J. VELAZQUEZ.

BURNER FOR PETROLEUM OR SIMILAR FUELS.

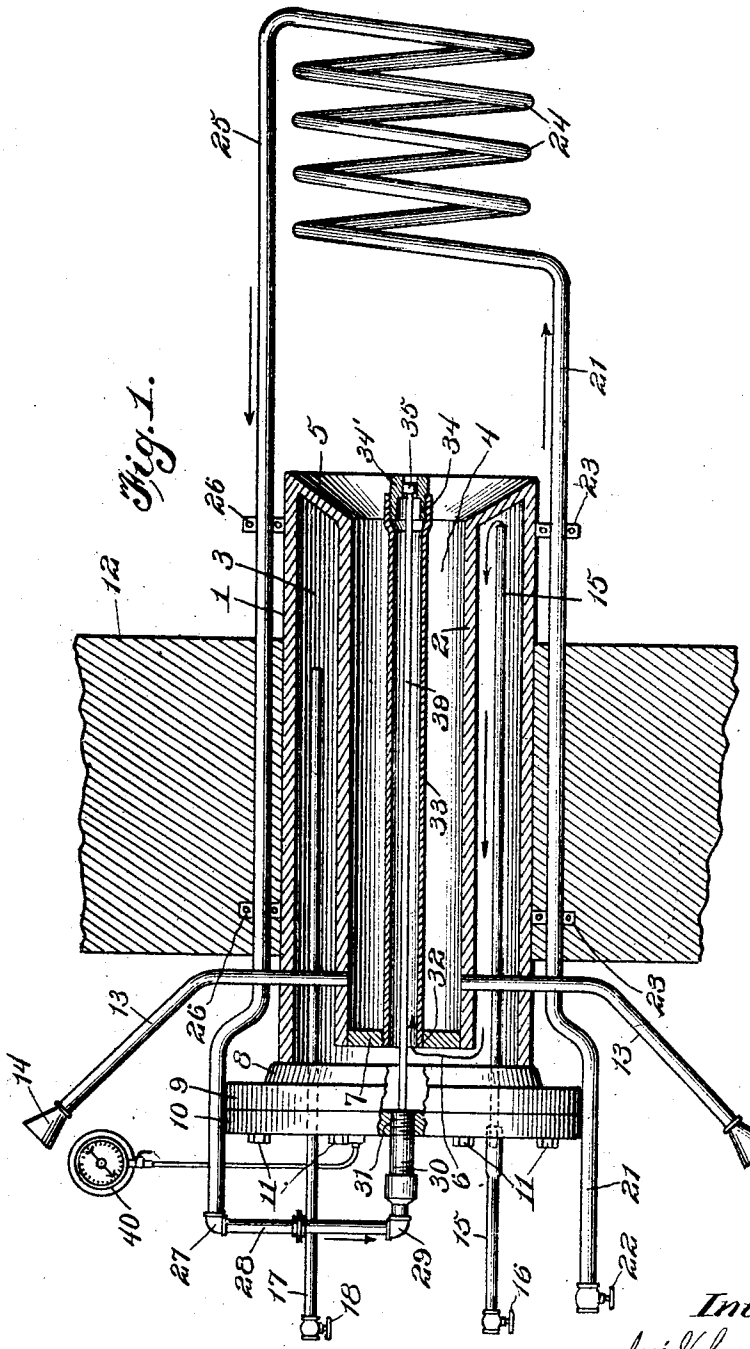
APPLICATION FILED SEPT. 23, 1919.

1,381,370.

Patented June 14, 1921.

2 SHEETS—SHEET 1.

Fig. 1.



Inventor

José Velazquez,

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2 SHEETS—SHEET 2.

Fig. 2.

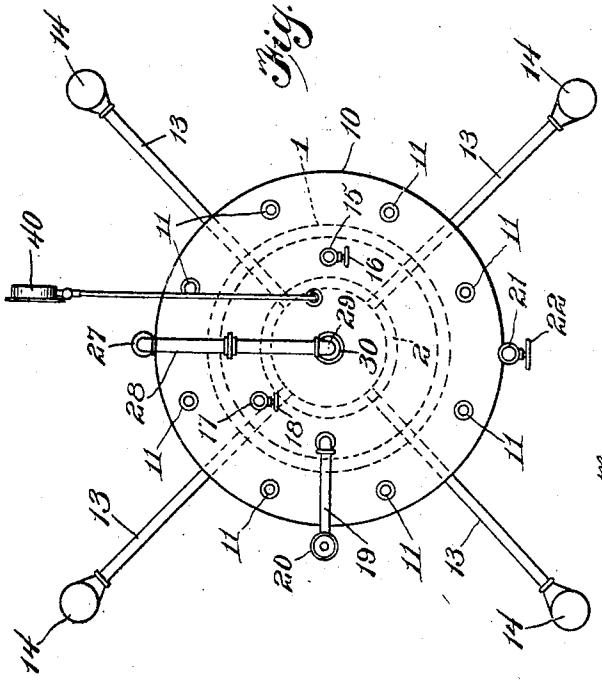


Fig. 4.

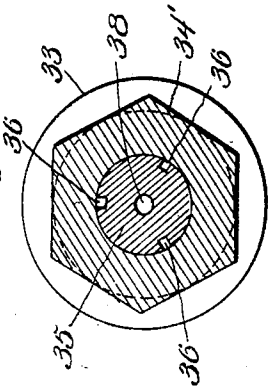
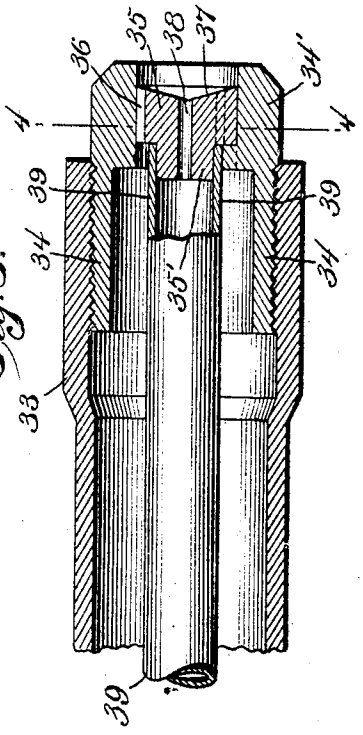


Fig. 3.



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UNITED STATES PATENT OFFICE.

JOSÉ VELAZQUEZ, OF CÁRDENAS, CUBA.

BURNER FOR PETROLEUM OR SIMILAR FUELS.

1,381,370. Specification of Letters Patent. Patented June 14, 1921.

Application filed September 23, 1919. Serial No. 325,621.

To all whom it may concern:

Be it known that I, JOSÉ VELAZQUEZ, a subject of the King of Spain, and a resident of Cárdenas, Province of Matanzas, Cuba, (whose post-office address is Refinería "La Vizcaya," Cárdenas, Province of Matanzas, Cuba,) have invented certain new and useful Improvements in Burners for Petroleum or Similar Fuels, of which the following is a specification.

This invention relates to burners for petroleum or heavy oils from crude petroleum or similar fuels, and one of the objects of this invention is to provide a burner of novel construction in which there is a plurality of inlets for air and which provides a previous heating of the air before reaching the combustion zone. Another object of the invention is to provide for the mixing up of reheated steam with the fuel in the same point where the latter is discharged into the combustion zone. And a further object of the invention is to cause that when such mixture of fuel and reheated steam is effected at the inlet of the combustion zone, such mixture be wholly surrounded by the previously heated air coming in. Thus this burner affords a long white flame of high temperature which is produced in a very short time thereby offering an important economy of fuel for a predetermined heating action.

In the annexed drawing, illustrating an embodiment of the invention,

Figure 1 is a longitudinal diametral section of the burner forming the subject-matter of this invention, mounted through the front wall of a furnace.

Fig. 2 is a front end elevation of said burner.

Fig. 3 is a longitudinal diametral section detail view of the petroleum and steam tubes and discharge nozzle.

And Fig. 4 is a transverse section on line 4—4 of Fig. 3.

This burner comprises an outer cylinder 1 and an inner cylinder 2 arranged concentrically and separated apart, thereby forming an intermediate chamber 3 and an inner chamber 4, both cylinders being connected together at its inner end corresponding to the inside of a furnace by an inclined bottom 5 forming a conical surface, and at its other end corresponding to the outside of the furnace, said cylinders are of different length, the inner cylinder 2 terminating within the outer cylinder 1 so as to constitute between both heads a transverse passage 6, to which effect the inner cylinder 2 is closed at said end by a disk 7 and the outer cylinder 1 terminates in a flared portion 8 and a circular flange 9 on which a plate 10 is secured by a plurality of bolt-screws 11. This double cylinder is set through the wall 12 of furnace in the position illustrated in the drawing so that its ends may project nearly an equal distance from the inner and outer faces of said wall 12.

The air for the combustion is supplied to the inner chamber 4 and near disk 7 by four radial tubes 13 arranged on the same transverse plane, and which pass through the walls of cylinders 1 and 2 and at certain distance from the former they are bent forward terminating in bushings 14.

Petroleum is supplied to the inside of the intermediate chamber 3 at a point near the conical bottom 5 by a horizontal tube 15 passing through the covering plate 10 and is provided at its outer part with a cock 16. Said chamber 3 is also provided with a steam pipe 17 provided outside with a cock 18 and which serves to cleanse off the petroleum residues from said chamber, and which residues are discharged through an outlet pipe 19 through plate 10 and which is provided with a discharge valve 20.

A tube 21 carrying steam of low temperature from any source of supply and which is provided with a cock 22, is connected to the double cylinder at the outside thereof by means of proper clamps 23 and is inserted in the furnace to a certain distance from the conical bottom 5, where it forms a coil 24 whose axial line corresponds with the axial line of the double cylinder 1, 2, and from the inner end of the coil 24 leads another tube 25 parallel and diametrically opposite to the tube 21 passing to the outside through wall 12 and being connected to cylinder 1 by means of proper clamps 26 and terminates near the plate 10 where it is connected by means of an angular union 27 with a radial tube 28 which is in turn connected by an angular union 29 with a tube 30 screwed to a threaded opening 31 formed at the center of plate 10. There is in turn screwed in a threaded opening 32 formed at the center of disk 7 a tube of wide section 33 which is concentric with the inner cylinder 2 and terminates transversally in front

of the conical surface 5, where it has screwed at the inside thereof a threaded nozzle 34 (Fig. 3) provided with a reduced inner longitudinal section, and inside its portion of less inner section 34′ which is of polygonal shape at its outer periphery is tightly lodged a tip 35 provided at its outer periphery with three longitudinal channels equally spaced apart 36 and which terminates in a conical recess 37 formed at the outer face of said tip, and said tip 35 has a central longitudinal narrow hole 38 terminating at the center or vertex of conical recess 37 and said hole 38 terminates inside a tube of small diameter 39 which is mounted concentrically inside tube 33 and which is screwed at its outer end inside the inner end of tube 30 leading from plate 10, and at its other end said tube 39 fits on a portion of reduced diameter 35′ of tip 35 formed farther inside of the channels 36.

The operation of this device is as follows: The petroleum which is supplied through tube 15, by properly opening the cock 16, fills the intermediate chamber 3 where same is discharged and passes through tube 33 to the nozzle 34 where it can not find other way out than by passing through the channels 36 formed at the periphery of the tip 35, thereby forming three jets near the end of the outlet of the nozzle 34, said jets of petroleum being mixed inside the nozzle with the jet of steam highly heated coming out from the central hole 36 of tip 35 and which comes through the small tube 39 from the coil 24 located inside the furnace through the intermediate of pipes 25, 28 and 30 and the mixture of petroleum and heated steam discharged from the nozzle 34 is ignited when coming into contact with the ring of air surrounding the nozzle 34 and which comes from the inside of chamber 4, having been heated while traveling along same. Owing to the conical shape of bottom 5, the discharge of the hot air into the furnace is aided, thus being obtained a complete and immediate combustion of the petroleum after the instantaneous volatilization thereof produced when being mixed up with the highly heated steam which is discharged between the three jets of petroleum formed, there being obtained a white and long flame inside the furnace.

Owing to the high temperature produced inside the furnace the coil 24 is heated to a white red and the inner end of the double cylinder 1, 2 is heated nearly to a red.

Whenever it may be so necessary, the residues of petroleum in the intermediate chamber 3 of the double cylinder are cleansed off by closing the valve 16 and opening the valve 18 of the cleansing steam and the extracting valve 20, whereby the steam expels out all the residues of petroleum, thus cleaning the walls of cylinders 1 and 2.

On the inner face of wall 12 of the furnace is formed a deposit of carbon which comes from the petroleum burnt and which protects the fire proof brick forming said wall against the heating action. Such carbon is easily removed with a proper tool such as a pick or bar, and since such carbon is similar to the coke coal, it can be used as such in any proper furnaces.

It is obvious that the form of the burner and the details of construction thereof can be changed without altering the spirit of the invention which is as pointed out in the appended claim.

What I claim is:—

A burner for petroleum or similar fuels, comprising an outer cylinder for arrangement through the wall of the furnace and closed at the outer end of the furnace, an inner cylinder in said outer cylinder, connected at its inner end to the outer cylinder and having a closed outer end within the outer cylinder, inlet tubes for air at different points of the periphery of the inner cylinder and near its outer closed end, petroleum supplying means arranged at the space between the cylinders, a tube arranged longitudinally in the inner cylinder and opening through the closed outer end thereof, said tube having at its inner end a nozzle and a tip in said nozzle provided with jet openings, and a tube arranged in the first named tube and discharging through the tip, and steam superheating means included in the last named tube.

In witness whereof I affix my signature.

JOSÉ VELAZQUEZ.