

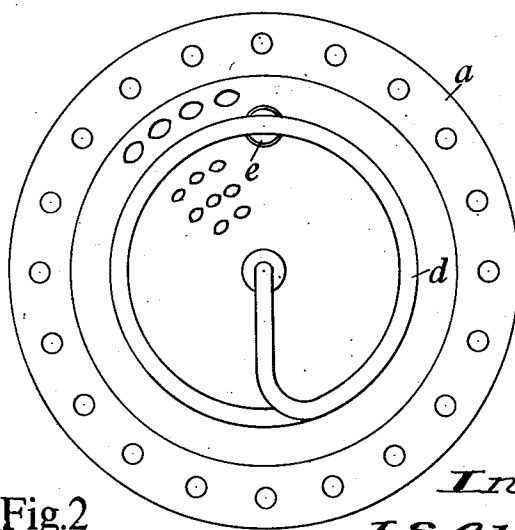
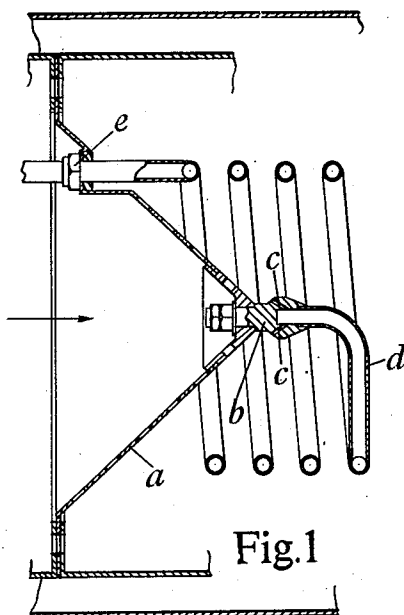
Sept. 23, 1952

J. S. CLARKE ET AL
LIQUID FUEL VAPORIZER AND BURNER

2,611,244

Filed Dec. 27, 1949

4 Sheets-Sheet 1



Inventors

J. S. Clarke

A. E. Clarke

N. P. Coupe

By Elmer Downing, Atty.

Sept. 23, 1952

J. S. CLARKE ET AL

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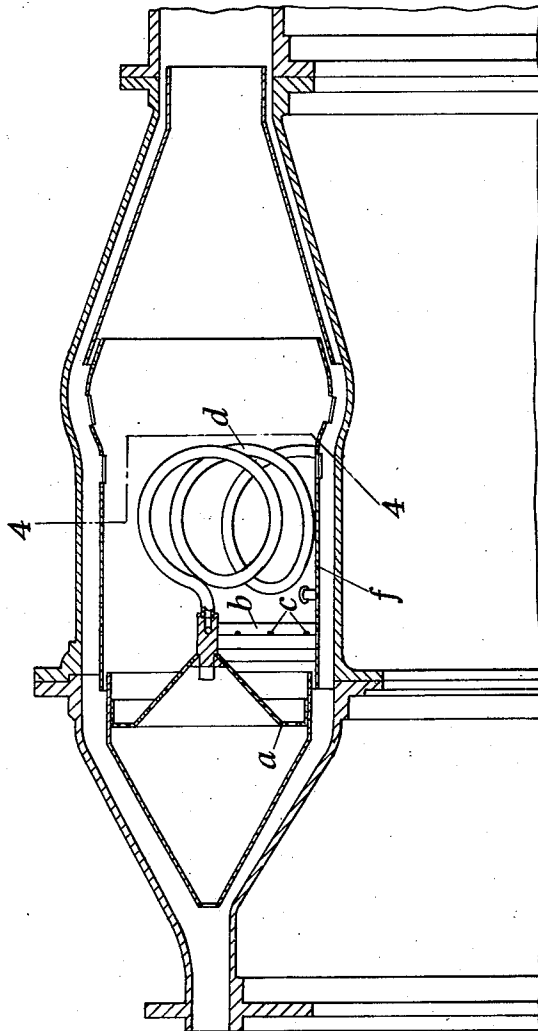


Fig. 3

Inventors
J. S. Clarke
A. E. Clarke
N. P. Coupe
By *Glascock Downing* *Attys.*

Sept. 23, 1952

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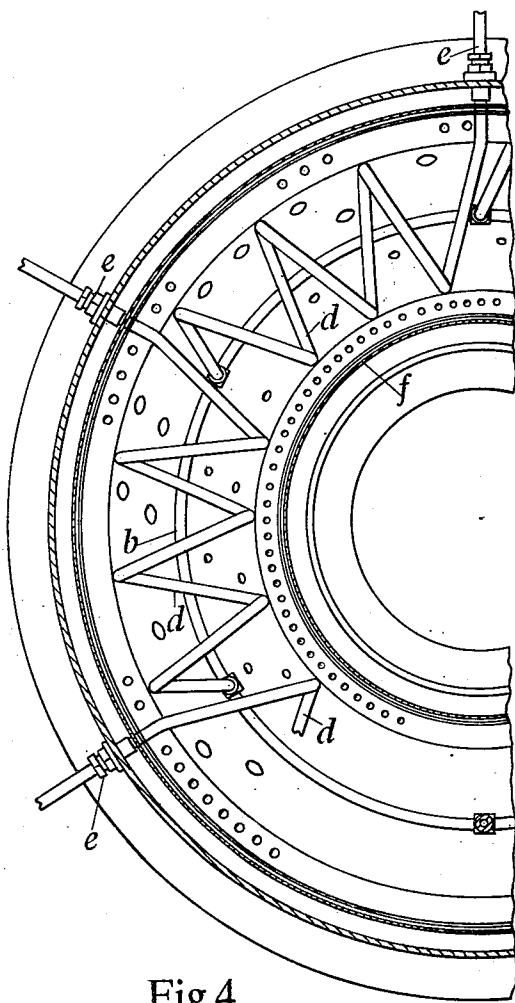


Fig. 4

Inventors
J. S. Clarke
A. E. Clarke
N. F. Coupe
By Harold Downing
Attys

Sept. 23, 1952

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4 Sheets-Sheet 4

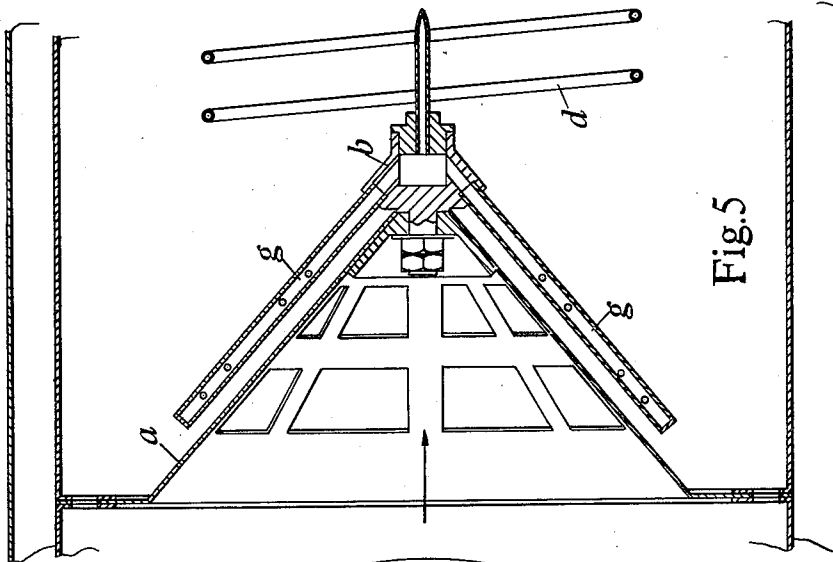


Fig. 5

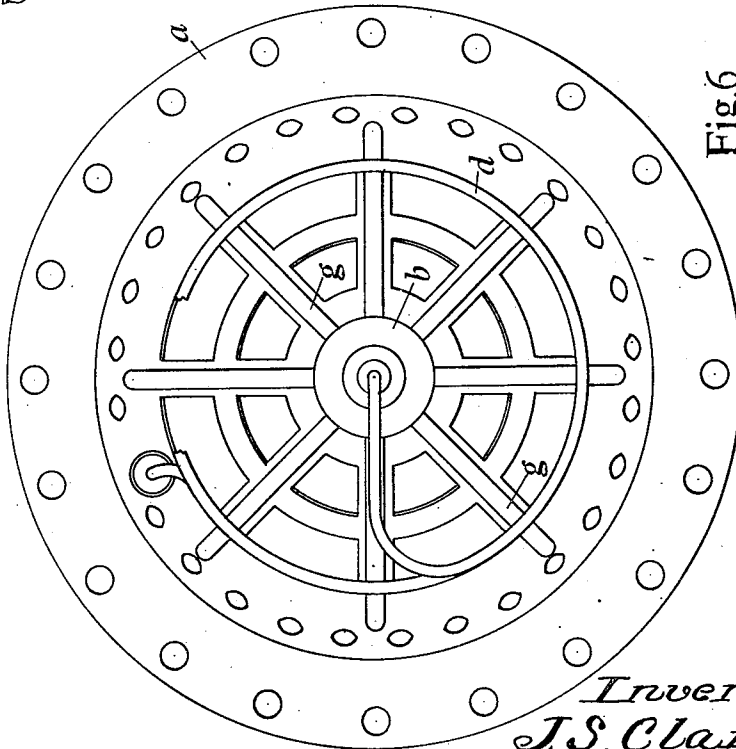


Fig. 6

Inventors
J. S. Clarke
A. E. Clarke
N. P. Coupe
By *Glenn Downing* *Att'y*

UNITED STATES PATENT OFFICE

2,611,244

LIQUID FUEL VAPORIZER AND BURNER

John Stanley Clarke, Blacko, near Nelson, Albert
Edward Clarke, Brierfield, Burnley, and Noel
Parker Coupe, Burnley, England, assignors to
Joseph Lucas Limited, Birmingham, England

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3 Claims. (Cl. 60—39.71)

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This invention has for its object to provide an improved liquid fuel burner adapted for use more particularly in the combustion chamber of a jet-propulsion engine or gas turbine, but applicable also to other uses.

In the accompanying drawings:

Figure 1 is a sectional side elevation and Figure 2 a front elevation illustrating one embodiment of the invention.

Figures 3 and 4 are respectively fragmentary sectional side and front elevations illustrating another embodiment, Figure 4 being taken on the line 4—4 of Figure 3.

Figures 5 and 6 are respectively similar views of Figures 3 and 4 illustrating a further embodiment.

Referring to Figures 1 and 2, there is provided a sheet metal base piece *a* shaped to a hollow conical form, and adapted to be mounted transversely across the end of a cylindrical combustion chamber at which air is admitted, the front convex side being directed towards the region of combustion. The conical part of the base piece is formed with perforations through which air can flow from its interior to the combustion region. Alternatively the base piece may be of any other suitable or equivalent form; thus it may be pyramidal, semi-ellipsoidal or hemispherical.

At the apex of the base piece is secured a multi-orificed nozzle *b* adapted to discharge through orifices *c* equi-spaced streams of fuel parallel or substantially parallel with the convex side of the base piece, so that they can become intimately mixed with the air streams flowing through the base piece.

For supplying fuel to the nozzle we employ a helically coiled vaporizing tube *d* which at one end is attached to the nozzle *b* and at the other end to a supply pipe connection *e* on the base piece. The coil is mounted coaxially with and at the convex side of the base piece, and is adapted to be heated by the hot gases in the combustion region.

In the modification shown in Figures 3 and 4 the base piece *a* is made from a metal sheet of annular form, the sheet being shaped in cross section to an annular conical form providing a pair of mutually inclined surfaces extending from inner and outer flat marginal portions and terminating in an annular apex. The said base piece is adapted to be fitted into the entrance end of an annular combustion chamber *f* with the apex of the inclined sides extending into the said chamber. Also the base piece has formed in both its inclined and flat surfaces, perforations through which air can flow into the combustion chamber.

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Immediately adjacent the apex of the inclined surfaces of the base, and secured thereto, is mounted an annular nozzle *b* made by bending a tube to a circular form, and in the side of the nozzle facing the base are formed a number of small orifices *c* adapted to direct streams of vaporised liquid fuel in directions substantially parallel with the inclined surfaces of the base.

In the combustion chamber are mounted a plurality of helically coiled vaporising tubes *d* each bent to a segmental form, the tubes being attached at one end to equi-spaced points on the nozzle, and at the other end to supply pipe connections *e* on the combustion chamber.

The arrangement is such that when in operation, the vaporised fuel supplied to the annular nozzle is discharged along inclined paths which are substantially at right angles to the streams of air entering the combustion chamber through the inclined surfaces of the base, thus ensuring intimate mixture prior to ignition.

Referring to Figures 5 and 6 there is arranged at the apex or crown of the base piece *a*, a hollow fitting *b* connected to one end of a vaporising coil *d* extending into the combustion zone of the combustion chamber. From this fitting *b* extend radially a plurality of tubes *g* which lie parallel or substantially parallel with the convex side of the base piece. The tubes are closed at the ends remote from the fitting, and along its length each tube has formed in it a row or rows of small holes arranged to discharge the vaporised fuel in streams directed sideways across the face of the base piece where they can become mixed with the air flowing into the combustion chamber through the base piece.

Alternatively instead of a hollow fitting at the apex or crown of the base piece, there may be employed an annular fitting situated at the other ends of the tubes *g*.

By this modification, a uniform distribution of the vapour in the region of the surface of the base piece can be ensured in a simple and convenient manner.

By this invention efficient burners can be provided in simple and robust forms.

Having thus described our invention what we claim as new and desire to secure by Letters Patent is:

1. A liquid fuel burner comprising in combination a hollow base piece having a convex outer surface and provided with perforations through which air can flow, a multi-orificed nozzle attached to the crown of the base piece for discharging streams of vaporised fuel into the region

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adjacent to the convex outer surface of the base piece, and at least one helically coiled vaporising tube for conducting fuel to the nozzle, the vaporising tube being situated outside the base piece and connected to the nozzle.

2. A liquid fuel burner as claimed in claim 1, in which the hollow base piece and the nozzle are of annular form.

3. A liquid fuel burner as claimed in claim 1, in which the nozzle is provided with a plurality of vapour discharge tubes arranged substantially parallel with the convex outer surface of the base piece.

JOHN STANLEY CLARKE.
ALBERT EDWARD CLARKE. 15
NOEL PARKER COUPE.

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