July 20, 1926. 1,593,186

J. G. McKEAN ET AL

ATOMIZER FOR LIQUID FUEL AND THE LIKE

Filed June 6, 1923

FIG. 1.

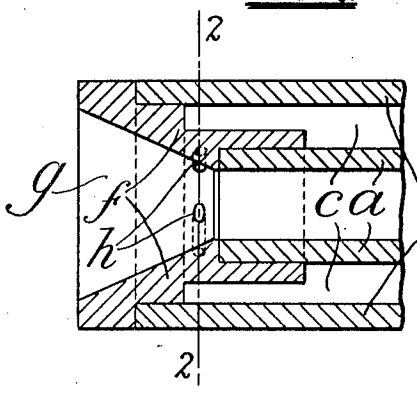


FIG. 2.

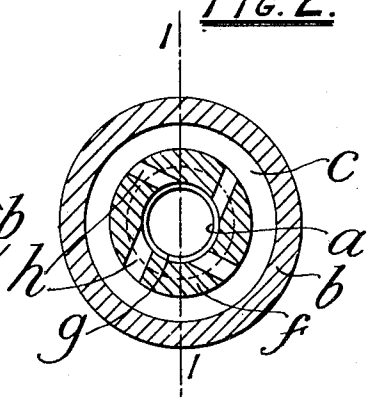


FIG. 3.

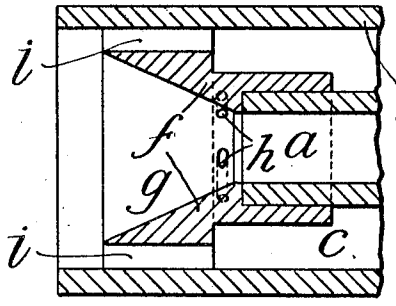


FIG. 4.

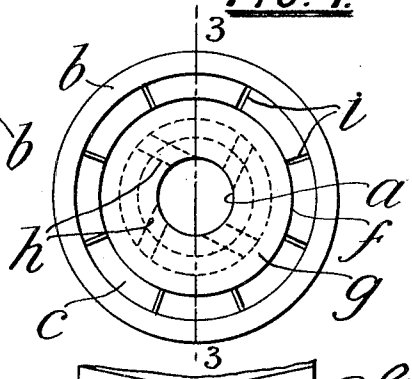
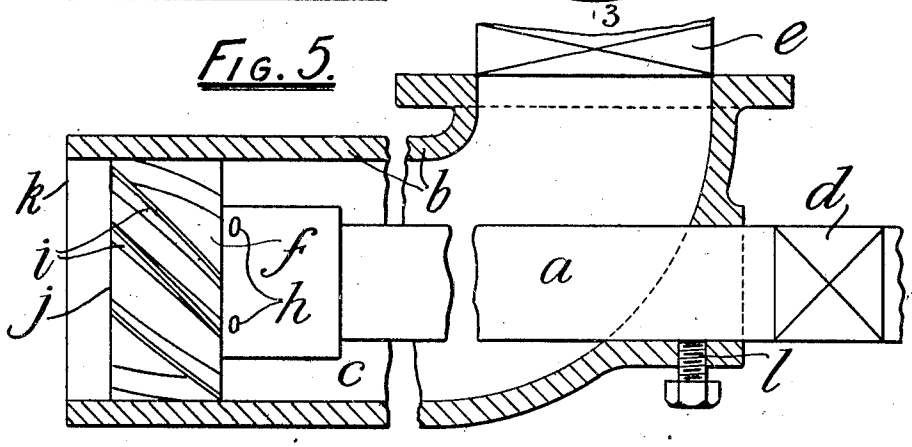


FIG. 5.



Inventors.—
John Graves McKean,
Robert Frederick Jones.
by their Attorneys.—
Howson & Howson.

Patented July 20, 1926. 1,593,186

UNITED STATES PATENT OFFICE.

JOHN GRAVES McKEAN, OF MOUNT VERNON, AND ROBERT FREDERICK JONES, OF GLASGOW, SCOTLAND.

ATOMIZER FOR LIQUID FUEL AND THE LIKE.

Application filed June 6, 1923, Serial No. 643,674, and in Great Britain June 22, 1922.

This invention has reference to improvements in and relating to atomizers for liquid fuel and the like and particularly relates to that type of device in which the liquid fuel is ejected in the form of a spray by means of pressure fluid such as steam or compressed air.

According to this invention the atomizer consists of two tubes arranged concentrically with a space between same. A nozzle or cap having a frusto-conical shaped passage is fitted to the ends of these tubes. The diameter of the smaller end of said frusto-conical passage is equal to the diameter of the internal bore of the inner tube and registers therewith. Tangential passages formed through the wall of the said nozzle open into the said frusto-conical passage and lie wholly on planes which are radial to the longitudinal center line of said frusto-conical passage. Vanes located between the outer surface of the said nozzle and the inner surface of the outer tube are secured to said nozzle so that the said vanes and inner tube are capable of adjustment longitudinally within the said outer tube.

In order that our said invention and the manner of carrying the same into effect or practice may be properly understood we have hereunto appended one sheet of explanatory drawings in which Figure 1 is a sectional elevation taken on the line 1—1 of Figure 2 and Figure 2 is a sectional elevation taken on the line 2—2 of Figure 1 of an atomizer for liquid fuel and the like as constructed according to this invention.

Figure 3 is a sectional elevation, taken on the line 3—3 of Figure 4 of a slightly modified construction of atomizer. Figure 4 is an end view of the atomizer illustrated by Figure 3.

Figure 5 is an elevation of the atomizer illustrated by Figures 3 and 4 but showing the outer tube in section and illustrating the arrangement whereby the position of the nozzle and inner tube may be varied in relation to the outlet from the outer tube.

Referring to these drawings:—

In carrying the improvements of this invention into effect or practice the atomizer consists of two tubes *a* and *b* arranged concentrically one *a* inside the other *b* with a space *c* between same. The one end of the tube *a* is connected to an oil supply pipe in any suitable manner and is provided with a suitable valve or the like (indicated at *d* Figure 5) in order that the flow of the liquid fuel through said tube may be controlled. At the same end the tube *b* is connected to a steam or compressed air supply pipe in any suitable manner and is provided with a suitable valve or the like (indicated at *e* Figure 5) in order that the steam or compressed air supply to the space *c* may be controlled. At the other end the two concentric tubes *a* and *b* are provided with a nozzle or cap *f* which is fitted to both tubes and closes the end of the space *c* between same. This nozzle or cap *f* is formed with a frusto-conical shaped passage *g* which at the smaller end is in alignment with the internal bore of the tube *a* and which flares outwards. Passing through the wall of the nozzle or cap *f* one or more holes or passages *h* are formed which are adapted to conduct the steam or compressed air from the space *c* tangentially into the frusto-conical passage *g* of the nozzle *f*. The hole or holes *h* may lie wholly on a plane radial to the tubes *a* and *b*.

In operation the liquid fuel flows in a stream through the tube *a* and enters the frusto-conical passage *g* at the smaller end of same where it is met by the jet or jets of steam or compressed air issuing from the tangential holes *h* and swirled or rotated round the conical passage *g* and thrown outwards in the form of a whirling spray from the larger end of said passage *g*.

If desired and according to a slightly modified arrangement illustrated by Figures 3 and 4 the nozzle or cap *f* with the frusto-conical passage *g* and tangential holes *h* may be so constructed and fitted to the tube *a* that the space *c* between the tubes *a* and *b* is not closed by same but in the space between the nozzle *f* and the inner wall of the tube *b* a plurality of vanes *i* may be arranged in an angled or spiral manner so that some of the steam or compressed air in the space *c* passes outwards from the end of the tube *b* in a whirling stream which surrounds the whirling spray from the frusto-conical passage *g* of the nozzle or cap *f*.

These vanes *i* may be so arranged that the direction of rotation of the whirling stream of steam or compressed air may be in the same direction as the direction of rotation of the whirling spray of fuel within same.

If desired the position of the nozzle *f* with

the vanes *i* within the tube *b* may be adjusted as indicated by Figure 5 in order that the diameter or spread of the flame issuing from the end of the tube *b* may be varied. When the end face *j* of the nozzle *f* is in alignment with the end *k* of the tube *b* the flame is well spread out and when the tube *a* is drawn back so that the end face *j* is within the end *k* of the tube *b* as illustrated by Figure 5 the wall of the tube *b* acts to restrict the spreading tendency of the flame so that same is longer and narrower that is, it is not so well spread out but is projected further into the furnace. When the position of the tube *a* and nozzle *f* is adjusted in relation to the end of the tube *b* the tube *a* is secured by means of the pinching screw *l*.

We claim:—

1. An atomizer comprising two tubes concentrically disposed with a space therebetween; a nozzle having a frusto-conical passage communicating with the inner of said tubes; and tangential passages formed in the wall of said nozzle and opening into said frusto-conical passage, said tangential passages being disposed in a plane transverse to the longitudinal axis of said frusto-conical passage.

2. An atomizer comprising two concentrically disposed tubes forming a space therebetween; a nozzle fitted to the end of the inner of said tubes and formed with a frusto-conical passage, the walls of said nozzle having tangential passages opening into said frusto-conical passage and disposed in a plane transverse to the axis of said frusto-conical passage; and vanes disposed between said tubes; said vanes, said nozzle and said inner tube being adjustable longitudinally of said outer tube.

3. An atomizer of liquid fuel comprising two tubes concentrically disposed with a space therebetween; a nozzle fitted to the end of the inner of said tubes and provided with a frusto-conical passage, the smaller end of which is contiguous with the bore of the inner of said tubes, the walls of said nozzle having tangential passages opening into said frusto-conical passage and disposed in a plane transverse to the longitudinal center line of said frusto-conical passage; and vanes disposed between the outer surface of said nozzle and the inner surface of said outer tube but secured to said nozzle, said vanes, said nozzle and said inner tube being adjustable longitudinally of said outer tube.

JOHN GRAVES McKEAN.
ROBERT FREDERICK JONES.