G. A. P. BELLON.

LIQUID FUEL BURNER.

APPLICATION FILED DEC. 26, 1913.

1,238,089.

Patented Aug. 28, 1917.

3 SHEETS—SHEET 1.

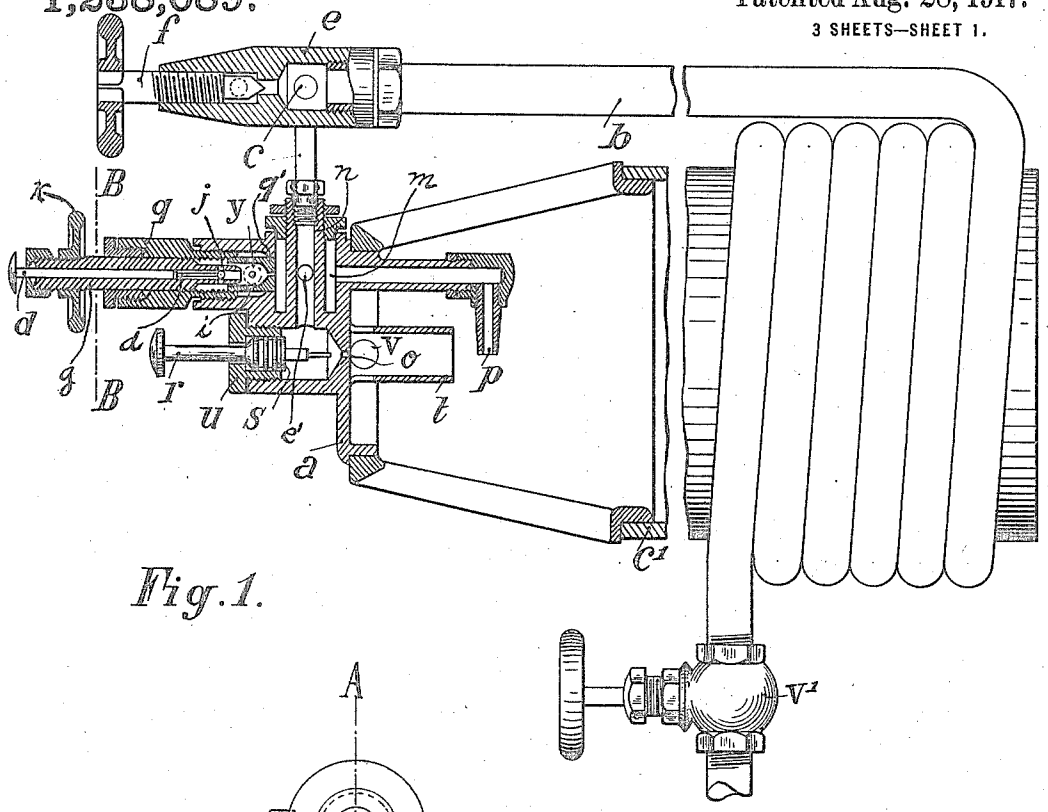


Fig. 1.

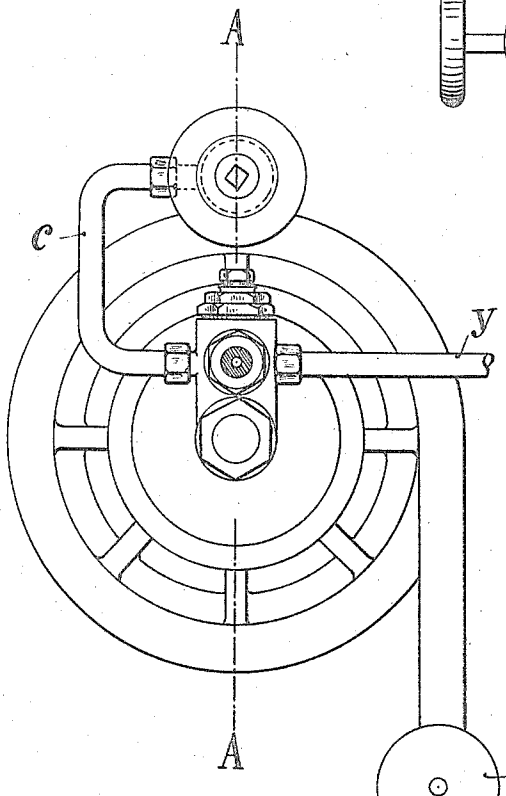


Fig. 2.

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Inventor:
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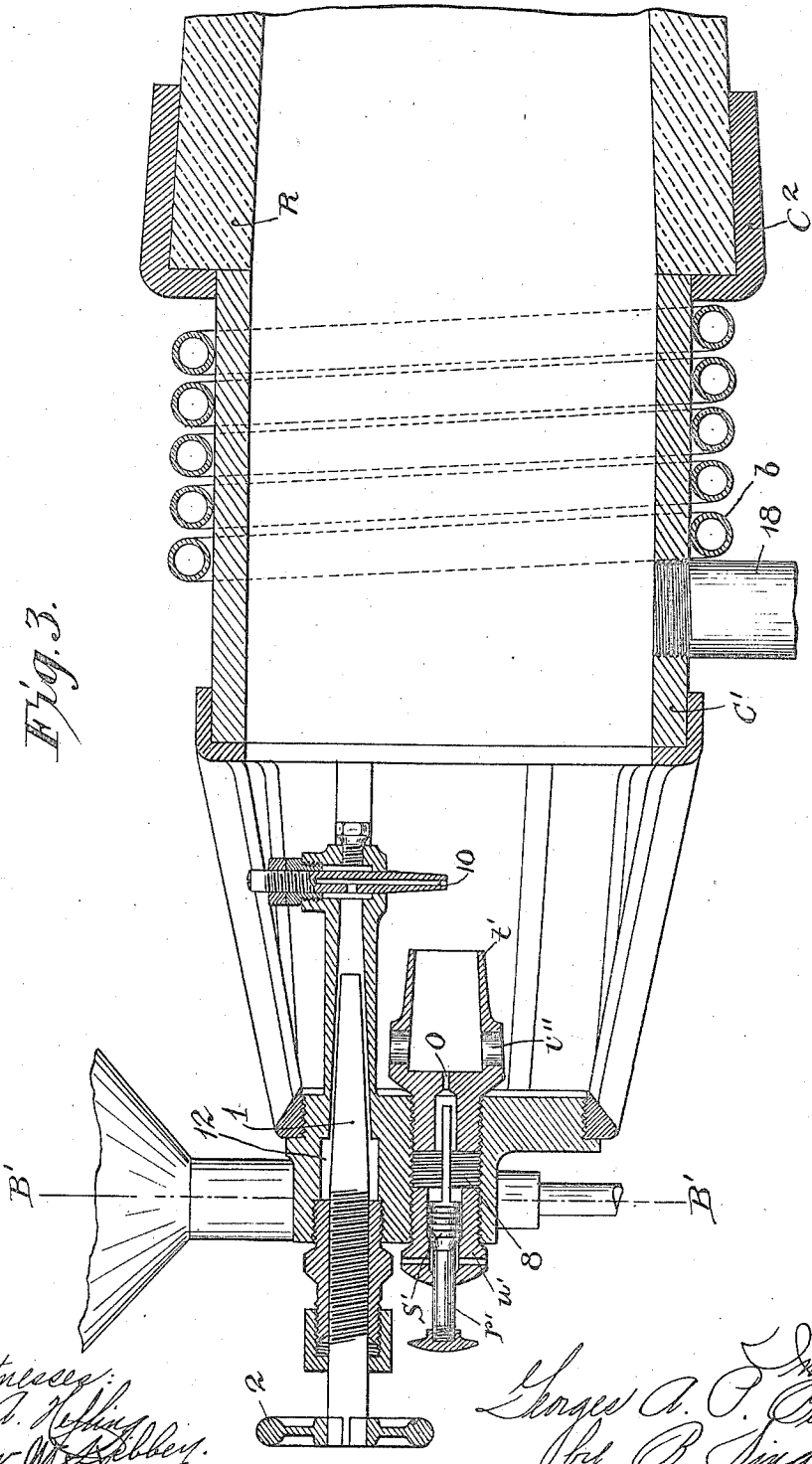


Fig. 3.

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3 SHEETS—SHEET 3.

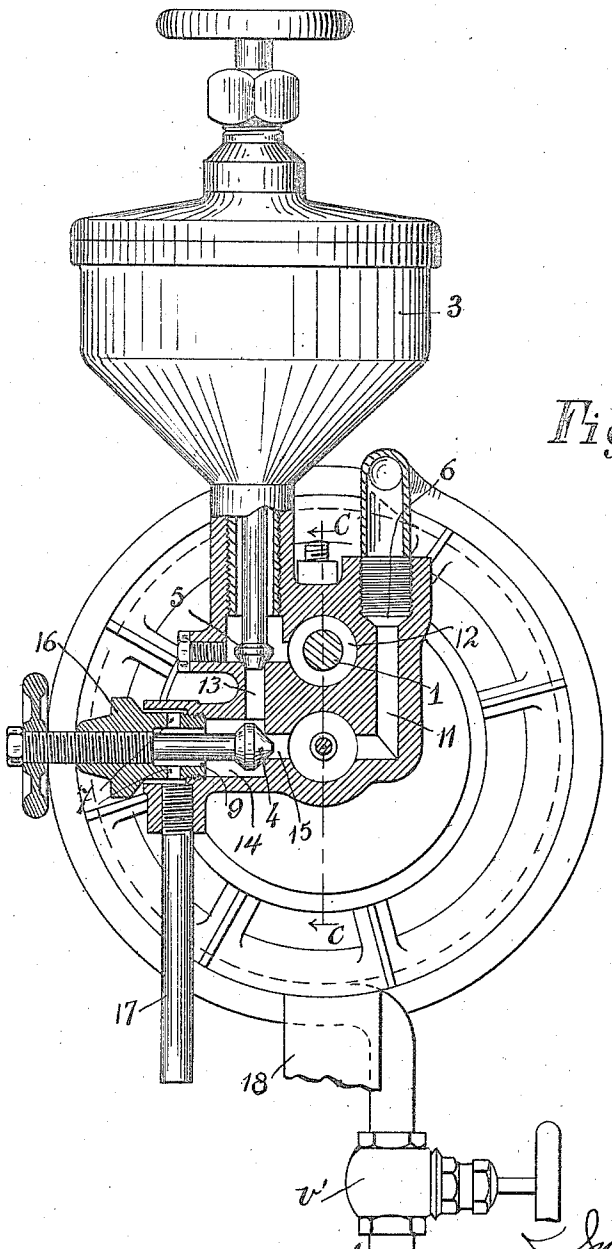


Fig. 4.

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UNITED STATES PATENT OFFICE.

GEORGES ALEXANDRE PHILIPPE BELLON, OF VINCENNES, FRANCE.

LIQUID-FUEL BURNER.

1,238,089. Specification of Letters Patent. Patented Aug. 28, 1917.

Application filed December 26, 1913. Serial No. 808,880.

To all whom it may concern:

Be it known that I, GEORGES ALEXANDRE PHILIPPE BELLON, a citizen of the French Republic, residing in Vincennes, in France, have invented a certain new and useful Improvement in Liquid-Fuel Burners, of which the following is a specification.

The invention relates to liquid fuel burners and its principal object consists in providing means for cleaning the nozzles of the burner.

A further object of the invention consists in providing a fuel burner which is distinguished by its adaptability for industrial purposes.

Other objects will become apparent by reference to the drawings, the specification and the claims forming part thereof.

In the accompanying drawings several embodiments of the invention are illustrated.

Figure 1 is a longitudinal section on line A—A of Fig. 2 of a liquid fuel burner made in accordance with the invention.

Fig. 2 is an end view of the same.

Fig. 3 is a longitudinal section on line C—C of Fig. 4.

Fig. 4 is a section on line B'—B' of Fig. 3.

Referring to the drawings and especially to Figs. 1 and 2, the burner head *a* is illustrated as receiving liquid fuel through a pipe *y* which enters a discharge tip *q'* mounted in a tube *q* which has threaded engagement with the burner head *a*. The tip *q'* is provided with a series of openings *i* in its side walls leading to an annular chamber into which the oil pipe *y* is connected. A hollow spindle *g* is arranged within the tube *q* and has the function of a guide sleeve. It is provided with openings *j* near its inner end. The needle *d* within the spindle *g* serves to clean the discharge opening of the tip *q'*. The hollow spindle carries on its outer end a hand wheel *k* to facilitate manipulation thereof. From the foregoing it is obvious that in order to reduce the volume of liquid fuel conducted into the annular chamber formed by the side walls of the discharge tip *q'* the openings *j* of the spindle *g* are brought into registry with the openings *i* of the discharge tip whereupon the spindle *g* is rotated to restrict the passage formed by openings *i j* or, if desired, the passage may be entirely closed. The liquid fuel escapes through the discharge tip into an annular chamber *m* formed by a central tubular core *n* integral with the head *a*. The liquid fuel flows therefrom into the nozzle *p* where it is discharged in front of a nozzle *t* to be atomized.

Superheated steam conveyed through a pipe coil *b* to a casing *e*, provided with a drain controlled by the valve *f*, escapes through a pipe *c* and enters through an opening *e'* the tubular core *n* where it heats the surrounding liquid fuel to render the same more appropriate for atomizing. The opening *o* in the burner head *a* communicating with a nozzle *t* provides for the passage of the superheated steam, and a series of openings *v* in the nozzle *t* permit the ingress of air to obtain a mixture suitable for perfect combustion.

To provide a cleaning device for the opening *o* a pusher *r* carrying a cleaner needle on its inner end in alinement with said opening *o* is arranged in the head and upon manipulation of said pusher the needle enters said opening *o*.

A packing nut *u* closes the opening provided for the pusher and forms a guideway for a piston *s* formed on the pusher. Thus it is seen that upon actuation of the pusher *r* to clean the opening *o* the oncoming steam acting on the relatively large surface of the piston restores the pusher automatically to normal position when released. The superheated steam used for the induction of air with which the fuel is atomized is taken from any suitable source, such as a boiler, or the like, and is conducted past a regulating valve *v'* through a pipe coil *b* around the part *c'* of the burner head to the casing *e*, where it is conducted to the nozzle *t* in the predescribed manner.

In the modified form of the invention illustrated in Figs. 3 and 4 the valve spindle *q* is replaced by a conical valve 1 having a comparatively large surface and adapted to be operated by a hand wheel 2 so as to allow a proper regulation of the fuel supply. Furthermore the end c^2 of the pipe *c'* carrying the burner head according to said figures is lined with a refractory material R to protect persons against possible injury by accidental contact with the superheated pipe. A drain pipe 18 is provided in the part *c'* of the burner head.

The fuel reservoir 3 is mounted directly on the head of the burner and its discharge is controlled by a valve spindle 5 extending through the reservoir and carrying a hand

wheel on its upper end for purposes of manipulation. Superheated steam is introduced from any source through pipe coil *b* leading to the screw threaded opening 6 of the burner head, whence a duct 11 leads to the passage 8 which communicates through the opening *o* with the nozzle *t*, whose series of openings *v* permit the ingress of air to obtain a suitable mixture for perfect combustion. The cleaning device for the opening *o* is similar to the modification shown in Figs. 1 and 2 and comprises a pusher *r'*, a piston *s'* formed on the pusher, a cleaner needle provided on said piston and a packing nut *u'* closing the opening provided for the pusher and forming a guideway for the piston *s'*.

The fuel flows past the valve 5 into the bore 12 and is offered by the nozzle 10 to the steam and air mixture emanating from the nozzle *t'*, whereby the fuel is atomized.

As is obvious from Fig. 4, the valve 5 also controls a duct 13 leading to a conduit 14 which communicates by a bore 15 with the passage 8. On the opposite side the conduit 14 leads to an annular chamber 9 formed in the packing gland 16 in screw threaded engagement with the burner head, and a plurality of openings 7 in said packing gland communicate with a pipe 17 leading to a steam trap or the like, not shown in the drawings. The packing gland is provided with a valved spindle 4 which may be reciprocated in the conduit 14 and which is adapted to control alternately the bore 15 and the annular chamber 9.

From the foregoing it is obvious that the valve 4 may be employed to drain part of the condensed water collected in the passage 8 and to this effect this valve is slightly opened to permit the oncoming steam to blow the condensed water through the bore 15, conduit 14, annular chamber 9 and opening 7 into the pipe 17, whence it is conducted to a steam trap, or the like, not indicated.

Provision is also made to prevent clogging of the fuel reservoir outlet by blowing steam therethrough. If in the course of normal operation the reservoir outlet becomes clogged the conical valve 1 and the pusher *r'* are closed, valve 4 is adjusted until it closes the annular chamber 9, whereupon the valve 5 is slightly raised. The steam entering at the opening 6 passes then through the duct 11, through the passage 8, thence through the bore 15 to duct 13 and into the reservoir, from where it may be discharged in any convenient or suitable manner. Thus it is seen that the high pressure steam effectively drives impurities back into the reservoir and out through a discharge provided for the steam.

When heavy oils are used which contain a considerable amount of naphthalene it is necessary to preheat the fuel in order to obtain ready gasification thereof. To accomplish this purpose the parts are adjusted in the manner described for preventing clogging of the reservoir, care being taken however that the steam entering the reservoir is not discharged, but instead remains in the reservoir so that the fuel contained therein is heated. Subsequently the valve 5 is adjusted to close the duct 13, and the valve 4 is brought in position to close the bore 15 while valve 1 is opened and pusher *r'* is released, so that the operation of the device is started in the normal manner.

Finally steam may be blown through the nozzle 10 when the same becomes clogged. In this case the valve 5 is raised sufficiently to prevent the fuel to be discharged from the reservoir 3, valve 4 is adjusted to close the annular chamber 9, pusher *r'* is closed and valve 1 is opened, whereupon the steam passes through the duct 11, passage 8, bore 15, duct 13, and into the bore 12 and finally enters the nozzle 10, whereby impurities collected therein are efficiently removed.

I claim:—

1. A liquid fuel burner of the character described, comprising in combination with the burner head thereof means for feeding the liquid fuel to said burner, a nozzle communicating with said fuel feeding means for discharging the fuel, a mixture nozzle in proper position relative to said first named nozzle adapted to atomize the fuel discharged from said first named nozzle and having a series of openings for the ingress of air, means for conducting steam to said mixture nozzle, said mixture nozzle communicating with said steam conducting means by a restricted opening in said burner head, a cleaner needle adapted to enter said restricted opening upon manipulation, and means for automatically restoring said cleaner needle to normal position upon release.

2. A liquid fuel burner of the character described, comprising in combination with the burner head thereof means for feeding the liquid fuel to said burner, a nozzle communicating with said fuel feeding means for discharging the fuel, a mixture nozzle in proper position relative to said first named nozzle adapted to atomize the fuel discharged from said first named nozzle and having a series of openings for the ingress of air, means for conducting steam to said mixture nozzle, said mixture nozzle communicating with said steam conducting means by a restricted opening in said burner head, a cleaner needle adapted to enter said restricted opening upon manipulation, a piston formed on said needle and adapted to reciprocate in a guide-way provided in said burner head, said piston being driven back to normal position by the steam when said cleaner needle is released.

3. A liquid fuel burner of the character described, comprising in combination with the burner head thereof a fuel reservoir mounted on said burner head, a nozzle carried by said burner head to discharge the fuel, means for conducting the fuel from said fuel reservoir to said nozzle, a mixture nozzle in proper position relative to said first named nozzle adapted to atomize the fuel discharged from said first named nozzle and having a series of openings for the ingress of air, means for conducting superheated steam to said mixture nozzle, said mixture nozzle communicating with said steam conducting means by a restricted opening in said burner head, a cleaner needle adapted to enter said restricted opening upon manipulation, means for automatically restoring the cleaner needle to normal position upon release, and means for enabling steam to be blown alternately through the fuel reservoir and the fuel discharge nozzle to remove impurities collected therein.

4. A liquid fuel burner comprising in combination with a burner head a fuel reservoir mounted on said burner head, a fuel discharge nozzle carried by said burner head and communicating with said fuel reservoir, a mixture nozzle in proper position relative to said first named nozzle adapted to atomize the fuel discharged from said first named nozzle and having a series of openings for the ingress of air, means for conducting steam to said mixture nozzle, a drain pipe in communication with said steam conducting means, said fuel reservoir being in communication with said drain pipe and said steam conducting means, means for controlling the connection between said fuel reservoir and the steam conducting means and the drain pipe, and means for controlling the connection between said steam conducting means and said drain pipe.

5. A liquid fuel burner comprising in combination with a burner head a fuel reservoir mounted on said burner head, a fuel discharge nozzle carried by said burner head and communicating with said fuel reservoir, a mixture nozzle in proper position relative to said first named nozzle adapted to atomize the fuel discharged from said first named nozzle and having a series of openings for the ingress of air, means for conducting steam to said mixture nozzle, a drain pipe in communication with said steam conducting means, said fuel reservoir being in communication with said drain pipe and said steam conducting means, manually operated means for controlling the connection between said fuel reservoir and the steam conducting means and the drain pipe, and manually operated means for controlling the connection between said steam conducting means and said drain pipe.

In testimony whereof I affix my signature in presence of two witnesses.

GEORGES ALEXANDRE PHILIPPE BELLON

Witnesses:

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