Oct. 2, 1923. 1,469,326

J. A. MAHR

LIQUID AND GASEOUS FUEL BURNER

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Fig. 1

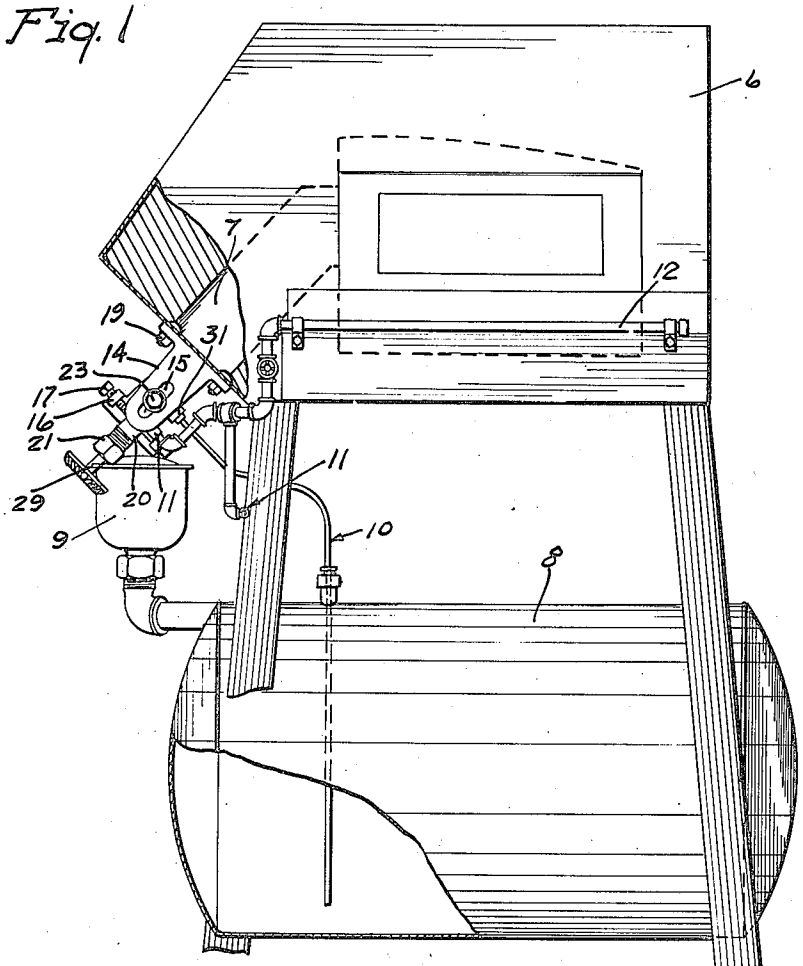
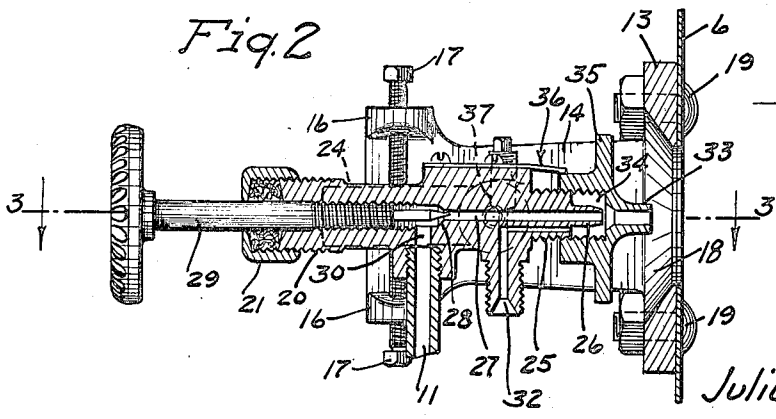


Fig. 2



INVENTOR
Julius A. Mahr
BY HIS ATTORNEYS
Williamson Merchant

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Fig. 5

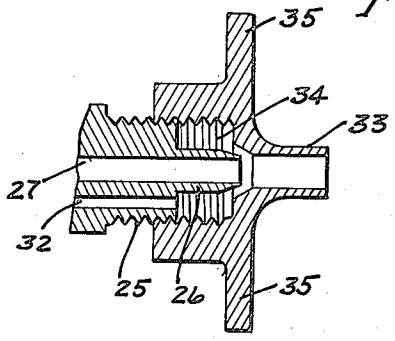


Fig. 4

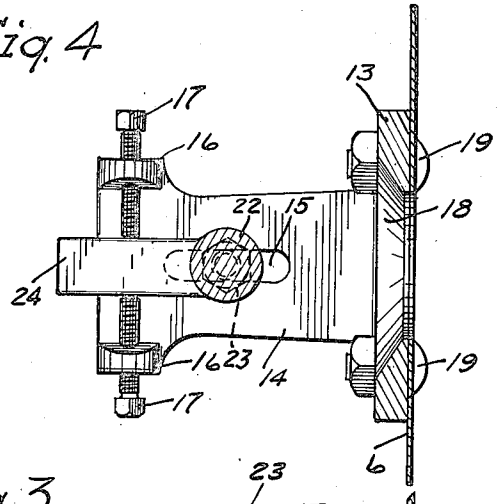
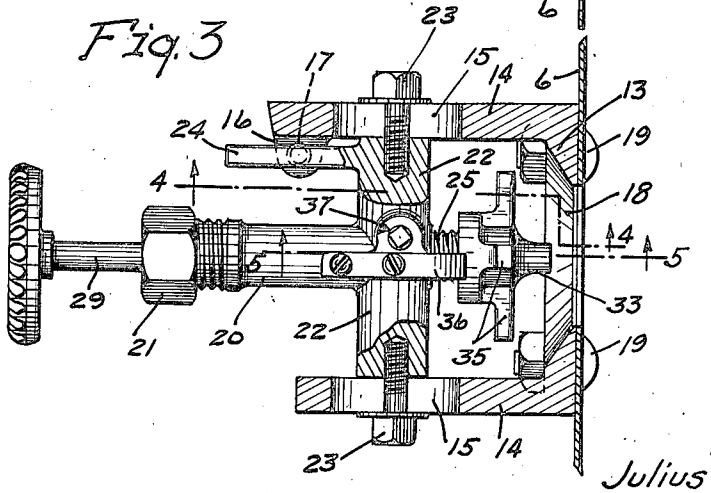


Fig. 3



INVENTOR
Julius A. Mahr
BY HIS ATTORNEYS

William Thurlow

Patented Oct. 2, 1923. 1,469,326

UNITED STATES PATENT OFFICE.

JULIUS A. MAHR, OF MINNEAPOLIS, MINNESOTA, ASSIGNOR TO MAHR MANUFACTURING COMPANY, OF MINNEAPOLIS, MINNESOTA, A CORPORATION OF MINNESOTA.

LIQUID AND GASEOUS FUEL BURNER.

Application filed August 23, 1919. Serial No. 319,311.

To all whom it may concern:

Be it known that I, JULIUS A. MAHR, a citizen of the United States, residing at Minneapolis, in the county of Hennepin and State of Minnesota, have invented certain new and useful Improvements in Liquid and Gaseous Fuel Burners; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to improvements in liquid and gaseous fuel burners, and has for its object to provide an extremely simple and highly efficient burner for spraying liquid fuel, one element of which is under pressure. Said invention also provides a supporting bracket for the burner whereby, said burner may be set in various different adjustments.

To the above end, the invention consists of the novel devices and combinations of devices hereinafter described and defined in the claims.

In the accompanying drawings, which illustrate the invention, like characters indicate like parts throughout the several views.

Referring to the drawings:—

Fig. 1 is a side elevation of the improved burner applied to a rivet forge, some parts of which are broken away and sectioned;

Fig. 2 is a view of the improved burner principally in central vertical section;

Fig. 3 is a view partly in plan and partly in horizontal central section taken on the line 3—3 of Fig. 2;

Fig. 4 is a view in vertical section taken on the irregular line 4—4 of Fig. 3; and

Fig. 5 is a detail view in section taken on the line 5—5 of Fig. 3.

For the purpose of showing the invention applied in working position, there is illustrated in the drawings a rivet forge 6 having a duct 7 leading to its heating chamber, an oil supply tank 8 having a filling funnel 9 and a suction pipe 10 leading from the bottom thereof, and an air supply pipe 11 leading from an air compressor, not shown, and having a branch curtain pipe 12 arranged to deflect the flames from the heating chamber of the forge when the door thereof is open.

Referring first to the burner bracket, the numeral 13 indicates a body having on its outer face a pair of horizontally spaced outwardly projecting arms 14, in each of which is formed a longitudinally extended slot 15. On the outer end of the left-hand arm 14 is a pair of vertically spaced ears 16 which project toward the other of said arms and carry a pair of aligned set screws 17 which project transversely of the respective arm 14 and have screw-threaded engagement with said ears for adjustment toward and from each other. The bracket body 13, as shown, is in the form of a flat plate having a large port 18 with outwardly diverging walls located between the arms 14. The burner bracket is rigidly but detachably secured by nut-equipped bolts 19 to the rivet forge 6 with its port 18 in alignment with the duct 7.

Referring now to the improved burner, the numeral 20 indicates a cylindrical body having on its rear end a stuffing box 21. Integrally formed with the burner body 20, at its front end portion, is a pair of diametrically opposite horizontally aligned hubs 22 which snugly fit between the bracket arms 14. The improved burner is secured to the supporting bracket by cap-screws 23 which extend through the slots 15 and have screw-threaded engagement with bores formed in the ends of the hubs 22 and support said burner with freedom for pivotal adjustment in a vertical plane and bodily sliding movement in a horizontal plane toward and from the port 18.

Integrally formed with one of the hubs 22 is a radially projecting adjusting arm 24 which extends between the inner ends of the adjusting screws 17 and is engaged thereby to hold the burner body in different pivotal adjustments. Obviously, by loosening the cap-screws 23, the burner may be moved bodily toward and from the port 18 by sliding said cap-screws in the slots 15. Also, while the cap-screws 23 are loose, the burner may be pivotally adjusted in a vertical plane by manipulating the adjusting screws 17 to change the inclination of said burner in respect to the projected axis of the port 18.

On the front end of the burner body 20 is a nipple 25 having on its front end a fixed air nozzle 26, the bore of which is axially aligned with said body. The axial bore in the nozzle 26 is extended, as shown, substantially half-way through the burner body 20 to afford an air conduit 27 having

at its receiving end a valve seat 28. This valve seat 28 is opened and closed by a needle valve 29 which extends axially into the burner body 20 through the stuffing box 21. The air pipe 11 is tapped into a bossed opening in the under side of the burner body 20 and has communication with the air conduit 27 through an L-shaped port 30, at the forward end of which is the valve seat 28.

The delivery end of the oil pipe 10 is attached by a suitable union 31 to a nipple on the bottom of the burner body 20 forward of the air pipe 11. An L-shaped oil port 32 forms an extension of the oil pipe 10 and projects upward in the burner body 20 nearly to the air conduit 27 and then extends forward parallel to said conduit and opens through the forward end of the nipple 25 just below the nozzle 26. It is important to note that the oil port or conduit 32 has very much less cross section and hence very much less conducting capacity than the chamber 34 of the outer nozzle. This affords what may be properly treated as a vacuum chamber in which the oil is drawn by vacuum produced by the outward discharge of air through the axially aligned conduits of the two nozzles.

A movable vapor nozzle 33, located forward of the nozzle 26, is axially aligned therewith and has an annular nut-like body. This body portion of the nozzle 33 has screw-threaded engagement with the nipple 25 and the interior thereof affords a chamber 34 which completely surrounds the fixed nozzle 26 and into the rear of said chamber the oil port 32 is arranged to discharge. A multiplicity of radial prongs 35 are formed with the body of the nozzle 33 to afford finger pieces by which said nozzle may be axially adjusted to vary the opening between the two nozzles 26 and 33. As shown, the nozzle 26 and inner end of the bore in the nozzle 33 are reversely formed to permit the nozzle 26 to be projected into the nozzle 33, and it will be noted that the diameter of the bore in the nozzle 33 is considerably larger than the air conduit 27 in the nozzle 26.

To hold the vapor nozzle 33 in different set adjustments in respect to the air nozzle 26, there is secured to the top of the burner body 20 a leaf spring 36, the free end of which yieldingly and frictionally engages the periphery of the body of the nozzle 33. Extending through the top of the burner body 20 is a clean-out opening 37 leading from the air conduit 27 and normally closed by a screw-plug 38.

The burner body 20 may be pivotally adjusted, as previously described, to change the inclination of the aligned burners 26 and 33 and thereby properly direct the flame from the burner into the forge duct 7. Said burner may also be moved bodily toward and from the port 18 in order to properly set the nozzles 26 and 33, as previously described, to secure the best results from the burner.

It is important to note that the oil supply conduit, formed by the pipe 10 and port 32, leads from the tank 8 to the chamber 34, has no oil regulating valve and is constantly open. To start the burner, it is only necessary to open the air valve 29 and light the vapor, as the same leaves the nozzle 33. The air, as it leaves the nozzle 26, produces a partial vacuum at the opening between said nozzle 26 and the nozzle 33 and thereby sucks the oil from the tank 8 through the conduit 10—32. By adjusting the nozzle 33 to vary the opening between said nozzle 33 and the nozzle 26, the partial vacuum, at said opening, may be either increased or decreased, at will, to thereby vary the proportion of oil to air that passes through the burner. This means of controlling the oil supply permits the use of a relatively large oil conduit, thus eliminating all danger from clogging due to dirty oil which causes a great deal of trouble where oil regulating valves are used and makes necessary the frequent readjustment of such valves. By the use of my improved burner, after the vapor nozzle 33 has been set to feed a given quantity of oil in proportion to air, the proportion will be maintained even under a fluctuating air pressure, which prevails in many shops due to lack of compressor capacity, thus making unnecessary constant attention required in valve controlled burners.

From the above description, it is evident that the improved burner permits the use of oils of either light or heavy consistency. Heavy oil naturally requires a greater partial vacuum to lift the required portion of oil than is required to lift the lighter oils, but after the nozzle 33 has once been properly adjusted for an oil of a certain consistency, it is not necessary to readjust said nozzle so long as oil of the same consistency is being used, so that the operator need only open the air valve 29 when starting the forge and to close said valve when through.

What I claim is:—

1. The combination with a furnace having a duct leading to its heating chamber, of a burner bracket attached to the furnace and having a port aligned with said duct, a burner body having a nozzle directed toward the port in the burner bracket, said body being mounted on the bracket for pivotal and sliding movements whereby its nozzle may be angularly adjusted in respect to the projected axis of said port and axially moved toward and from said port without changing the angularity thereof.

2. The combination with a furnace having a duct leading to its heating chamber, of a burner bracket attached to the furnace and having a port aligned with said duct, a

burner body having a nozzle directed toward the port in the burner bracket, said body being mounted on the bracket for pivotal and sliding movements whereby its nozzle may be angularly adjusted in respect to the projected axis of said port and axially moved toward and from said port, means for adjusting and holding the burner body against pivotal movement, and means for holding the same against sliding movement.

3. The combination with a burner bracket having two laterally spaced arms, and a port located therebetween, of a burner body having a nozzle directed toward said port and also having a pair of transversely aligned hubs, and means pivotally and slidably connecting said hubs to the bracket arms whereby said nozzle may be angularly adjusted in respect to the projected axis of said port and axially moved toward and from said port.

4. The combination with a burner bracket having two laterally spaced arms, and a port located therebetween, of a burner body having a nozzle directed toward said port and also having a pair of transversely aligned hubs, and means pivotally and slidably connecting said hubs to the bracket arms whereby said nozzle may be angularly adjusted in respect to the projected axis of said port and axially moved toward and from said port, said means adapted to hold the body against sliding movement.

5. The combination with a burner bracket having two laterally spaced arms, and a port located therebetween, of a burner body having a nozzle directed toward said port and also having a pair of transversely aligned hubs, means pivotally and slidably connecting said hubs to the bracket arms whereby said nozzle may be angularly adjusted in respect to the projected axis of said port and axially moved toward and from said port, said means adapted to hold the body against sliding movement, and means for holding said body in different pivotal adjustments.

6. The combination with a burner bracket having two laterally spaced arms, and a port located therebetween, of a burner body having a nozzle directed toward said port and also having a pair of transversely aligned hubs, means pivotally and slidably connecting said hubs to the bracket arms whereby said nozzle may be angularly adjusted in respect to the projected axis of said port and axially moved toward and from said port, said means adapted to hold the body against sliding movement, a radial arm on one of said hubs, and a pair of opposing set-screws having screw-threaded engagement with one of the bracket arms and engaging opposite faces of the radial arm to hold the burner body in different pivotal adjustments.

7. The combination with a burner bracket having two laterally spaced arms, and a port located therebetween, of a cylindrical body having at its rear end a stuffing box and at its other end an axially aligned nozzle directed toward said port, a needle valve extending through said stuffing box for controlling said nozzle, said burner body also having a pair of transversely aligned hubs, means connecting said hub to the bracket arms with freedom for pivotal and sliding movements and for securing said arm against sliding movement, a radial arm on one of said hubs, and a pair of opposing set-screws having screw-threaded engagement with one of the bracket arms and engaging opposite faces of the radial arm to hold the burner body against pivotal movement.

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

JULIUS A. MAHR.

Witnesses:
WINIFRED I. WARD,
HARRY D. KILGORE.