July 24, 1928. 1,678,057

W. C. COLEMAN

PRIMING DEVICE FOR HYDROCARBON BURNERS

Original Filed Feb. 9, 1923

Fig. 1.

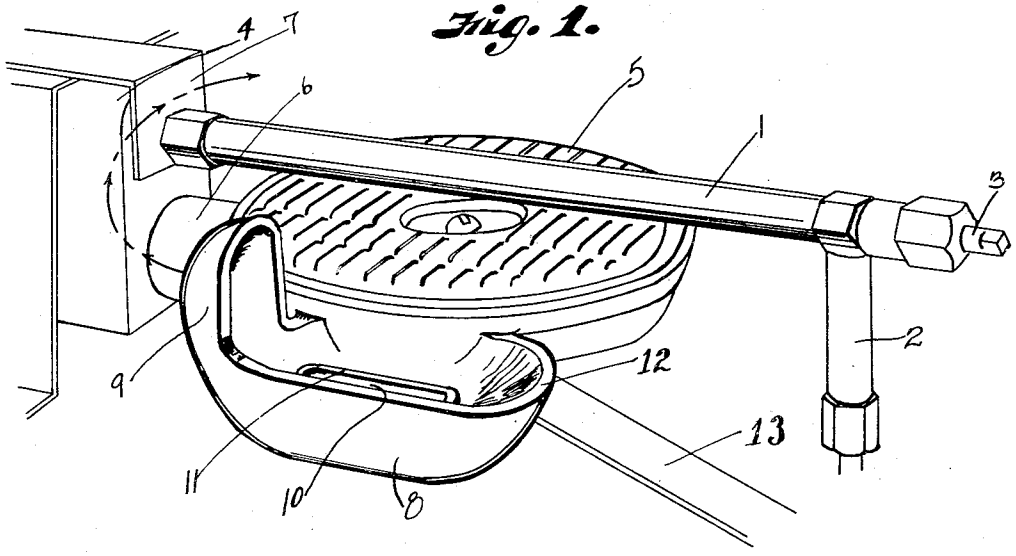


Fig. 2.

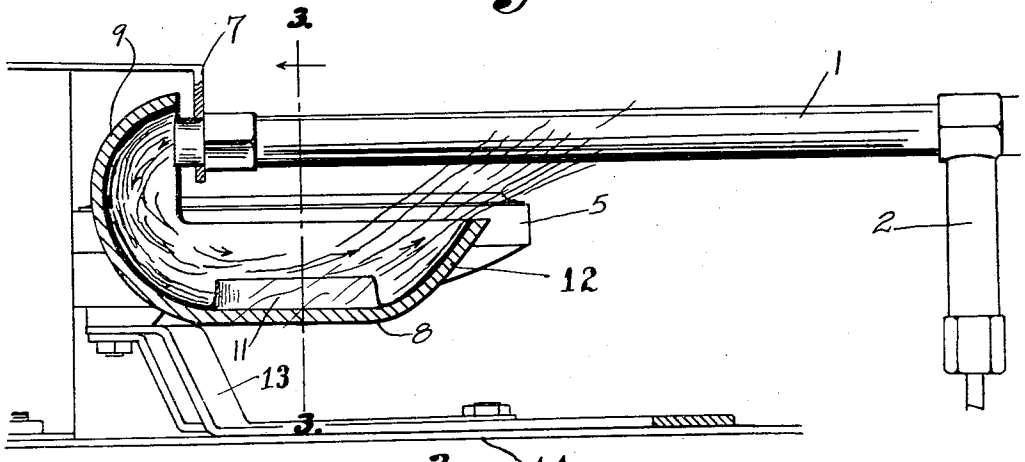
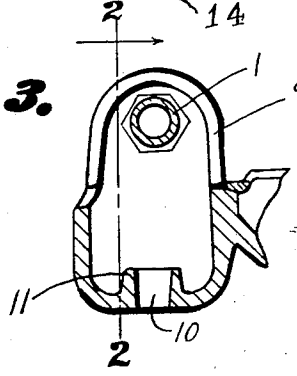


Fig. 3.



INVENTOR
William C. Coleman.
BY B. F. Lunn
ATTORNEY

Patented July 24, 1928. 1,678,057

UNITED STATES PATENT OFFICE.

WILLIAM C. COLEMAN, OF WICHITA, KANSAS, ASSIGNOR TO COLEMAN LAMP AND STOVE CO., OF WICHITA, KANSAS, A CORPORATION OF KANSAS.

PRIMING DEVICE FOR HYDROCARBON BURNERS.

Continuation of application Serial No. 618,056, filed February 9, 1923. This application filed September 12, 1925. Serial No. 56,079.

This invention relates to hydrocarbon oil burner units and the primary object thereof is to provide a burner unit in which the priming cup is so constructed and so disposed with relation to the vaporizing tube that the maximum heat efficiency will be obtained from the oil discharged from the vaporizing tube into the priming cup.

The present application is a continuation of an application filed by me Feb. 9, 1923, Serial #618,056. I have provided a novel form of priming cup, which may be brought into and out of position to receive oil from the vaporizing tube and when in functional position, the priming cup will direct the flame from the ignited oil therein in the form of a blast against the vaporizing tube, due to the fact that the bottom of the cup is curved on easy stream lines, tending to reduce the skin friction or resistance of the oil delivered into the cup, it being understood, of course, that in a device of this class the oil is fed from the vaporizing tube at an appreciable velocity due to the fact that the oil supply is under pressure.

This particular application has to do only with the cup per se, there being means for conveniently shifting the burner unit out of line with the vaporizing tube so as to shift the cup into line with the vaporizing tube and vice versa but such means constitutes the subject matter of a separate application.

The novel construction of the invention will be clearly apparent by reference to the following description in connection with the accompanying drawings, in which Fig. 1 is a perspective view of part of a burner unit including the cup.

Fig. 2 is a vertical, longitudinal, sectional view through the cup on the line 2—2 of Fig. 3, the vaporizer tube being shown in elevation, and

Fig. 3 is a cross sectional view on the line 3—3 of Fig. 2.

In the drawings I have shown only so much of a burner unit as is deemed necessary in order to illustrate the subject matter of the herein claimed invention. The vaporizer tube 1 is supplied from a tank through a pipe 2, the supply being controlled by a needle valve 3 in the usual manner. The pipe 2 may be connected to a closed reservoir under pressure, the pressure being supplied by a pump, but this is all well understood so it is thought unnecessary to illustrate or describe the tank in detail.

The discharge end of the vaporizing tube 1 normally feeds a hollow vaporizing tube chamber 4, which communicates with the burner proper 5 through a neck 6, the discharge end of the vaporizer tube being supported by the bracket 7. This is the position shown in Fig. 1, and it is the normal position when the burner is functioning. In order to cause the burner to function, however, it is necessary to vaporize the oil in the tube 1.

In order to provide for the vaporization of the oil I have designed a novel form of primer cup, which is shown as cast integral with the base of the burner proper although it may be separate if desired. The primer cup 8 consists of an elongated concave member having a hood 9 at one end, and curvature of the inner wall of which conforms to the curvature of the bottom of the cup, the hood acting as an abutment or baffle for the incoming oil discharged from the discharge end of tube 1.

The floor or bottom of the cup is preferably provided with an elongated air opening 10, the edges of which are surrounded by upstanding walls 11. The discharge end of the cup, that is, the end distant from the hood or baffle 9, is curved upwardly and outwardly, as at 12, so that the ignited oil will be directed against the vaporizer tube when the oil cup is brought into vertical alignment therewith.

When it is desired to generate the vapor or gas, the burner can be swung to the right and slightly rearward from the position shown in Fig. 1. This movement will bring the hooded portion 9 of the primer cup in longitudinal alignment with the discharge end of the vaporizer tube 1 or in the position shown in Fig. 2. Then the valve 3 can be opened to admit oil into the cup. The oil is ignited, and as it ignites, the flame will contact with the tube 1. If the valve 3 is open, liquid fuel or oil will be fed under pressure against the baffle or hooded portion 9, striking the downwardly and rearwardly curved surface which is generated on easy flow lines so that the ignited oil will pass along the bottom and up toward the tube 5 to heat it. In actual practice the device functions very much like a blow torch and as a result, the vaporizer tube 1 is quickly and, therefore,

efficiently heated so that it becomes hot enough to adequately function as a vaporizer.

The burner carrying the cup 8 is fastened to a lever 13 pivoted to the base of the stove at 14 so that the lever can be swung laterally to bring the cup or priming pan 8 under the vaporizer which is the purpose of aligning a part of the cup or baffle with the discharge end of nozzle 7; to cause the fuel to be deflected in easy stream lines in the form of a hot blast. In the form shown, when the fuel under pressure strikes the inner surface of the curved portion 9, it will flow in curved stream lines without having its velocity appreciably diminished and as it gasifies the flames will impinge upon the preheater cup or deflector so they will be directed against the vaporizer tube 4 in the form of a hot blast or blow torch with greater efficiency than would be possible if the liquid fuel was allowed to merely drip into the cup.

In actual practice, I have found that the preheater will vaporize the fuel in the vaporizing tube out of doors in zero weather, due to the fact that the inner face of the cup is so curved as to direct the combusted flame in the form of a hot blast.

As soon as the tube 1 becomes hot enough, the burner proper is shifted into the position shown in Fig. 1, the priming cup then being offset with respect to the generator tube 1, it having performed its function. Since the vaporizer tube 1 is then hot enough to vaporize the incoming oil, the gasified oil is fed in the usual way to the burner proper and as the fuel from burner proper is ignited, it will in turn supply sufficient heat to the tube 1 to maintain it at the proper temperature to vaporize the oil after the manner common in oil burners.

It is important in a device of the class herein described that the priming cup have a bottom so disposed that the oil under pressure can flow over the priming cup with a minimum loss of velocity, it being an important feature of this invention that the oil is never in a state of rest but is flowing at a relatively rapid rate through the cup and against the vaporizing tube with sufficient velocity to function as a blow torch because if the oil were allowed to remain at a state of rest as is ordinarily the case, a very much longer time would be required to heat the tube hot enough than is true with the present invention.

What I claim and desire to secure by Letters-Patent is:

1. In a burner unit for liquid hydrocarbons, a vaporizing tube and a priming cup, the priming cup comprising an elongated body having a concave, upstanding wall projecting from the edge of one end thereof, and having a shorter, inclined wall at the other end, the inner surface of the shorter inclined wall being symmetrical with the lower portion of the other wall with reference to the bottom, the surfaces of the two walls and bottom being so formed that liquid delivered against the inner surface of the upstanding wall will be directed through the cup in easy stream lines without appreciably decreasing its velocity so that the combusted fuel will impinge upon the vaporizing tube in the form of a hot blast.

2. In a burner unit for liquid hydrocarbons, a vaporizing tube, a priming cup having a curved bottom and having a curved intercepting wall at one end to direct liquid downwardly and longitudinally over the bottom of the cup, an end wall of the cup distant from the intercepting wall curved upwardly, the inner surface of the second mentioned end wall being symmetrical with the surface of the lower portion of the intercepting wall with reference to the bottom, the surfaces of the two walls and bottom being so formed that liquid discharged against the intercepting wall will pass through the cup in easy stream lines without appreciable loss of velocity to cause the ignited liquid to impinge against the vaporizer tube in the form of a hot blast.

3. A priming cup for hydrocarbon burners, comprising an elongated concave member having a curved bottom wall, one end of which extends above the sides of the cup in the form of a concave hood, the other end being curved upwardly and terminating at the side walls, the surface of said other end being symmetrical with the lower portion of the end carrying the concave hood, with reference to the bottom, said surfaces of the ends and the bottom being so formed that fuel directed against the end wall will pass downwardly along the bottom of the cup without appreciably decreasing its velocity, the bottom of the cup being provided with an opening to admit air into the cup.

4. In a burner unit for liquid hydrocarbons, a vaporizing tube having a discharge end and a priming cup comprising an elongated member open at its top, having an upstanding hood projecting from one end in line with the tube the hood being in line with the longitudinal center of the cup and in line with the curved wall at the other end of the cup, the surface of said other end being symmetrical with the lower portion of the end carrying the upstanding hood with reference to the bottom, the surfaces of the ends and bottom being so formed that liquid delivered against the inner surface of the hood will be directed through the cup along the bottom in easy stream lines without appreciably decreasing its velocity so the combusted fuel from the cup will be impinged upon the vaporizing tube in the form of a hot blast.

5. In combination, a hydrocarbon vapor

generating tube having an inlet and an outlet, and a priming cup associated therewith comprising an elongated, concave member provided with an open portion substantially parallel with the tube, the concave member having an intercepting end wall in line with the outlet in the tube, the member having another end wall opposite the intercepting wall, the end walls being in line with the bottom of the member so that fuel discharged against the intercepting wall by the vapor generating tube may pass over the inner face of the intercepting wall along the bottom of the member and be directed against the tube in the form of a hot blast.

6. The combination with a hydrocarbon burner having a liquid hydrocarbon vaporizing member terminating at one end in a discharge nozzle, of a priming cup comprising an elongated concave member having an upwardly projecting curved wall extending from one end of the cup and a shorter curved wall at the other end of the cup, said cup lying below the hydrocarbon vaporizing member with the said projecting end wall in line with the said discharge nozzle for discharging fuel therefrom and causing the same to pass downwardly and travel along the bottom of the cup in a reverse direction to the other end wall, the latter being inclined upwardly toward the vaporizing member from a point below the same to deflect the flame of the combusted fuel upwardly and cause the fuel to impinge against the vaporizing member, the bottom of the cup being provided with an elongated opening having an upstanding flange surrounding the opening in spaced relation with the end walls of the cup.

7. The combination with a hydrocarbon burner having a liquid hydrocarbon vaporizing tube provided with a substantially straight portion terminating in a nozzle, of a priming cup comprising an elongated concave member having a liquid intercepting wall projecting upwardly from one end of the cup, the cup being provided at its other end with a shorter wall in line with the projecting wall, the cup lying below and along the vaporizing member, with its projecting end wall arranged in line with the nozzle to receive fuel from the discharge nozzle and deflect it downwardly and reverse the direction of the fuel and cause the same to pass along the bottom of the cup so that the flame will be directed upwardly by the shorter end wall and be caused to impinge against the vaporizing tube.

8. The combination with a hydrocarbon burner having a liquid hydrocarbon vaporizing member terminating at one end in a discharge nozzle, of a priming cup comprising an elongated concave member lying below and extending longitudinally of the vaporizing member in slightly spaced relation to the same and having a liquid intercepting wall at one end spaced from and in line with the nozzle, the bottom portion of the cup in line with and distant from the intercepting wall being inclined upwardly towards the vaporizing member so that the fuel directed against the intercepting wall reverses its path of travel upon contact with such wall, whereby the liquid fuel is directed into the priming cup and the vapor portion of the discharged fuel in combusted form is directed upon the vaporizing member adjacent the discharge nozzle by the said inclined portion of the cup.

In testimony whereof I affix my signature.

WILLIAM C. COLEMAN.