Aug. 20, 1935. S. D. ROSS 2,011,912

CARBURETOR

Filed May 16, 1934 2 Sheets-Sheet 1

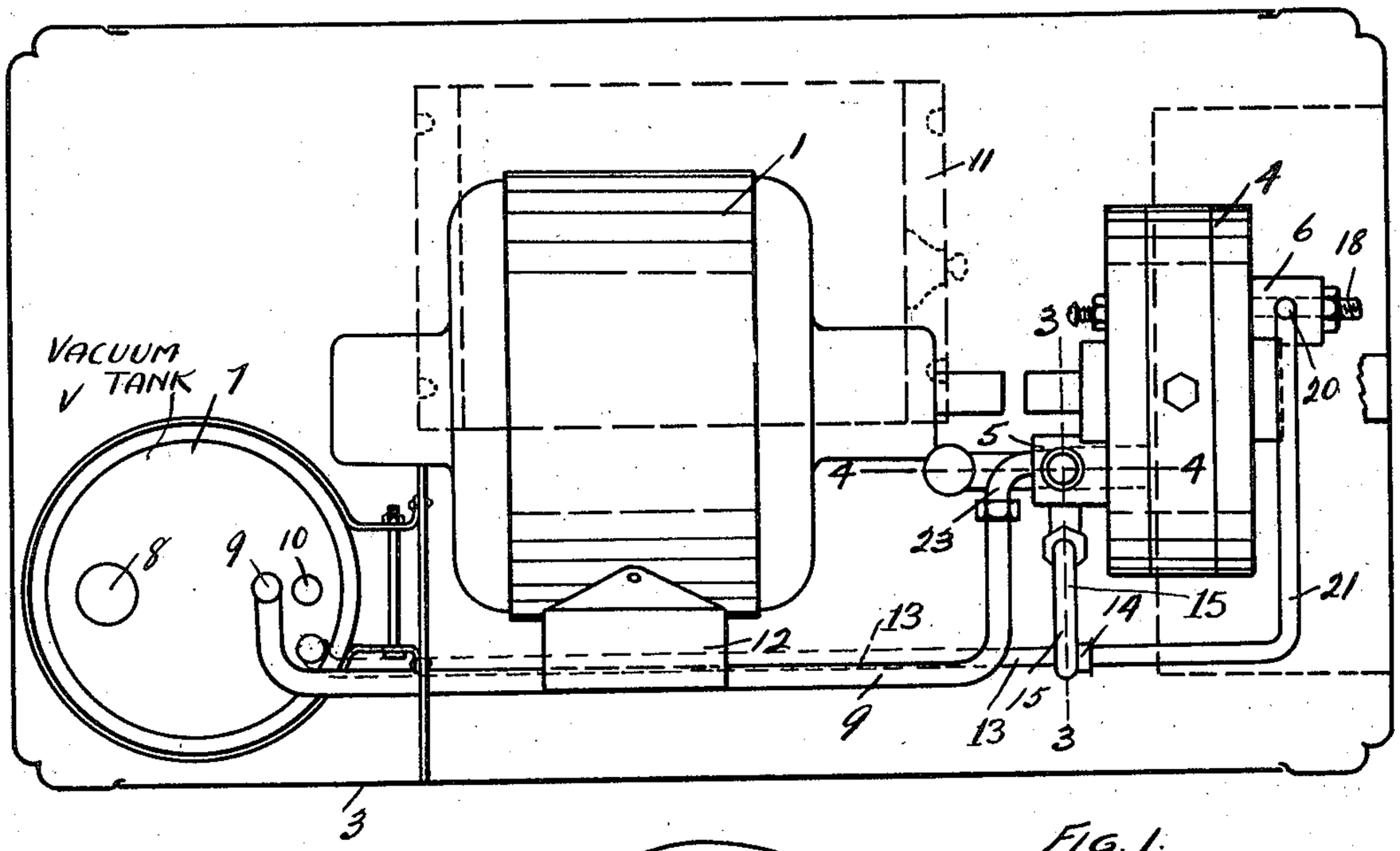


FIG. 1.

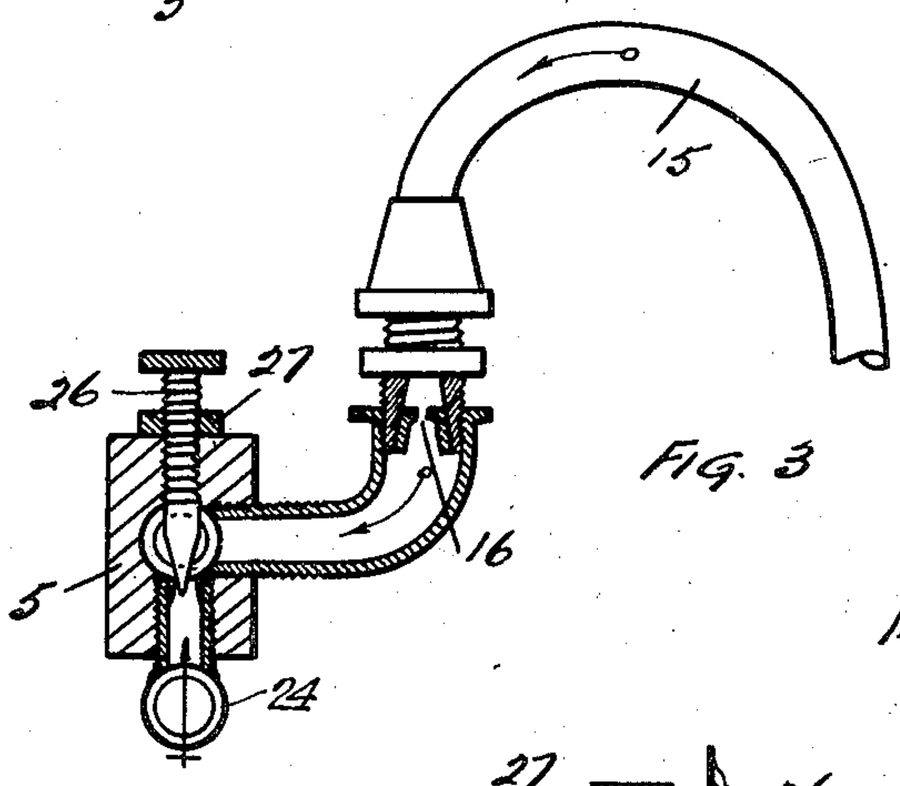


FIG. 3

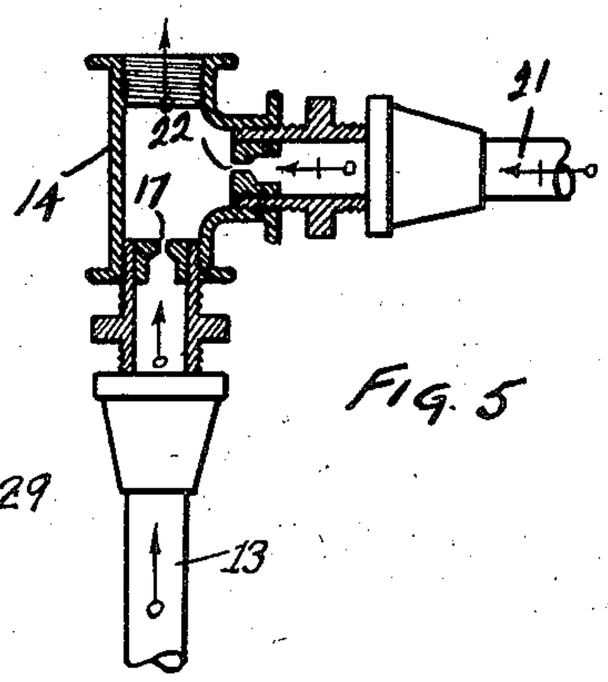


FIG. 5

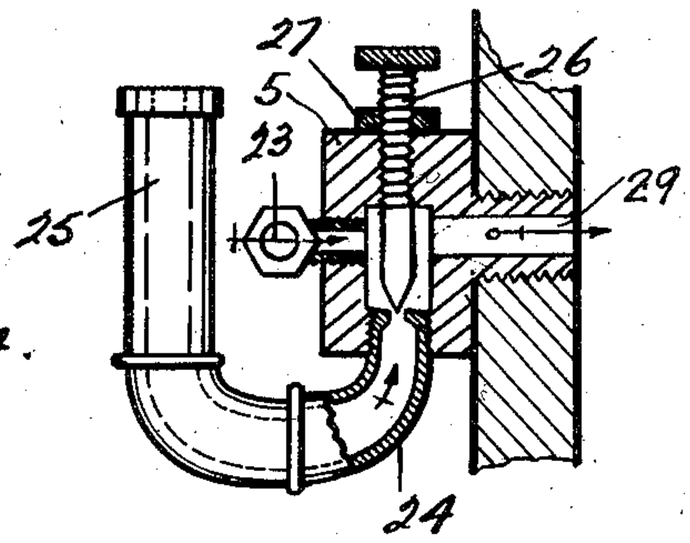


FIG. 4.

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CARBURETOR

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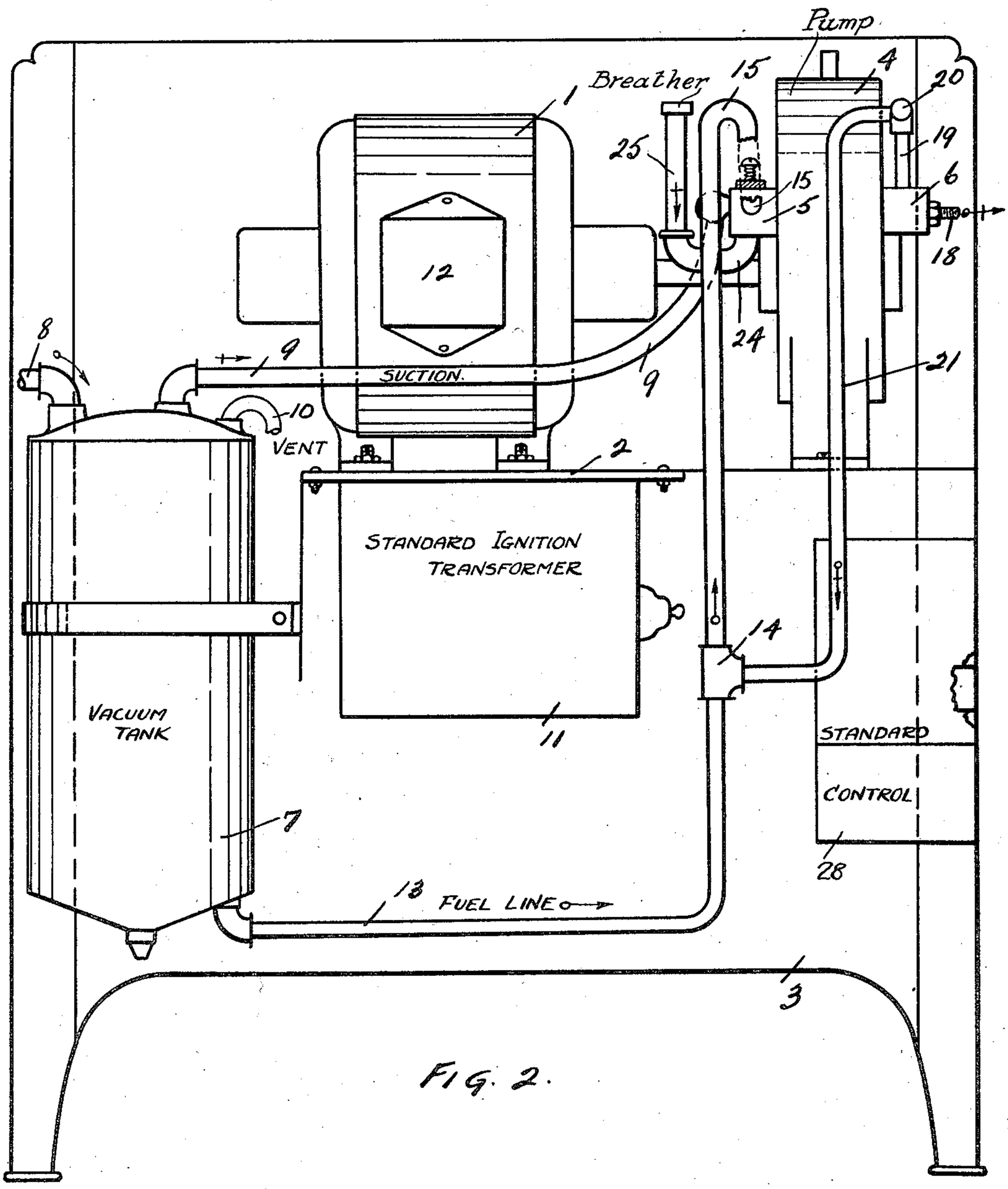


FIG. 2.

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Patented Aug. 20, 1935 2,011,912

# UNITED STATES PATENT OFFICE

2,011,912

## CARBURETOR

Stanley D. Ross, Vancouver, British Columbia, Canada

Application May 16, 1934, Serial No. 726,006

3 Claims. (Cl. 261—28)

This invention relates to improvements in oil burning apparatus of the positive pressure type and designed specifically for use with my new process of carburetion, and volume and pressure-controlled rotary pump, and also for use with an auxiliary vacuum tank having a high lift and globuliferous feed, all of which are subject matters of co-pending applications filed May 16, 1934, Serial Nos. 726,005, 726,007 and 726,008.

A particular object of my present invention is to provide an oil burning apparatus composed principally of standard manufactured units which are purchaseable on the open markets in quantities at favourable prices, whereby an economically assembled unit may be produced which has passed all inspection of authorized bodies, whereby the purchaser of such an outfit may be assured of having secured an apparatus of high grade manufacture that will not affect or endanger the insurance of any premises upon which such apparatus is installed.

Another object of my invention is to eliminate the use of expensive and specially designed castings in the fabrication of the oil burner proper, as with the exception of the base and compressor, no other castings are used, as all the other parts of the apparatus are constructed from standard materials purchaseable in the open market upon which minor operations are carried out, thereby enabling the production of a high grade oil burning apparatus at an economical price.

Still another object of my invention has been to produce an efficient oil burning apparatus for use without the necessity of having to use high pressure blower fans to support combustion within the furnace, thereby providing lowered stack and flue temperatures through the use of natural draught, and providing a greater measure of economy in operation by eliminating such stack and flue losses.

A still further object of my invention has been to provide an efficient oil burning apparatus having a fixed oil supply and a single air control through which the apparatus may be adjusted to provide the greatest measure of operating economy.

With these and other objects in view I have invented the oil burning apparatus which is the subject matter of this application, and which is further illustrated in the accompanying drawings forming part of this application, and in which:

Figure 1 is a plan view of the oil burning apparatus showing the positioning of the motor, the vacuum tank and the compressor pump.

Figure 2 is an elevation of the oil burning apparatus within its cabinet showing the positioning of the various units in combination with the electrical control mechanisms.

Figure 3 is a section of the needle control and air intake block taken on the line 3—3 of Figure 1 showing the restricted passage at the end of the U-loop.

Figure 4 is a section of the needle control and air intake block taken on the line 4—4 of Figure 1 and shows the needle valve control to the air intake and vacuum connection to the vacuum tank.

Figure 5 is a cross section of the T fitting 14 showing the restricted passages.

In these drawings like numerals indicate like parts, and the numeral 1 indicates an electric motor mounted upon a shelf 2 within a cabinet 3.

Attached to the motor through a flexible coupling (not shown) is a rotary pump and compressor 4 having an intake block fitting 5 on the motor side and a discharge block fitting 6 on the opposite side. The block 5 communicates with the intake port 29, while the block 6 communicates with the outlet port 30.

Mounted below the motor 1 and upon the opposite side of the cabinet 3 to which the pump 4 is mounted, is a standard vacuum tank 7 having the usual fuel supply line 8 and vacuum line 9 and atmospheric vent 10.

Secured immediately below the motor shelf 2 is a standard ignition transformer 11 and below the pump a standard set of controls 28.

The motor 1 has the usual connector box 12 secured upon one side of it, but as the wiring circuits from the controls to the motor and ignition transformer form no part of this application, no wiring is shown.

From the bottom of the vacuum tank 7 is a fuel line 13 having a fitting 14, the upper end of which is connected by the inverted U-loop 15 connected into the side of the intake block fitting 5.

In the end of the U-loop 15, where it connects into the side of the intake block fitting 5, is a restricted passage 16, and likewise in the bottom of the T fitting 14 is a restricted passage 17.

Upon the end of the discharge block fitting 6 is provided a connection 18 for attaching the fuel line leading to the burner nozzle positioned within the furnace. Upon the upper side of the fitting 6 is mounted the short stand pipe 19 having an elbow fitting 20 at the top to which is connected the copper tubing 21 connected into the side of the T fitting 14.

The terminal fitting of the tubing 21, where it connects into the side of the T 14, has a restricted

passage 22 in the end thereof. (See Figure 5.)

The stand pipe 19 is in communication with the discharge opening or passage through the block fitting 6.

In the outer end of the intake block fitting 5 is secured the vacuum connection 23 connected to the vacuum line 9 of the vacuum tank 7.

Below the block fitting 5 is the air intake 24 leading to the air filter pipe or breather 25.

On top of the block fitting 5 is positioned the needle control valve 26 having a lock nut 27 to secure the setting.

The above summary comprises all the essential parts and their connections.

In operation the apparatus works as follows: Assuming the motor to be running, a vacuum is set up by the pump 4 and through the duct 9 to the top of the vacuum tank 7, which causes oil from the main supply tank to flow through the fuel supply line 8 and supply the vacuum tank 7.

From the tank 7 the oil flows through the fuel line 13 to the T 14, which is positioned slightly below the oil line in the vacuum tank 7 where it meets the restricted passage 17 through which only a limited or measured quantity can flow.

As the oil rises above the restriction 17 by reason of the vacuum exerted upon the fuel line 13 via pipe 15 by the pump 4, it meets with a positive pressure stream from the restricted passage 22 in the side of the T 14 set up from the discharge side of the pump through the stand pipe 19 and tubing 21, the result of which is that the limited supply of oil rising above the restricted passage 17 is aspirated and broken up, and formed into bubbles or air in oil envelopes which rise in the line 13 until they reach the inverted U-loop 15 and restricted passage 16 through which the bubbles are passed and burst, and the resultant vapour meets the incoming stream of air from the air intake 24 and is affined therewith to be drawn into the pump 4 and discharged upon the opposite side through the connection 18 for delivery to the burner nozzle positioned within the furnace.

What is meant by the positive pressure acting through the restriction 23 is as follows: A part of the discharge from the pump 4 is deflected into the pipe 19 and thence down the pipe 21 and through the restricted passage 22 to be discharged into the T 14; such action is caused by the fact that there is always sufficient back pressure in the discharge 18 of the pump to cause a part of the pump's discharge to be so deflected up the pipe 19 as the nozzle to which the discharge outlet 18 connects has an opening of limited degree, and this is the reason for the accumulation of pressure in the discharge 18 to cause the deflection of positive pressure up the pipe 19 and no induction is set up in the pipes 19 and 21.

The action of the rupturing of the bubbles at the junction of the air intake 24 results in the very finest of atomization possible as the oil film envelopes are under exceptional tension by reason of being formed by the positive pressure stream entering through the restricted passage 22 and are of a more attenuated structure than is possible with an induced current stream.

Another particular resulting from the use of positive pressure to create air in oil envelopes or bubbles is that much heavier oils can be atomized and broken up into bubbles than is possible with induction systems.

Having now described my invention and the nature of same, what I claim and desire to be protected in by Letters Patent, is:

1. In a portable and positive pressure type oil burning apparatus, a rotary pump having a discharge outlet, a standard vacuum tank positioned adjacently, a duct connecting said tank to the intake side of said rotary pump, said duct comprising a T fitting, a U-loop and air intake and control valve, said T fitting positioned slightly below the oil level in said tank, a restricted oil passage formed in the bottom of said T, a restricted pressure passage formed in the side of said T, said pressure passage being connected by a duct to the discharge side of said rotary pump whereby when said pump is operating an oil flow is set up in said duct and through said restricted oil passage to be formed into bubbles under the action of the pressure stream from the discharge side of said rotary pump entering said duct through the restricted passage formed in the side of said T to form a combustible mixture for ultimate delivery to said discharge outlet.

2. In a portable and positive pressure type oil burning apparatus, a rotary pump having a discharge outlet, a standard vacuum tank positioned adjacently, a duct connecting said tank to the intake side of said rotary pump, said duct comprising a T fitting, a U-loop and air intake and control valve, said T fitting positioned slightly below the oil level in said tank, a restricted oil passage formed in the bottom of said T, a restricted pressure passage formed in the side of said T, said pressure passage being connected by a duct to the discharge side of said rotary pump whereby when said pump is operating an oil flow is set up in said duct and through said restricted oil passage to be formed into bubbles above said restricted passages under positive pressure from the discharge side of said pump, and means to rupture said bubbles before the latter are drawn into said pump to form a combustible mixture for ultimate delivery to said discharge outlet.

3. In a portable and positive pressure type oil burning apparatus, a rotary pump having a discharge outlet, a standard vacuum tank positioned adjacently, a duct connecting said tank to the intake side of said rotary pump, said duct comprising a T fitting, a U-loop and air intake and control valve, said T fitting positioned slightly below the oil level in said tank, a restricted oil passage formed in the bottom of said T, a restricted pressure passage formed in the side of said T, said pressure passage being connected by a duct to the discharge side of said rotary pump whereby when said pump is operating an oil flow is set up in said duct and through said restricted oil passage to be formed into bubbles above said restricted passages under positive pressure from the discharge side of said pump, and means to rupture said bubbles before the latter are drawn into said pump, said means comprising a restricted passage formed at the terminal of said U-loop and its place of connection to said air intake and control valve whereby said bubbles are forced through said restricted passage under the combined action of the suction and pressure discharge stream of said pump and ruptured by an air stream entering through said air intake and control valve by reason of the suction of said rotary pump to form a combustible mixture for ultimate delivery to said discharge outlet.

STANLEY D. ROSS.