering air under pressure, together with pulverized coal, oil, gas or other combustible material.

The conduit 9 is connected to a fan 10, having an air inlet pipe 11 communicating therewith, and 12 is a fuel delivery pipe connected to the inlet pipe 11 and a fuel hopper 13. 14 designates a conveyor screw in the hopper for feeding fuel from the hopper 13 to the fuel delivery pipe 12.

A primary air conduit 15 is connected to the air conduit 4, which discharges into a primary air pipe 16 which extends into the surrounding annular distribution box 7, and discharges a direct current of primary air into the axis of the burner.

In the operation of the burner the combustible material together with air are discharged under pressure into the distribution box 7 through the conduit 9 and from the distribution box 7 into the burner between the blades of the deflector 8, whereby the fuel and air are given a turbulent motion. The turbulent motion of the fuel and air is increased by the discharge of secondary air through the tangential orifices 6. At the same time primary air is fed under pressure through pipe 16 into the axis of the stream of fuel and air passing from the distribution box into the burner and into the heart of the zone of combustion.

Thus there is obtained a perfect combustion with a short flame by reason of the spiral movement imparted to the combustible mixture.

This device shows moreover a very great flexibility of regulation.

What I claim is:

1. In a fuel burner, a first chamber of truncated cone form, a refractory lining for said chamber, air ducts tangentially passing through said lining and the wall of the chamber, a cylindrical chamber enclosing the truncated chamber, a conduit opening tangentially into the cylindrical chamber for introducing therein secondary air under pressure, a distributor mounted at the small end of and having the same axis as the first chamber and discharging thereinto, said distributor having an outer wall and an inner frusto conical wall whose base is adjacent the small end of the first chamber, a conduit tangentially communicating with the space between the outer wall and the inner wall of said

distributor in the same direction as the first named conduit for introducing therein a mixture of combustible material and air under pressure, and a cylindrical conduit coaxially disposed along the axis of the distributor and of smaller diameter for delivering air under pressure into the first chamber axially of said chamber.

2. In a fuel burner, a first chamber of truncated cone form, a refractory lining for said chamber, air ducts passing through said lining and the wall of the chamber and opening tangentially on the inside of said lining, a cylindrical chamber enclosing the truncated chamber, a conduit opening tangentially into said cylindrical chamber for introducing therein secondary air under pressure, a cylindrical distributor mounted at the small end of and having the same axis as the first chamber and discharging thereinto, said distributor having an outer wall and an inner frusto conical wall having its base adjacent to the small end of the first chamber, a blade deflector between said inner wall and outer wall and connecting the base of the inner conical wall with the small end of the first chamber, a conduit tangentially communicating with the space between the walls of the distributor in the same direction as the first conduit for introducing therein under pressure a mixture of combustible material and air, and a conduit cylindrically arranged along the axis of the distributor and of smaller diameter for delivering air under pressure into the first chamber.

3. In a fuel burner, a mixing chamber of truncated cone form, a cylindrical air chamber surrounding the mixing chamber, there being tangential air ducts communicating with the air chamber and the mixing chamber, a conduit opening tangentially into the air chamber for introducing therein secondary air under pressure, a fuel and air chamber communicating with the small diameter end of said mixing chamber for introducing into it a mixture of combustible fuel and air under pressure, means between the mixing chamber and fuel and air chamber for imparting to said mixture a turbulent motion as it discharges into said mixing chamber, a conduit axially communicating with the small end of the said mixing chamber and inside said means for imparting a turbulent motion to the mixture, for injecting a direct current of air under pressure into the said mixing chamber axially of said chambers, and means for forcing air into the air chamber and into the conduit axially communicating with the mixing chamber.

4. In a fuel burner, a mixing chamber of truncated cone form, a cylindrical air chamber surrounding the mixing chamber, there being tangential air ducts communicating with the air chamber and the mixing chamber, a conduit opening tangentially into the air chamber for introducing therein secondary air under pressure, a fuel and air chamber communicating with the small diameter end of said mixing chamber, a conduit tangentially connected to the fuel and air chamber for introducing into it under pressure a mixture of combustible material and air, means between the mixing chamber and the fuel and air chamber for imparting a turbulent motion to the mixture as it passes into the mixing chamber, said means comprising a blade deflector between the fuel and air chamber and the mixing chamber, a conduit axially communicating with the said mixing chamber and of less diameter than the deflector for injecting into the mixing chamber a direct current of air under pressure axially of said chambers, and means for forcing air into the air chamber and into the conduit axially communicating with the mixing chamber.

HENRI DE COSTER.