W. A. BENNETT & J. L. ARDERN.

SPRAY BURNER.

APPLICATION FILED FEB. 24, 1911.

1,000,227.

Patented Aug. 8, 1911.

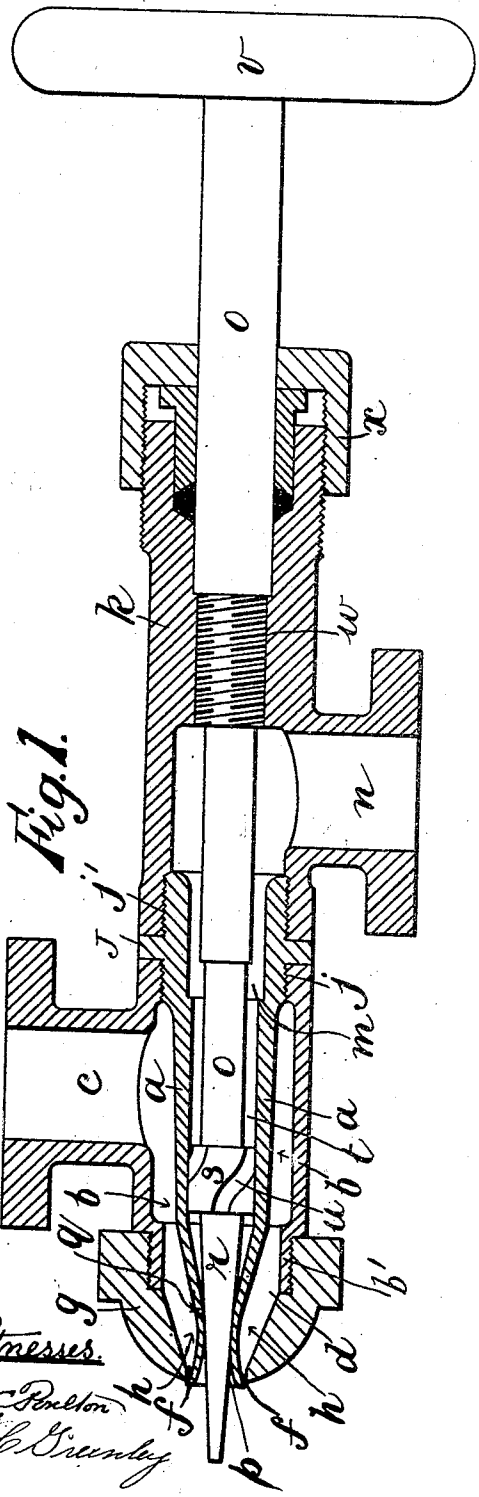

Fig. 1.

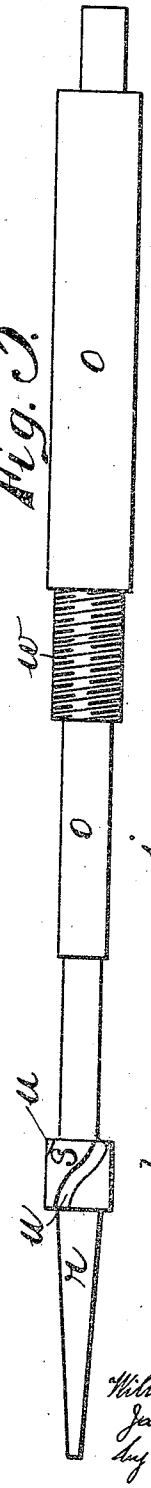

Fig. 3.

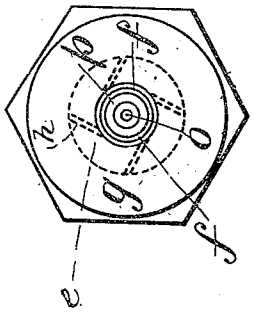

Fig. 2.

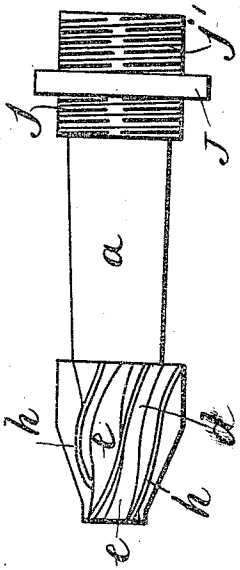

Fig. 4.

Witnesses.

Geo. C. Benston

W. C. Greenley

Inventors.

William A. Bennett, &

James L. Ardern.

by Herbert W. Jenner.

Attorney.

UNITED STATES PATENT OFFICE.

WILLIAM ALBERT BENNETT, OF BOLTON, AND JAMES LIPTROT ARDERN, OF NEWTON-LE-WILLOWS, ENGLAND.

SPRAY-BURNER.

1,000,227. Specification of Letters Patent. Patented Aug. 8, 1911.

Application filed February 24, 1911. Serial No. 610,535.

To all whom it may concern:

Be it known that we, WILLIAM ALBERT BENNETT and JAMES LIPTROT ARDERN, subjects of the King of Great Britain and Ireland, the former a resident of Bolton, in the county of Lancaster, England, and the latter a resident of Newton-le-Willows, in the aforesaid county, England, have invented certain new and useful Improvements in Spray-Burners, of which the following is a specification.

Our invention relates to improvements in oil burners for furnaces and other purposes and particularly to such as are used for burning crude oils, creosote and the like, the object being to provide a burner whereby the oil is more efficiently consumed than is the case with those at present in use.

Our invention relates to that type of burner in which the oil is mixed with air of steam and delivered in the form of a jet, helical screw devices being used for giving a rotary or screw-like motion to the air or steam and oil and a central spindle for regulating the quantity of oil drawn through by the vacuum caused by the flow of air or steam or for entirely shutting off the supply.

Our invention will be fully described with reference to the accompanying drawings in which,

Figure 1 is a longitudinal section of a burner constructed in accordance with our invention, Fig. 2 elevation of the nozzle end, Fig. 3 elevation of the central regulating spindle and Fig. 4 elevation of an improved form of nozzle forming one of the main features of our invention.

The shell of the burner is made in two parts *k* and *b*. The part *k* carries the valve spindle *o* having a screw threaded portion *w* which engages with a screw threaded portion on the part *k*. The valve spindle *o* has an operating handle *v* at one end and a conical valve *r* at the other end. A short collar *s* is provided at the larger end of the valve *r*, and this collar has helical grooves *u* in its periphery through which the oil issues. The part *k* of the shell is provided with an oil inlet branch *n* on one side. A nozzle *a* is secured inside the part *b* of the shell, and forms therewith an air or steam chamber, and this nozzle is provided at one end portion with two screw threaded portions *j* and *j'* having a flange J between them. The part *j* is screwed into the steam chamber *b*, and the part *j'* is screwed into the part *k* of the shell, so that the two parts of the shell are coupled together and either part may be removed at will for repair.

The steam or air chamber *b* is provided on one side with an inlet branch *c* for steam or air, and it has a screw threaded projection *b'* at its free end. The free end portion of the nozzle *a* is arranged to project from the part *b'*, and it is provided with a valve seat *q* at a little distance from its extreme end, for the valve *r* to engage with. The free end portion of the nozzle is formed of two cones, and the exterior cone has an annular bell-mouthed outlet *p* around the valve *r*. The free end portion of the nozzle is provided with a guide *d* which is formed of helical ribs *h* having helical grooves *e* between them. A cap *g* is screwed upon the screw threaded projection *b'* and bears against the outer end portion of the guide *d*, which is conical in form, and thereby forms narrow outlets *f* for steam or air around the extreme end portion of the nozzle.

The nozzle *a* is provided with a cylinder *t* in which the collar *s* is slidable, and the cylindrical bore *t* is connected with the oil space of the part *k* by an annular passage *m* around the valve spindle.

The steam or air which enters through the branch *c* has a whirling motion imparted to it as it passes through the grooves *e*, and the oil has a whirling motion imparted to it as it passes through the grooves *u*. These whirling streams mingle and burn outside the cap *g*, and as the valve seat *q* is arranged at a distance from the point where combustion takes place it does not become obstructed with burned oil or otherwise injured by the heat.

What we claim is:

In a burner, the combination, with an outer shell provided with inlets for oil and for pressure fluid, of a nozzle having one end portion secured in the shell between the said inlets and having a cylindrical bore which communicates with the oil inlet, said nozzle having at its free end a converging portion forming a valve seat, and a flaring portion extending beyond the valve seat, said free end portion having also external helical grooves which communicate with the pressure fluid inlet, and being arranged to project from the said shell, a cap secured to

the shell over the projecting end portion of the nozzle and forming outlets therewith, and a valve spindle operatively connected with the said shell and having a conical valve for engaging with the valve seat and having also a collar provided with helical grooves for the oil and arranged to slide in the said cylindrical bore.

In testimony whereof we have hereunto set our hands in the presence of two witnesses.

WILLIAM ALBERT BENNETT.
JAMES LIPTROT ARDERN.

Witnesses:
WILLIAM W. TAYLOR,
AMY E. EVINS.