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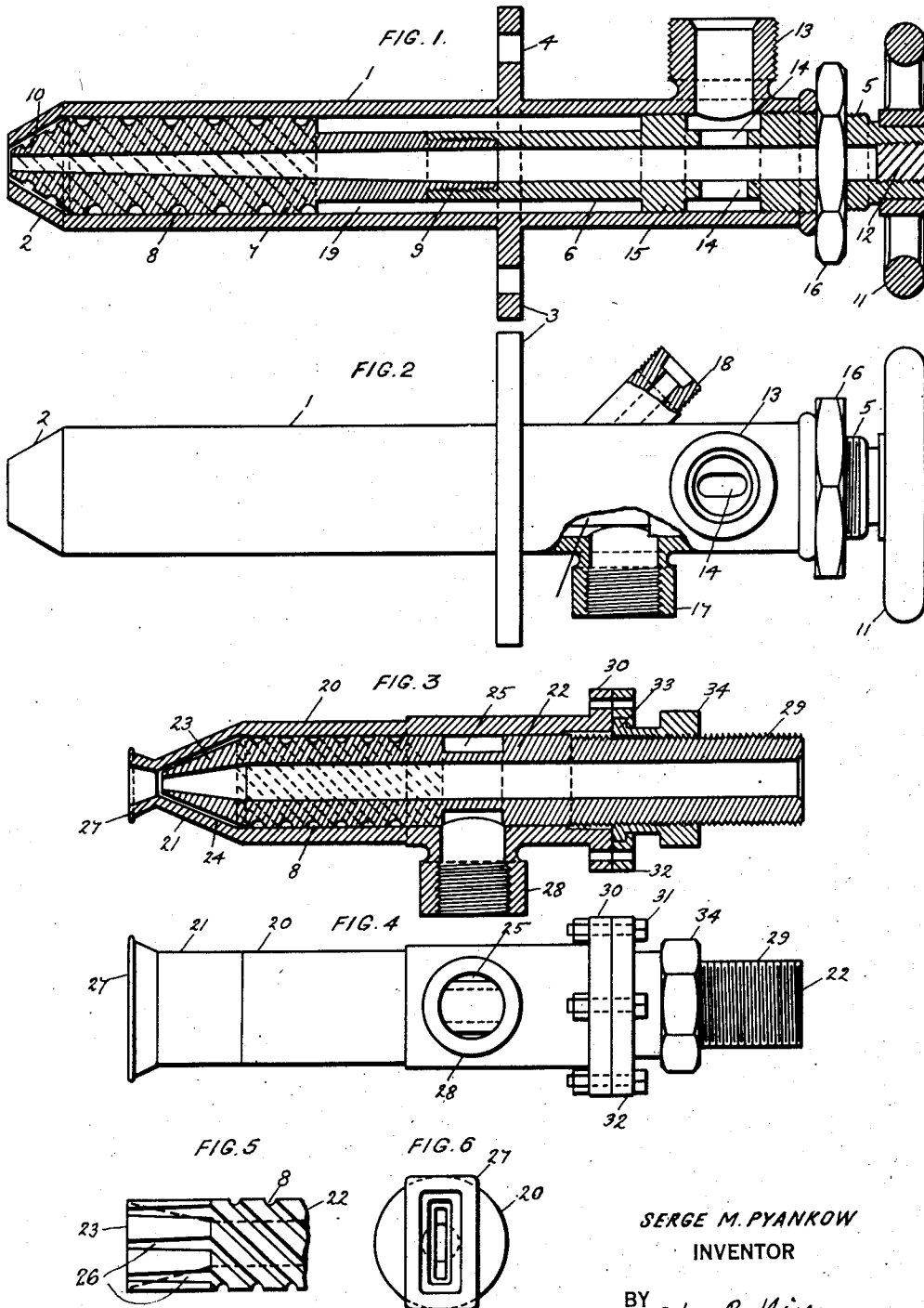
S. M. PYANKOW

1,813,083

OIL BURNER

Filed Nov. 18, 1929

2 Sheets-Sheet 1



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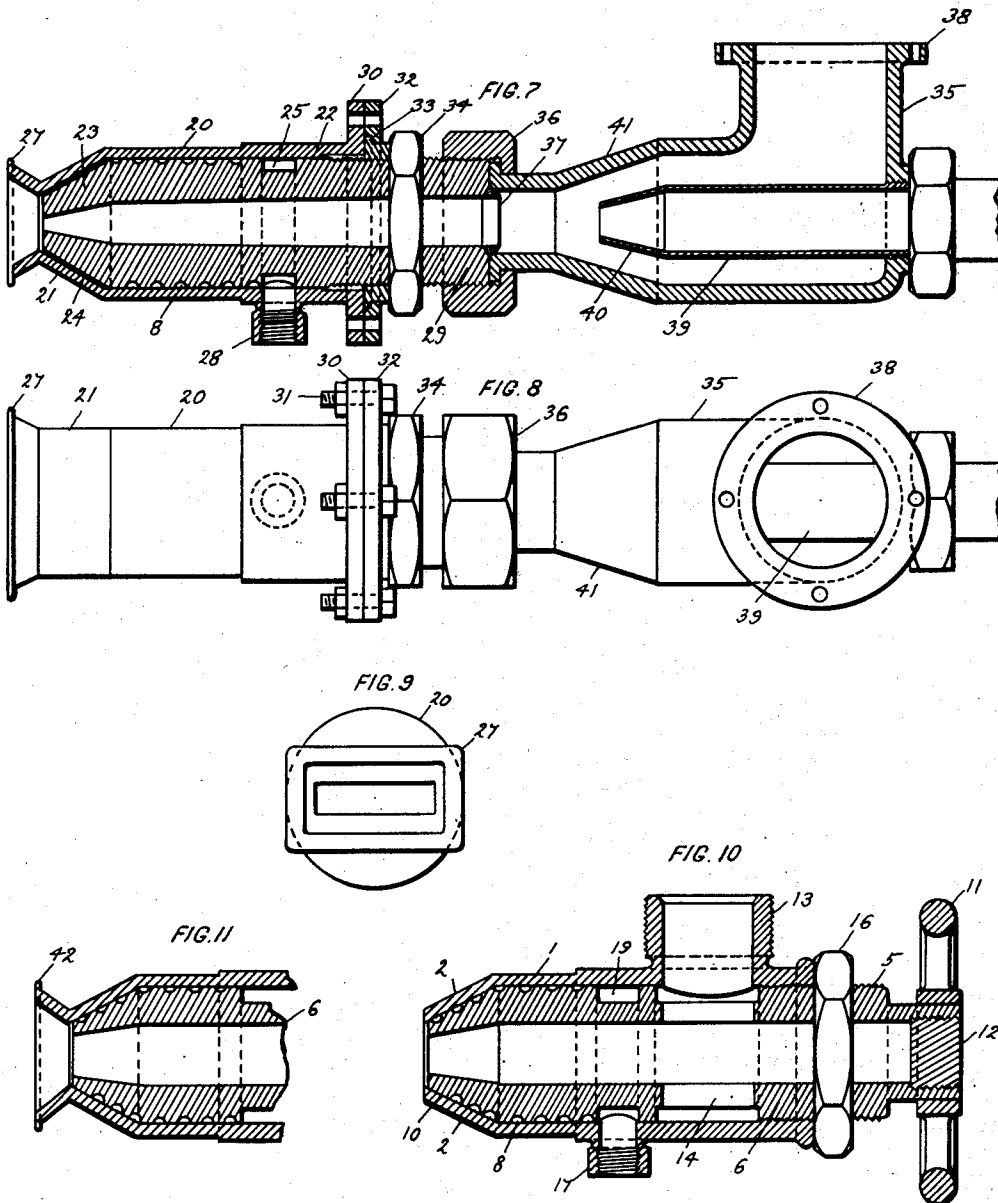
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UNITED STATES PATENT OFFICE

SERGE M. PYANKOW, OF MOSCOW, UNION OF SOCIALIST SOVIET REPUBLICS

OIL BURNER

Application filed November 18, 1929, Serial No. 407,996, and in the Union of Socialist Soviet Republics March 14, 1928.

My invention relates to oil burners and has a particular reference to burners of a sprayer type, operated by a compressed fluid, such as air, gas, also steam, etc.

5 The object of my invention is to provide a burner adapted to give a conical flame of a predetermined shape, in which the fuel particles are given a rotary motion so as to produce more uniform mixture with air. Another object of my invention is to increase the path of fuel particles in the body of the burner, thereby preheating them and improving the process of combustion.

My invention is more fully described in the accompanying specification and drawings in which—

Fig. 1 is a sectional elevation of my burner adapted to give a round diverging flame, Fig. 2 is an outside view of same, Fig. 3 is a longitudinal section of a modified burner adapted to give a flat flame, Fig. 4 is an outside view of the modified burner, Fig. 5 is a detailed view of the fuel channels for the modified burner, Fig. 6 is an end view of the modified burner, Fig. 7 is a longitudinal section of a modified construction for flat flame, especially adapted for forges etc., Fig. 8 is an outside view of the last named modified construction, Fig. 9 is an end view of the last named modified construction, Fig. 10 is a longitudinal section of a modified burner for a round flame for forges, and Fig. 11 is a partial section taken in another plane.

35 My burner consists of an outer tubular shell 1 with a tapering tip 2. A flange 3 can be provided with holes 4 for attaching the burner to the wall of a furnace. The rear end of the tube is threaded and is adapted to receive the threaded rear portion 5 of an inner tube 6. The front or operating end of the inner tube has a cylindrical portion 7 slidably fitted inside of the tube 1 and provided with spirally arranged channels or grooves 8. There may be a single groove or several of them, and I found that good results are obtained with as many as six. The grooves extend over the conical front portion of the cylinder 7 which corresponds to the inside cone of the tip 2.

The grooved portion can be attached to the rear portion of the inner tube by screwing them together on threads 9.

The amount of fuel flowing through the nozzle can be regulated by the width of a slot or clearance 10 between the inner tip and outer cone 2. This adjustment can be made by screwing the threaded portion 5 in or out of the rear threaded portion of the outer tube 1. A handwheel 11 is attached to the rear end of the tube 6. This end is closed with a plug 12.

A threaded nipple 13 extends from the tube 1 for steam. The inner tube 6 is provided with an aperture or slot 14 opposite this nipple. The steam space around the tube 6 opposite the nipple 13 is closed by a cylindrical enlarged portion 15 on the tube 6 which fits tightly and slidably inside of the tube 1.

A lock nut 16 can be used to lock or tighten the inner tube 6 in any desired position in relation to the tube 1.

A threaded nipple 17 extends from the tube 1 below the enlarged portion 15 for fuel. A suitable feed pipe (not shown) can be attached to this nipple, connecting same with a fuel tank located above the burner (for gravity feed), or for delivery under pressure.

A third nipple 18 extends from the side of the tube 1 into the fuel space, preferably at an angle as shown in Fig. 1. This nipple can be smaller than the other nipples as it is used only for periodic cleaning of the spiral grooves by blowing through them compressed air (or steam under high pressure). For this purpose the nipple 18 is threaded and adapted to be connected with a suitable piping by a coupling of an ordinary type (not shown).

The operation of my burner is as follows.

The blowing pipe connected with the nipple 18 is closed, and the fuel is admitted into the space 19 around the tube 6.

The steam is then admitted inside of the inner tube 6 through a pipe connected with the nipple 13. Instead of steam a compressed air or similar fluid can be used. The inside diameter of the tube 6 is reduced at

the tip in order to increase the velocity of flow.

The fuel, following the spiral grooves 8, becomes preheated and separated into several separate streams which all come out of the nozzle and spread out in a conical shape.

This burner is especially suitable for use with liquid fuel, such as crude oil or petroleum residue, and adapted for service with locomotive and stationary boilers.

A modified construction is shown in Figs. 3, 4, 5 and 6. Here the outer tube 20 is not threaded inside and is provided with a flat tapering tip or nozzle 21. The inner tube 22 is slidably fitted inside of the tube 20 and is provided with a flat tapering tip or nozzle 23. The angle of the inner tip corresponds to the angle of the outer tip, so that a space between them is formed (24) of a uniform width.

The spiral grooves 8 extend from a circular recess 25 to the beginning of the tip 23. They extend further on this tip to its end in the form of straight grooves 26.

The outer tip is provided with an expanding nozzle 27 adapted to give the flame a proper angle of divergence.

A nipple 28 extends from the body 20 opposite the recess 25 for admitting fuel inside of the burner. The steam or compressed air is admitted inside of the tube 22 through its rear end which is provided with threads 29. The fuel flexible pipe (not shown) is attached to the end of the tube 22 by means of a suitable threaded coupling fitting the threads 29.

The rear end of the tube 20 has a flange 30 with holes for bolts 31 with which a ring 32 is attached. This ring has a shoulder with which it retains the collar 33 of an adjusting nut 34.

This nut can turn on the threaded portion of the tube 22, the collar or shoulder 33 rotating between the flange 30 and the ring 32. The nut cannot move lengthwise, so that its rotation causes the tube 22 to slide in the outer tube 20, thereby changing the width of the opening 24.

This burner is especially suitable for steam locomotives and stationary boilers, as it gives a flattened narrow flame, wide and thin, suitable for low furnaces.

Another modification is shown in Figs. 7, 8 and 9. Here the construction is similar to the one shown in Figs. 3, 4, 5 and 6, except that an elbow 35 is attached to the end of the tube 22 being clamped by a nut 36 with a compression sealing washer 37 between them. The elbow has a flange 38 with which it is attached to a pipe delivering preheated air from a suitable source, for instance, from a foundry cupola, furnace jacket, etc. A smaller pipe 39 is inserted in the wall of the elbow 35 for compressed air or steam. This pipe has a nozzle 40 at the

end placed inside of conical section 41 of the elbow. This arrangement represents an ordinary air injector, the blast of the compressed air (or steam) through the nozzle 40 producing a suction in the elbow 35 and thereby drawing preheated air or gases from the cupola and delivering them into the burner for the combustion.

Instead of an elbow any suitable chamber may be provided. It is only necessary that it should have a tapering or conical portion for the inner nozzle so as to form an injector.

A similar arrangement is shown in Fig. 10 of a burner, especially adapted for forges and foundries. It has a round nozzle 2 and a nipple 17, the other parts being also the same as in Fig. 1. This burner is especially suitable to be used with compressed air which is delivered through the nipple 13. It can be provided with an expanding nozzle tip 42 of a conical or round section, as shown in Fig. 11.

I claim as my invention:

1. In an oil burner, the combination with an outer tubular member provided with an outer flattened tapering tip with an elongated aperture at the end, of an inner tubular member slidably fitted in the tubular portion of said outer member and provided with a flattened tapering tip conforming to said outer tapering tip, said inner member being provided with a central channel for air, and with grooves on the outside for fuel.

2. In an oil burner, the combination with an outer tubular member, the main portion of said member being of a cylindrical cross-section, a flattened nozzle on said member, an inner member slidably fitted in the cylindrical portion of said outer member, a flattened tip on said inner member conforming to said flattened nozzle, said inner member being provided with a channel inside for air and with spiral grooves on the outside for fuel, said tip being provided with straight grooves extending in a direction of the flattened aperture in said nozzle and forming a continuation of said spiral grooves.

3. In an oil burner, the combination with an outer tubular member provided with a flattened nozzle, of an inner member slidably fitted in said outer member and provided with a flattened tip conforming to said nozzle, grooves for a fuel extending over said inner member and its tip, and a nipple on said outer member adapted to be connected to a source of a compressed fluid for cleaning said burner.

4. In an oil burner, the combination with an outer tubular member provided with a flattened nozzle, of an inner member slidably fitted in said outer member and provided with a flattened tip conforming to said nozzle, grooves for fuel extending over said inner member and its tip, the rear portion

of said outer member being of a conical shape and opened into the outside air, and a nozzle in said conical portion connected with a source of compressed fluid.

5 Signed at Berlin in the county of Brandenburg and State of Prussia this 25th day of October, A. D. 1929.

SERGE M. PYANKOW.

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