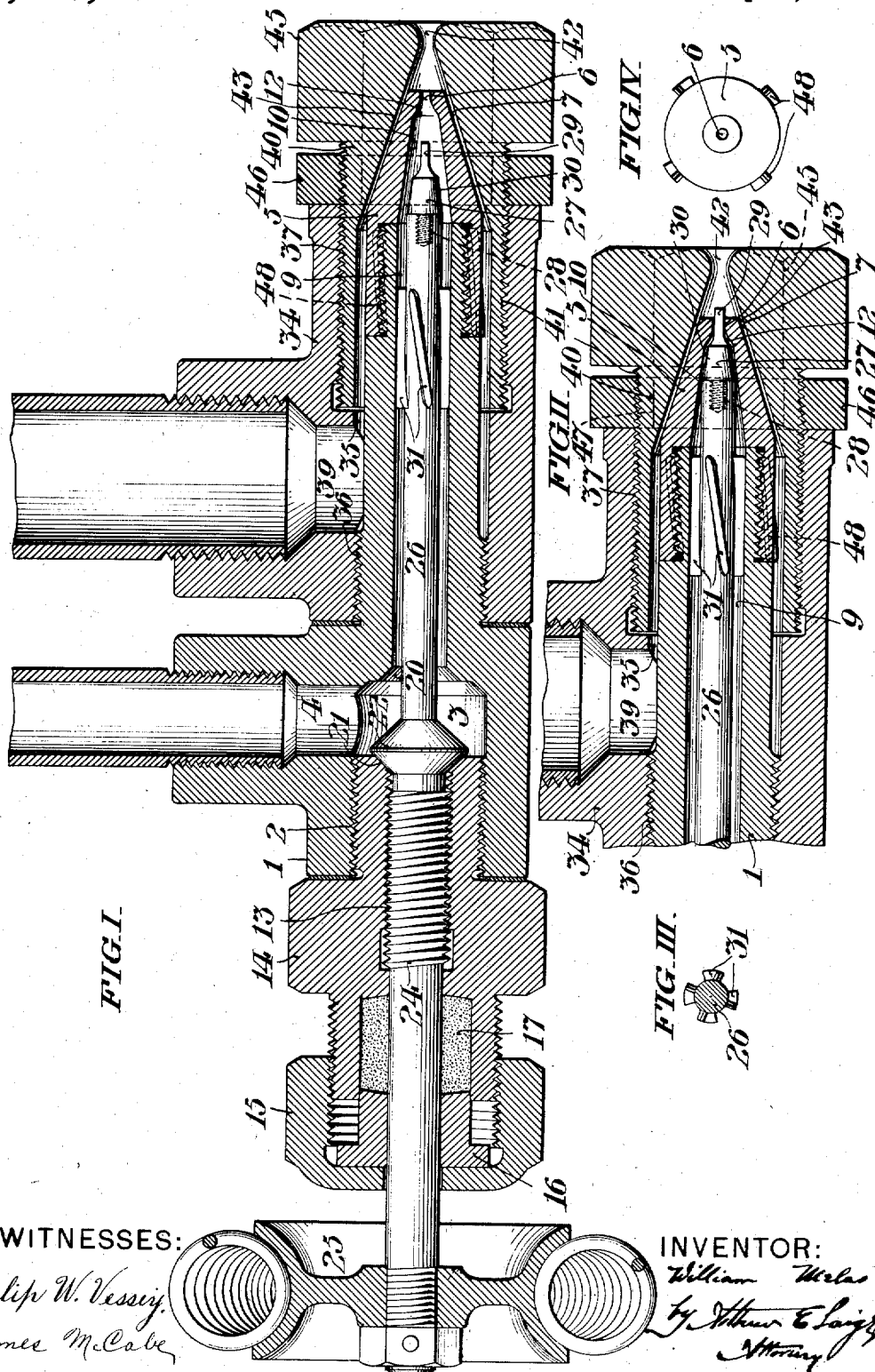


W. MELAS.
OIL BURNER.

APPLICATION FILED MAY 3, 1911.

1,057,868.

Patented Apr. 1, 1913.



WITNESSES:

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UNITED STATES PATENT OFFICE.

WILLIAM MELAS, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR OF ONE-HALF TO
DAVID TOWNSEND, OF PHILADELPHIA, PENNSYLVANIA.

OIL-BURNER.

1,057,868.

Specification of Letters Patent.

Patented Apr. 1, 1913.

Application filed May 3, 1911. Serial No. 624,834.

To all whom it may concern:

Be it known that I, WILLIAM MELAS, of Philadelphia, in the State of Pennsylvania, have invented a certain new and useful Improvement in Oil-Burners, whereof the following is a specification; reference being had to the accompanying drawing.

My invention relates to burners of the class wherein liquid hydrocarbon may be mixed with a blast of another fluid serving as a diluent, for instance air, steam, oxygen or other gas, so as to be discharged, atomized and burned in combustible mixture therewith, and, my invention provides such a burner wherein the diluent fluid blast is so directed and controlled as to educe the oil in proper proportions in accordance with the pressure of the blast without providing other means to discharge the oil.

As hereinafter described, my invention includes the combination with an exterior air blast nozzle, of an oil nozzle within said blast nozzle and a valve head within said oil nozzle; the interior of said air blast nozzle and the exterior of said oil nozzle forming between them a conical passageway for the air blast at a particular angle, to wit, thirty-five degrees, and, said oil nozzle and valve head forming between them a conical passageway for the oil at a particular angle, to wit, fourteen degrees; said oil nozzle terminating in a cylindrical orifice within said air blast nozzle and said valve head being carried by a reciprocatory plunger and having a cylindrical tip which when the valve is closed, is thrust through said orifice so as to keep the latter free from obstructions which otherwise might interfere with the operation of the burner. Said plunger is carried in axial alinement by a valve stem having a valve with opposite faces fitted to opposed seats in a valve chamber through which the oil flows; said seats being respectively in the valve casing to control the passage of oil through said discharge orifice, and, in a stuffing box to limit the outward movement of the valve and enable the valve to seal the valve stem passage through the stuffing box so as to permit the latter to be

repacked without removing the valve or permitting the escape of oil through said stuffing box.

My invention includes the various novel features of construction and arrangement hereinafter more definitely specified.

In the drawing:—Figure I is a longitudinal sectional view of a burner conveniently embodying my improvement, the burner being shown in open operative position. Fig. II is a fragmentary sectional view of the right hand end of the burner shown in Fig. I but showing the burner closed in inoperative position. Fig. III is an end sectional view of the valve plunger showing the arrangement of the spiral ribs thereon. Fig. IV is an end view of the oil nozzle showing the arrangement of the spiral ribs thereon.

In said figures; the cylindrical valve casing 1 has the screw threaded axial socket 2, valve chamber 3 and radial oil inlet 4. The oil discharge nozzle 5 which is conveniently connected in removable screw threaded engagement with said casing 1, has cylindrical axial discharge orifice 6 and a thirty-five degree exterior conical end surface 7 concentric with said orifice. The oil discharge passage 9 which extends from the inner end of said chamber 3 through said valve casing 1, has a fourteen degree interior conical end surface 10 in said nozzle 5 merging into said discharge orifice 6 in curves 12. The valve stem passage 13 which extends from the opposite end of said chamber 3 in axial alinement with said discharge passage 9 is conveniently formed in the screw threaded stuffing box 14 which is separable from said valve casing 1 but normally fitted in stationary relation therewith in said socket 2 as shown, and is conveniently provided with the exterior removable screw cap 15 and gland 16 for adjusting the packing 17. The inner ends of said passages 9 and 13 are respectively provided with opposed conical valve seats 20 and 21, and, the double valve 22 in said chamber 3 has its axially opposite conical faces respectively fitted to said seats. The screw threaded stem 24 on said valve 22 which extends

through said valve passage 13 in engagement therewith has the operating handle 25 exterior to said valve casing 1. The valve plunger 26 on said valve 22 extends in said oil discharge passage 9 in axial alinement with said valve stem 24, being conveniently formed in unitary relation therewith. The head 27 on said plunger 26, which is conveniently separable but rigidly connected therewith by the screw thread 28 includes the cylindrical tip 29 fitted to reciprocate in said orifice 6 in said nozzle 5 without contact with the latter, and has the fourteen degree conical exterior surface 30 between said tip and said valve. It may be observed that the conical interior surface 10 of said nozzle 5 and the conical exterior surface 30 of said valve plunger head 27 form between them a conical passageway for the oil at a particular angle, to wit, fourteen degrees, which I have found to facilitate the eduction of the oil through said orifice 6. Said plunger 26 is provided with the spiral ribs 31 fitting said oil discharge passage 9 between said plunger head 27 and valve 22 and insuring that said head 27 shall be maintained in concentric relation with said orifice 6. Said ribs are pointed at both ends to facilitate the passage of the oil and give the latter a slight rotary motion which prevents clogging of the nozzle 5, the adhering particles being constantly washed away by the rotating oil stream. The cylindrical air blast casing 34 concentrically surrounding said valve casing 1 is conveniently detachably connected therewith, having an axial blast chamber 35 with screw threaded sockets 36 and 37 respectively at the opposite ends thereof, surrounding the oil discharge nozzle 5, and having the radial air inlet 39 to said blast chamber 35. The adjustable blast nozzle 40 which has the exterior screw thread 41 fitted in said socket 37 in the casing 34 is provided with the axial orifice having the flaring curved outer end 42 and the thirty-five degree interior conical surface 43 and may be axially adjusted in said casing 34, being provided with the wrench hold 45 by which it may be rotated, and, the lock nut 46 provided with the wrench hold 47 being arranged to bear against the end of said blast casing 34. It may be observed that the conical interior surface 43 of said nozzle 40 and the conical exterior surface 7 of the oil nozzle 5 form between them a conical passageway for the air at a particular angle, to wit, thirty-five degrees, which I have found to facilitate the eduction of the oil through said orifice 6. I provide said nozzle 5 with the spiral exterior ribs 48 which fit said blast chamber 35 between said conical surface 43 and the air inlet 39 and insure that the opposed conical surfaces be-

tween which the air passes shall be maintained in concentric relation. Said ribs being pointed at each end to facilitate the passage of the air, extend at an angle opposite to the angle of said ribs 31 and give the air a rotary motion opposite to that of the oil stream, thus bringing a greater number of particles of oil into contact with the air and correspondingly facilitating the atomization of the oil.

The oil may gravitate through the oil inlet 4 at atmospheric pressure, but I prefer to maintain the oil supply below the level of the burner and raise the oil to the latter at less than atmospheric pressure, by the eductive effect of the air blast, so that when the operation of the burner ceases the oil gravitates backwardly and empties the pipes immediately adjacent thereto, such arrangement being particularly advantageous where the burner is exposed to such low temperature that the oil might be thereby rendered abnormally viscid if retained in the pipes thus exposed while the burner is inoperative. I prefer to supply compressed air through said inlet 39 at a pressure of from forty to sixty pounds per square inch, and said nozzle 40 may be axially adjusted to afford the maximum efficiency of the blast in accordance with the pressure of the latter; said nozzle being retained in adjusted position by the lock nut 46. As the opposed surfaces which are relatively adjustable to vary the volume of oil and air emitted should be maintained in a polished state to insure the maximum efficiency of operation of the burner, it is to be particularly noted that the construction described is such that such surfaces cannot be brought into contact by any manipulation of the burner. The volume of oil educed is varied in accordance with the position of said tip 29 with relation to the orifice 6 and the conical and curved surfaces 10 and 12 leading thereto, but the supply of oil may be entirely shut off by the valve 22 only. Any accidental obstruction of the orifice 6 may be dislodged by merely closing the valve 22 and thus thrusting through said orifice the cylindrical tip 29 on the plunger head 27 as shown in Fig. II.

It may be observed that when the valve 22 is opened to the fullest extent as shown in Fig. I, it bears upon the seat 21 in the stuffing box 14 and thus prevents the escape of oil through the valve stem passage 13 therein, so that the packing 17 may be removed and renewed without interrupting the operation of the burner and without leakage of oil.

It may be noted that the drawings represent a burner wherein said cylindrical tip is three sixty-fourths of an inch in diam-

eter, and, that the capacity of the burner may be varied by merely changing the size of the orifice 6 and said tip 29 which cooperates therewith, without otherwise changing the burner.

The particular conical angles described, have been determined by an extended series of experiments to afford the maximum eductive effect. However, the other features of my invention may be advantageously employed without limitation to those particular angles. Therefore, I do not desire to limit myself to the precise details of construction and arrangement herein set forth, as it is obvious that various modifications may be made therein without departing from the essential features of my invention as defined in the appended claims.

I claim:—

1. In an oil burner, a valve casing having a valve chamber and an oil inlet to said chamber; a nozzle on said valve casing having an axial discharge orifice of circular cross section, the smallest area of which is at the extreme outer end of said nozzle, said end being internally cylindrical and externally conical and outwardly converging concentric with said orifice, said outer surface of said nozzle having its opposite sides at an angle of 35 degrees to each other; an oil discharge passage extending from one end of said chamber through said valve casing and having an outwardly converging interior conical end in said nozzle, concentric with and merging into said discharge orifice, said conical end having its opposite sides at an angle of 14 degrees with each other; a valve seat in said chamber at the inner end of said passage; a valve in said chamber fitted to said seat; a screw threaded stem on said valve having an operating handle exterior to said valve casing; a screw thread surrounding and engaging said stem; a plunger on said valve extending in said discharge passage, having a cylindrical tip fitted to reciprocate in the orifice of said nozzle and an outwardly converging conical exterior portion between said tip and said valve, concentric with said discharge orifice and having its opposite sides at an angle of 14 degrees with each other; a blast casing concentrically surrounding said valve casing, inclosing an outwardly converging axial blast chamber surrounding said oil nozzle, and having an air inlet to said blast chamber; and an axially adjustable blast nozzle fitted in said blast casing, having an outwardly flaring orifice with an outwardly converging interior conical portion, concentric with said discharge orifice, and having its opposite sides at an angle of 35 degrees with each other; whereby the oil blast is delivered within the air blast in said blast

chamber which converges outwardly beyond the conjunction of said blasts to an extent variable by adjustment of said blast nozzle.

2. In an oil burner, a valve casing having a valve chamber and an oil inlet to said chamber; a nozzle on said valve casing having an axial discharge orifice of circular cross section, the smallest area of which is at the extreme outer end of said nozzle, said end being externally conical and outwardly converging concentric with said orifice; an oil discharge passage extending from one end of said chamber through said valve casing and having an outwardly converging interior conical end in said nozzle, concentric with and merging into said discharge orifice; a valve seat in said chamber at the inner end of said passage; a valve in said chamber fitted to said seat; a screw threaded stem on said valve having an operating handle exterior to said casing; a screw thread surrounding and engaging said stem; a plunger on said valve extending in said discharge passage, having a tip of circular cross section fitted to reciprocate in the orifice of said nozzle and an outwardly converging conical exterior portion between said tip and said valve, concentric with said discharge orifice; a blast casing concentrically surrounding said valve casing, inclosing an outwardly converging axial blast chamber surrounding said oil nozzle, and having an air inlet to said blast chamber; and an axially adjustable blast nozzle fitted in said blast casing, having an orifice with an outwardly converging interior conical portion, concentric with said discharge orifice; whereby the oil blast is delivered within the air blast in said blast chamber which converges outwardly beyond the conjunction of said blasts to an extent variable by adjustment of said blast nozzle.

3. In an oil burner, a valve casing having a valve chamber and an oil inlet to said chamber; a nozzle on said valve casing having an axial discharge orifice of circular cross section, the outer end of said nozzle being externally conical and outwardly converging concentric with said orifice; an oil discharge passage extending from one end of said chamber through said valve casing and having an outwardly converging interior conical end in said nozzle, concentric with and merging into said discharge orifice; a valve seat in said chamber at the inner end of said passage; a valve in said chamber fitted to said seat; a plunger on said valve extending in said discharge passage, having a tip of circular cross section fitted to reciprocate in the orifice of said nozzle and an outwardly converging conical exterior portion between said tip and said valve, concentric with said discharge orifice;

means detachably connecting said tip with said plunger; a blast casing concentrically surrounding said valve casing, inclosing an outwardly converging axial blast chamber
 5 surrounding said oil nozzle, and having an air inlet to said blast chamber; and an axially adjustable blast nozzle fitted in said blast casing, having an orifice with an outwardly converging interior conical portion,
 10 concentric with said discharge orifice; whereby the oil blast is delivered within the air

blast in said blast chamber which converges outwardly beyond the conjunction of said blasts to an extent variable by adjustment of said blast nozzle. 15

In testimony whereof, I have hereunto signed my name at Philadelphia, Pennsylvania, this 29th day of April, 1911.

WILLIAM MELAS.

Witnesses:

O. M. BOEHM,
 A. M. STOKES.

Corrections in Letters Patent No. 1,057,868.

It is hereby certified that in Letters Patent No. 1,057,868, granted April 1, 1913, upon the application of William Melas, of Philadelphia, Pennsylvania, for an improvement in "Oil-Burners," errors appear in the printed specification requiring correction as follows: Page 1, line 23, before the word "blast" insert the word *air*; same page, line 73, after the word "has" insert the article *the*; and that the said Letters Patent should be read with these corrections therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 22nd day of April, A. D., 1913.

[SEAL.]

C. C. BILLINGS,

Acting Commissioner of Patents.

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