Nov. 29, 1960 P. C. JOY 2,961,859

GAS-FIRED LUAU TORCH

Filed Oct. 13, 1959 2 Sheets-Sheet 1

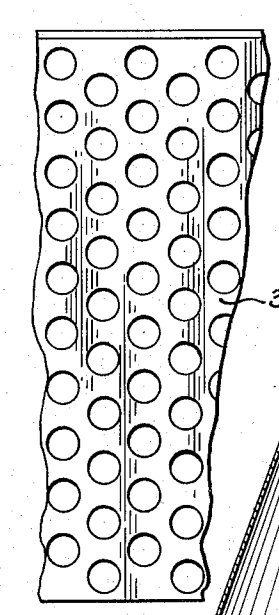


Fig. 4.

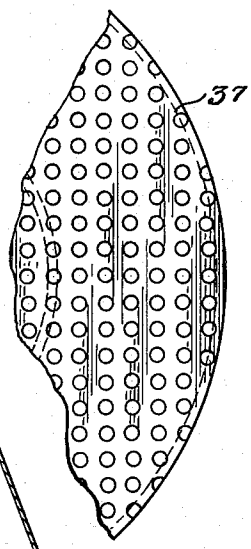


Fig. 3.

Fig. 1.

Fig. 5.

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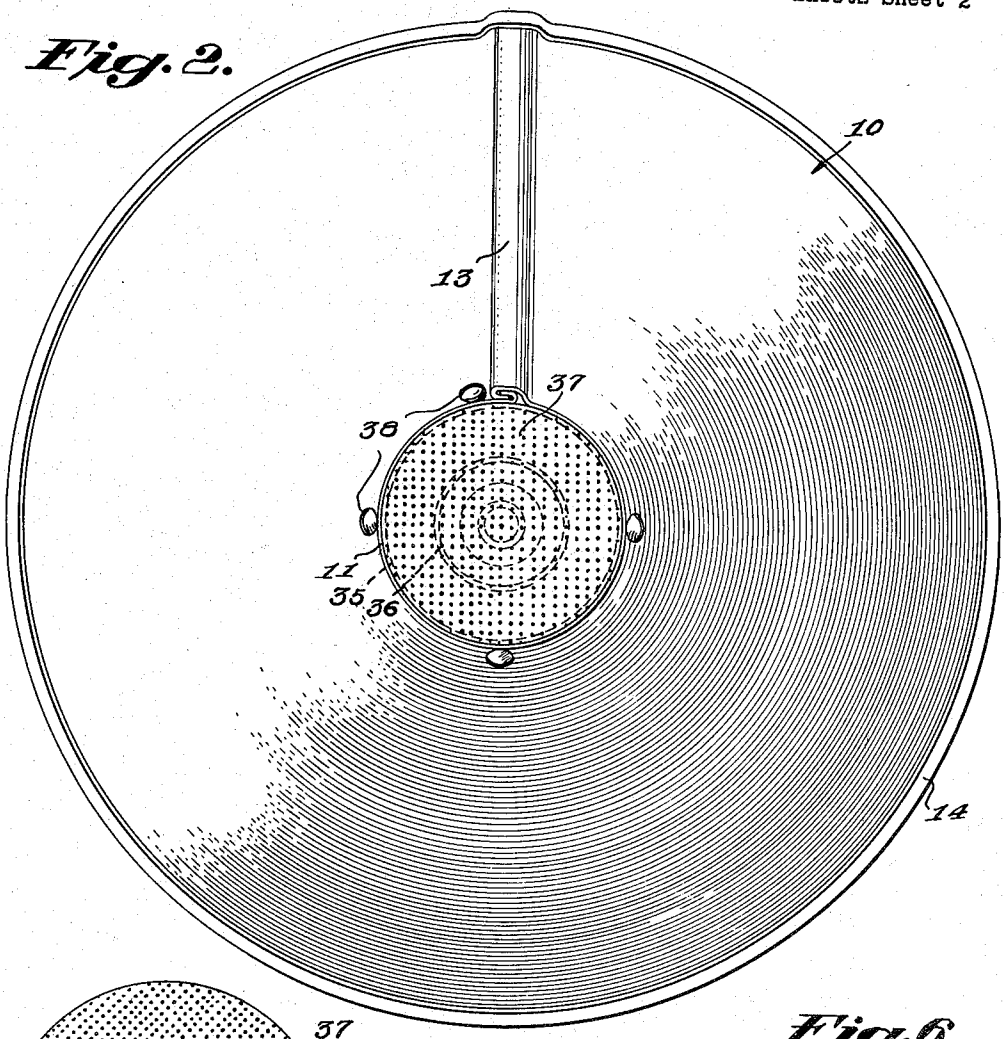
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Fig. 2.



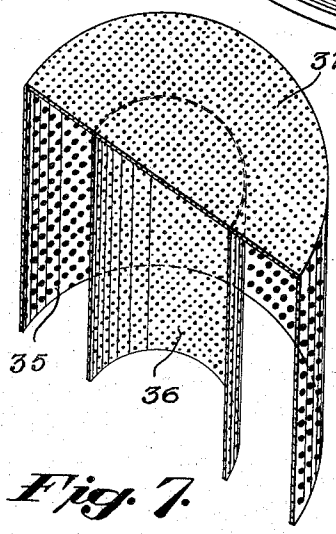
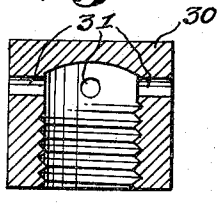


Fig. 7.

Fig. 6.



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2,961,859

GAS-FIRED LUAU TORCH

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5 Claims. (Cl. 67—87)

The invention more particularly relates to a torch, or flare, primarily for outdoor use, and whose illumination arises from the flame of burning gases without a prior admixture of oxygen at the burner.

The primary features of this invention are to provide a gas torch which:

(1) will produce an illuminating flame of pleasing, integrated form and of sufficient size to provide useful outdoor illumination.

(2) will have stability of combustion to resist tenaciously the extinguishing action of wind and

(3) will have a gas consumption rate low enough to keep operating costs at a level of practical economy.

A secondary feature of the invention is to provide a design which has aesthetic appeal and results in moderate initial cost and low maintenance cost.

As will be hereinafter described, illustrated and claimed, it is the novel construction, combination and arrangement of parts of this invention which accomplishes the aforesaid primary features of low gas consumption, pleasing integrated flare and high resistance to extinguishment.

A practical and preferred structural embodiment of the invention is shown in the accompanying drawings, wherein:

Fig. 1 is an axial vertical sectional view of the improved torch with the central gas conducting pipe or tube shown partly in elevation;

Fig. 2 is a top plan view of the torch with certain concealed elements shown in dotted lines;

Fig. 3 is a fragmental plan view of the top wall of the flame hood on an enlarged scale;

Fig. 4 is a fragmental side elevational view of the outer cylindrical member of the flame hood on an enlarged scale;

Fig. 5 is a fragmental side elevational view of the inner cylindrical member of the flame hood;

Fig. 6 is an enlarged vertical sectional view of the distributor head disposed within the flame hood; and

Fig. 7 is an isometric view of one half of the flame hood.

Referring now in detail to the drawings, the improved gas fired torch comprises a hollow central body, shown as a truncated cone **10**, whose smaller upper end is open as indicated at **11** and whose larger lower end is closed by means of a disc **12**. The truncated cone **10** is typically formed of 16 gauge sheet copper which is rolled about an axis with opposite edges thereof connected by an interlocking crimp seam **13**, as is indicated in Fig. 2.

The cone base **12** is also typically of 16 gauge sheet copper which is circular in plan and is assembled with

the lower end of the truncated cone **10** by upwardly crimping a marginal lip **14** about the exterior of said lower end of the truncated cone.

The base **12** is provided with a central aperture **15** of relatively large diameter for the reception of an inlet fixture including a galvanized pipe coupling **16** disposed beneath the base **12** concentrically thereof and with the upper end thereof engaged with the base adjacent the aperture **15** and the pipe coupling is secured to the base **12** as by means of soldering as is indicated at **17** in Fig. 1.

As is indicated in Fig. 1, the pipe coupling **16** is provided with a thread **18** extending throughout the length thereof with the root of the threads being of a diameter equal to that of the aperture **15**.

A bushing or reducer **19** is threaded into the upper end of the coupling **16** and same is provided with an axial bore **20** having an internal thread **21** within the upper reduced end thereof.

An elongated tube or internal feed pipe **23** provided with a bore **24** is provided and is disposed vertically within the conical central body as follows:

The lower end of the internal feed pipe is threaded as indicated at **25** and said end is provided with a plug **26** having a central vertical aperture **27** therein of substantially less diameter than the pipe bore **24** which provides a gas flow metering orifice. The said internal feed pipe is further provided with a pair of diametrically opposed apertures or ports **28** which are preferably disposed nearer the threaded end **25** than the opposite end. Said ports provide for the flow of a minor volume of gas into the interior of body **10**.

The opposite or upper end of the internal feed pipe is threaded as at **29** and provided with a cap or distributor head **30** whose skirt is provided with a plurality (preferably six) of radially disposed apertures **31** which communicate with the upper end of the bore **24** in the pipe **23**.

With the internal feed pipe thus prepared, same is lowered into the truncated cone or body **10** from the upper open end thereof and its lower threaded end is aligned with the bushing **19** after which a bushing or reducer **32** is threaded into the upper reduced end of the bore **20** and also threaded onto the lower end of the internal feed pipe **23**.

A flame hood **34** completes the construction and as is more clearly indicated in Figs. 1, 3, 4, 5 and 7 such hood comprises theree screens **35**, **36** and **37** of perforated sheet metal and which includes an outer cylindrical screen **35**, an inner cylindrical screen **36** and a top circular screen **37**.

As is shown more clearly in the enlarged Figs. 3, 4 and 5, the outer cylindrical screen **35** is preferably of #10 juice screen which contains 64 holes of .085" diameter per square inch while the inner cylindrical screen **36** and the circular screen **37** are preferably of #3 juice screen containing 225 holes of .039" diameter per square inch.

The assembled flame hood is lowered over the upper end of the feed tube **23** with the lower open end of the hood disposed below the upper open end of the truncated cone **10** and removably secured in position by means of screws **38**.

A torch according to the foregoing description will burn a variety of gases and maintain combustion despite adverse winds. Recommended values for three typical

gases are listed below. The last three columns refer by piece number to orifice and ports shown in Fig. 1 of the drawings.

Gas	Calorific Values, B.t.u./c.f.	Specific Gravity	Recommended Input, B.t.u./hr.	Gas Pressure at Inlet, Inches W.C.	Pc. 27 Meter Orifice Drill Size	Ports, Number and Sizes	
						Pc. 28 Internal Feed	Pc. 31 Distributor Head
Oilgas	760	0.86	18,500	4	#38	2—#54	6—#54
Butane	3,300	2.0	15,000	11	#60	2—#54	6—#54
Natural	1,000	0.55	35,000	7	#41	2—#41	6—#54

Having set forth the construction of the gas-fired torch in accordance with a preferred structural embodiment, the operation thereof is as follows:

The torch is designed to provide a pleasing illumination with a minimum expenditure of fuel in such manner that the flame will withstand the extinguishing action of wind or rain, or both.

The hollow central body **10** and the flame hood as embodied in the accompanying drawings resemble the conical kerosene reservoir and wick involved in the traditional Hawaiian kerosene luau torch. The conical shape is not vital to the proper operation of the torch.

In use the lower threaded end of the coupling **16** is connected to a gas source. The gas passes upwardly through the internal feed pipe **23** and emerges in jets from the two apertures **28** therein as well as from the six apertures **31** in the upper end of the distributor head and within the inner cylindrical screen **36**. The gas emerges from the six apertures **31** with such velocity that it normally passes through both the inner and outer screen **36** and **35** before igniting. The gas jetting into the interior of the central body via the ports **28** in the internal feed pipe **23**, wells up into the base of and then to the outside of the flame hood where it burns and adds roundness to the torch flame. It also adds stability to the flame under windy conditions by excluding air from the lower part of the flame hood.

All combustion, except under windy conditions, takes place outside this flame hood **34**, and since there is no prior admixture of air, it occurs as a bright yellow flame. In quiet air and mild breezes the gas will pass through the various screens and burn outside the flame hood. The diffusing action of the screens causes this combustion to form an integrated flame above the flame hood. As wind velocity increases, the combustion first tends more and more to the leeward side of the flame hood and then retreats on the windward side into the annular space between the two cylindrical screens. In strong gusts where the wind velocity is, say, 35 m.p.h. or above, the flame will retreat completely within the annular space between the two cylindrical screens but is very difficult to extinguish completely because the wind is so diffused by the outer screen that it cannot sweep away the gas jetting through the inner screen before ignition takes place and only serves to provide an air-blast effect between the two cylindrical screens, reducing the flame to a short bluish one of intense heat which keeps a substantial portion of the circumference of the cylindrical screens at a sufficiently high temperature to strongly support continued combustion.

Combustion does not take place within the inner cylindrical screen **36** at any time. Whenever the wind moderates after having been sufficiently strong to drive the flame within the annular space between the two cylindrical screens, the constant supply of gas will soon exclude air from the annular space to such a degree that combustion therein cannot be supported and the flame will pass to the outside of the outer screen again.

This application is a continuation-in-part of application Serial No. 707,894, filed January 9, 1958, now abandoned.

I claim:

1. An illuminating torch for gaseous fuels comprising a hollow central body, a flame hood supported on said body, said hood including two perforated cylindrical screens of unequal radii and of equal length and a perforated circular screen of a radius equal to that of the larger cylindrical screen, said cylindrical screens being concentric to each other and attached concentrically at corresponding ends thereof to the said perforated circular screen at the margin thereof and within the margin respectively, an opening in said central body of substantially the same radius as that of the said larger perforated cylindrical screen into which the said flame hood assembly is inserted and secured so that its major portion lies externally of the said central body and with the said circular screen being externally of the body, a distributor head supported concentrically with and wholly within the said smaller perforated cylindrical screen and provided with ports which lie outside the said central body in a plane normal to the center line of the said perforated cylindrical screens, an internal feed pipe supporting said distributor head and communicating therewith for feeding fuel thereto, said feed pipe being provided with ports intermediate of its ends for feeding fuel to the interior of said central body, an inlet fixture secured fuel-tight into a wall of the said central body and supporting the said internal feed pipe into which it feeds fuel from an external connection.

2. An illuminating torch according to claim 1 wherein said central body is of truncated conical form, and said flame hood being disposed within the smaller end of the central body.

3. An illuminating torch according to claim 2 wherein the larger end of said central body is provided with a closure disc, said disc having a central aperture co-axial with said internal feed pipe, a cylindrical coupling having one end thereof secured to said disc marginally of said aperture, a reducer disposed within said coupling and having an aperture therein communicating with said internal feed pipe, and a fuel entry aperture in the end of said internal feed pipe of substantially less diameter than that of the interior of the pipe.

4. An illuminating torch according to claim 1, wherein the inner one of said cylindrical screens and said circular screen are provided with perforations of substantially like dimensions and spacing, and the outer one of said cylindrical screens being provided with larger perforations and greater spacing.

5. An illuminating torch according to claim 4, wherein said cylindrical screens and said circular screen comprise metallic plates having apertures therein.

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