Nov. 30, 1948. S. C. BRODY 2,455,220

BLAST TORCH

Filed May 29, 1947

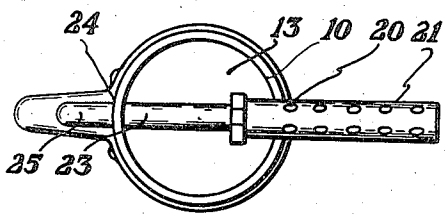


Fig. 1

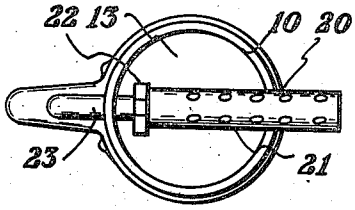


Fig. 5

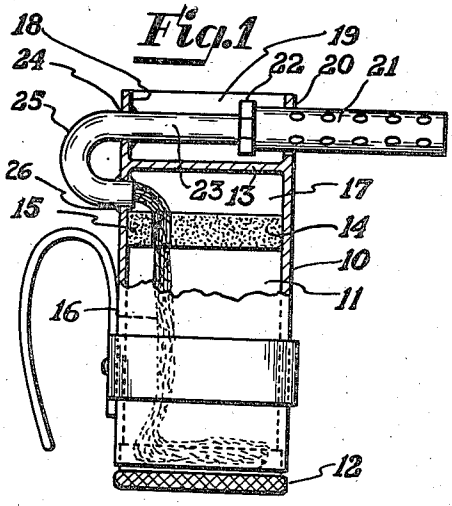


Fig. 2

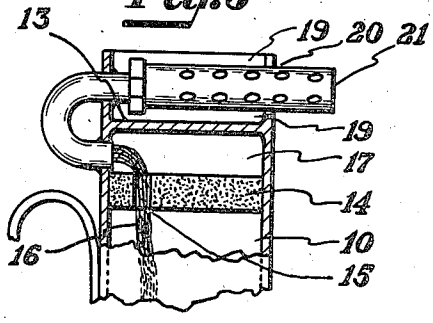


Fig. 6

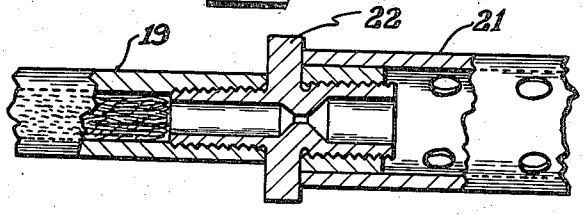


Fig. 3

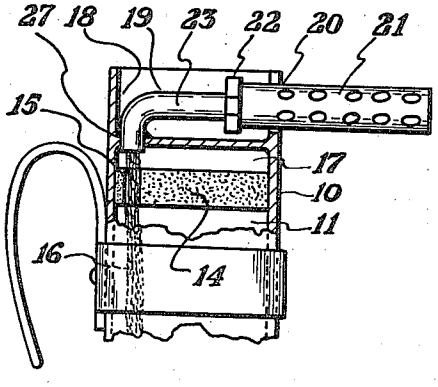


Fig. 4

INVENTOR.
Samuel C. Brody.
BY
Geo B Rawlings
ATTORNEY

Patented Nov. 30, 1948

2,455,220

UNITED STATES PATENT OFFICE

2,455,220

BLAST TORCH

Samuel C. Brody, Newton, Mass.

Application May 29, 1947, Serial No. 751,344

15 Claims. (Cl. 158—35)

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This invention relates to automatic blast torches of the self-generating type which employ a combustion burner assembled to a pressure-generating unit for creating a blast flame with means for initially priming the same.

An important object of my invention is to provide a torch which will produce in the minimum time and maintain in any and all positions in which the torch may be operated a continuous, uniform and steady blast flame of maximum intensity.

Another important object is to provide a continuous and intense heat that is carried back by the combustion burner to the pressure-generating tube (or so-called wick tube or gooseneck), as well as to the casing itself which houses the fuel. In a few minutes such heat causes the fuel to be vaporized and permits the blast flame to reach its maximum blast intensity, which is then continuously maintained until all the fuel has been exhausted or the torch is extinguished.

Another object is to greatly simplify the mechanical construction of the torch and thereby substantially reduce its manufacturing cost.

Other objects and features of superiority of my present torch over torches now on the market will appear as this description proceeds.

In attaining my objects and advantages I construct my torch in such a manner as to efficiently utilize (after priming) the heat developed by the combustion burner for quickly and thoroughly volatilizing the fuel into gas supplied to the burner from the fuel chamber of the torch before the fuel reaches said burner and is combusted therein.

According to my present invention the heat developed by the burner is continuously and intensely conducted back to the fuel chamber of the pressure-generating unit and pre-heats the fuel in said chamber as well as causing it to be quickly and thoroughly volatilized while it is passing along the pressure-generating tube which connects said chamber with the combustion burner.

Alternatively I may provide a barrier within the casing which subdivides the casing when so arranged into a fuel chamber and a superposed gas chamber.

As a result of this construction when the fuel is changed into gas and reaches the combustion burner it is thoroughly and intensely volatilized into a superheated gas and is in a condition best suited for mixture with the air for supporting maximum combustion in the burner and thus will produce a steady, continuous and super-intense blast flame emitting from the discharge end as well as from the holes of the combustion burner.

My torch is extremely simple in construction and very safe and reliable in operation. Because

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of its extremely efficient action in causing high volatilization of the fuel, the fuel gases are delivered continuously to the combustion burner at a continuously increasing rate until the maximum combustion is attained, thus substantially reducing fuel loss and consumption as well as assuring smooth and intense blast-flame operating efficiency. My torch is extremely compact in design and may be manufactured at much lower cost than torches now on the market. For the super-intensity of its blast flame, my torch is much lighter in weight than any self-generating torch of the nearest comparable blast flame intensity now in use.

In carrying out my present invention, I preferably locate the combustion burner, in part at least, within a heating chamber which preferably overlies the top and closure of the fuel chamber in close proximity thereto, and I connect the gas intake end of said burner to the pressure generating tube of the torch which likewise is located, in part at least, within said heating chamber. So mounted, the burner when operating causes heat from the blast flame coming through some of the holes in the burner to play against said closure as well as heating by conduction the pressure generating tube and casing wall and thereby quickly, thoroughly and intensely volatilizing the fuel into gas before it is delivered by the pressure generating tube to the burner for combustion therein.

In the accompanying drawing wherein I have illustrated several embodiments of my invention.

Figs. 1 and 2 are, respectively, a top plan and a sectional elevation of one form of my torch.

Fig. 3 is a detail view of a jet unit which may be used with any of the forms of my torch.

Fig. 4 is a sectional elevation of a modified form of torch, and

Figs. 5 and 6 are, respectively, a top plan and a sectionalized elevation of a still further modification.

I have indicated generally at 10 the pressure generating unit of an automatic blast torch of the self-generating type. Unit 10 includes a casing, which may be of cylindrical, oval or other cross-section, and is formed to provide a fuel chamber 11, closed at its lower end by a filling closure 12 and at its upper end by another closure 13. Within fuel chamber 11 may be mounted a barrier 14, preferably of permeable material, having an opening 15 therein preferably for the passage of suitable wicking 16. Barrier 14 is shown as spaced from closure 13 to provide a gas chamber 17 but may be in direct contact with said closure so as to be superheated thereby if so desired.

Beyond closure 13 casing 10 may be extended as at 18 to provide a heating chamber 19 of any desired depth in prolongation of said fuel chamber. Extending through an opening 20 in the

wall of the said casing and in close proximity to top closure 13 for a portion of its length is a perforated combustion burner 21. The outer end of said burner projects sufficiently beyond the casing to permit the blast flame emitted therefrom to be effectively directed upon the work.

Removably assembled to the gas inlet end of the burner 21 by means of the jet unit 22 depicted in Fig. 3 is one end of a pressure generating tube 23, the other end of which is open to the interior construction of the casing 10. Jet unit 22 is generally similar to that shown in my prior Patent No. 2,102,404, dated Dec. 14, 1937.

In the form of my invention shown in Figs. 1 and 2, tube 23 is extended through a hole 24 in the wall of the heating chamber 19 and for a portion of its length is disposed externally of the casing as indicated at 25, re-entering the casing through a hole 26 in the wall thereof so as to communicate with the interior construction of the casing 10. The portion 25 of the tube which is external of the casing may serve as a priming area to be heated by an open flame or otherwise in starting the torch.

In the form of my invention shown in Fig. 4 the construction is generally the same as that shown in Figs. 1 and 2 except that tube 23 lies wholly within heating chamber 19 with its downturned intake end extending through an opening 27 in top closure 13 to establish communication with the interior construction of the casing.

In the form of the invention shown in Figs. 5 and 6 the construction is likewise generally similar to that shown in Figs. 1 and 2 except that the burner extends substantially entirely across the heating chamber before connecting with the outer end of tube 23.

In all forms the torch may be started by pouring some fuel into the heating chamber 19 and igniting same, or by means of an open flame applied to tube 23 and/or casing, or by any other means applicable for starting.

In all forms, after the torch has been started, heat and open flame from the holes in that portion of the burner which overlies the top closure 13 plays directly upon said closure and said heat is continuously conducted by said tube, by said closure, and by the casing itself to the fuel within the fuel chamber to insure complete volatilization of the same.

Should the torch be equipped with a barrier and the barrier located in contact with the top closure, the heat from the combustion burner constantly being carried back to and by the pressure generating tube to the closure and casing, and in addition the flame from some of the holes of the burner impinging directly upon the closure will also superheat the closure to a maximum degree and thereby superheat the barrier, thus making possible the maximum volatilization of the fuel and accelerates the generation of the gas.

As a result of this construction the fuel is quickly, thoroughly and intensely volatilized into gas before delivery to the burner for combustion therein, thereby insuring generation of a uniform, steady and powerful blast flame of maximum intensity.

While I have shown and described embodiments of my invention which have been found to work extremely satisfactorily under actual service conditions, it will be understood that such showing is illustrative only and that I am not to be limited to the structures actually shown, since many other modifications are possible within the spirit and scope of my invention as defined by the appended claims.

I claim:

1. In a torch, a pressure generating unit comprising a casing formed to provide a fuel chamber having a top closure, a pressure generating tube lying in part at least above and extending transversely and in close proximity to and in heat exchange relationship with said closure and communicating at its gas intake end with the interior of the casing, and a perforated combustion burner assembled to the gas outlet end of said tube and lying in part at least above and extending transversely and in close proximity to and in direct heat exchange relationship with said closure, so that when the torch is operating heat from said burner is continuously conducted by said tube to the interior of said casing and direct heat exchange occurs between said burner and said closure thereby further heating the casing and volatilizing the fuel therein.

2. The torch of claim 1 in which said casing has a wall portion above said top closure, the pressure generating tube also extends outwardly through said wall of the casing at a point remote from the burner, then externally of the casing for a portion of its length, and then inwardly through said casing wall below said top closure to communicate with the interior of the casing.

3. In a torch, a pressure generating unit comprising a casing formed to provide a fuel chamber having a closure at its upper end, a barrier within said fuel chamber and spaced from said closure to form a gas chamber, a pressure generating tube lying in part at least above and extending transversely and in close proximity to and in heat exchange relationship with said closure and communicating at its gas intake end with said gas chamber, and a perforated combustion burner assembled to the gas outlet end of said tube and lying in part at least above and extending transversely and in close proximity and in direct heat exchange relationship with said closure, so that when the torch is operating heat from said burner is continuously conducted by said tube to the gas chamber and direct heat exchange occurs between said burner and closure thereby further heating the casing and volatilizing the fuel therein.

4. The torch of claim 3 in which said casing has a wall portion above said top closure, the pressure generating tube also extends outwardly through said wall of the casing at a point remote from said burner, then externally of the casing for a portion of its length, and then inwardly through said casing wall below said top closure to communicate with said gas chamber.

5. In a torch, a pressure generating unit comprising a casing formed to provide a fuel chamber having a top closure, a pressure generating tube lying in part at least above and extending transversely and in close proximity to and in heat exchange relationship with said closure and communicating at its gas intake end with the interior of said casing, said casing having a wall portion above said closure and a perforated combustion burner extending through said wall of said casing and assembled to the gas outlet end of said tube, said burner lying in part at least above and extending transversely and in close proximity to and in direct heat exchange relationship with said closure so that when the torch is operating heat from said burner is continuously conducted by said tube to the interior of said casing and direct heat exchange occurs be-

tween said burner, said closure and said casing wall thereby further heating the casing and volatilizing the fuel therein.

6. The torch of claim 5 in which the pressure generating tube also extends outwardly through said wall of the casing at a point remote from said burner, then externally of said casing for a portion of its length, and then inwardly through said casing wall at a point below said closure to communicate with the interior of the casing.

7. In a torch, a pressure generating unit comprising a casing formed to provide a fuel chamber having a top closure, a barrier within said fuel chamber and spaced from said closure to form a gas chamber, a pressure generating tube lying in part at least above and extending transversely and in close proximity to and in heat exchange relationship with said closure and communicating at its gas intake end with the gas chamber, said casing having a wall portion above said closure, and a perforated combustion burner extending through said wall of said casing and assembled to the gas outlet end of said tube, said burner lying for a portion of its length above and extending transversely and in close proximity to and in direct heat exchange relationship with said closure so that when the torch is operating heat from said burner is continuously conducted by said tube to the gas chamber and direct heat exchange occurs between said burner, said closure and the casing wall thereby further heating the casing and volatilizing the fuel therein.

8. The torch of claim 7 in which the pressure generating tube also extends outwardly through said wall of the casing at a point remote from said burner, then externally of the casing for a portion of its length, and then inwardly through said casing wall below said top closure to communicate with said gas chamber.

9. In a torch, a pressure generating unit comprising a casing formed to provide a fuel chamber having a top closure, the side wall of said casing being extended to provide a heating chamber above said closure, a pressure generating tube lying in part at least above and in close proximity to and in heat exchange relationship with said closure and communicating at its gas intake end with the interior of the casing, and a perforated combustion burner extending through the extended portion of the side wall of said casing and assembled to the gas outlet end of said tube, said burner lying for a portion of its length within said heating chamber and above and in close proximity to and in direct heat exchange relationship with said closure and with said casing wall, so that when the torch is operating heat from said burner is continuously conducted by said tube to the interior of said casing and direct heat exchange occurs between said burner, said closure, and said casing wall thereby further heating the casing and volatilizing the fuel therein.

10. The torch of claim 9 in which the pressure generating tube and the burner each extends for a portion of its length transversely of the heating chamber.

11. The torch of claim 9 in which the pressure generating tube also extends outwardly through the extended portion of the side wall of the casing at a point remote from said burner, then externally of the casing for a portion of its length, and then inwardly through said casing wall to communicate with said fuel chamber.

12. In a torch, a pressure generating unit comprising a casing formed to provide a fuel

chamber having a closure at its upper end, the side wall of said casing being extended to provide a heating chamber above said closure, a barrier within said casing and spaced from said closure to form a gas chamber, a pressure generating tube lying in part at least within said heating chamber above and in close proximity to and in heat exchange relationship with said closure and communicating at its gas intake end with said gas chamber, and a perforated combustion burner extending through the extended portion of the side wall of said casing and connected to the gas outlet end of said tube, said burner lying for a portion of its length within said heating chamber above and in close proximity to and in direct heat exchange relationship with said closure so that when the torch is operating heat from said burner is conducted by said tube to said gas chamber and direct heat exchange occurs between said burner, said closure and the wall of said casing thereby further heating the casing and volatilizing the fuel therein.

13. The torch of claim 12 in which the pressure generating tube and the burner each extends for a portion of its length transversely of the heating chamber.

14. The torch of claim 12 in which the pressure generating tube also extends outwardly through the extended portion of the side wall of the casing at a point remote from the burner, then externally of the casing for a portion of its length, and then inwardly through said casing wall to communicate with said gas chamber.

15. In a torch, a pressure generating unit comprising a casing formed to provide a fuel chamber having a closure at its upper and lower ends, the side wall of said casing being extended upwardly beyond the top closure of the fuel chamber to provide a heating chamber above said fuel chamber, a pressure generating tube extending in part at least within and transversely of said heating chamber and above and in close proximity to said top closure and in direct heat exchange relationship therewith and communicating at its gas intake end with said fuel chamber, a perforated combustion burner extending through the extended portion of the side wall of said casing and assembled to the gas outlet end of said tube, said burner lying for a portion of its length within and transversely of said heating chamber and above and in close proximity to and in direct heat exchange relationship with said top closure, so that when the torch is operating heat from said burner is continuously conducted by said tube to said fuel chamber and direct heat exchange occurs between said burner, said top closure and said side wall of the casing thereby further heating and volatilizing the fuel therein.

SAMUEL C. BRODY.

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