

[54] **FUEL BURNER ASSEMBLIES**  
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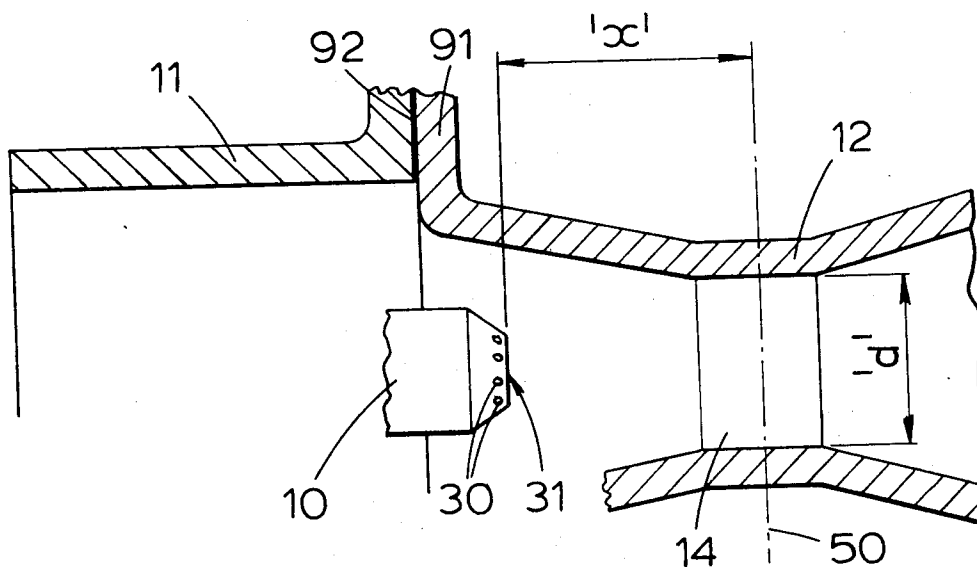
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 [51] **Int. Cl.**..... **F16k 19/00**  
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[57] **ABSTRACT**  
 A fuel burner assembly of the venturi type having its fuel nozzle provided with a plurality of jets and being more forwardly disposed in relation to the venturi than is conventional in order to reduce operating noise.

**2 Claims, 4 Drawing Figures**



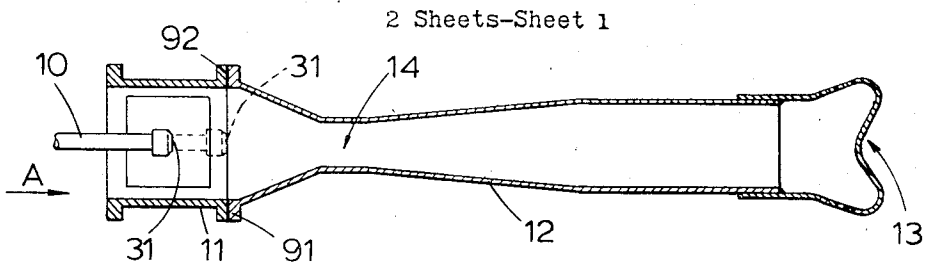


Fig. 1. PRIOR ART

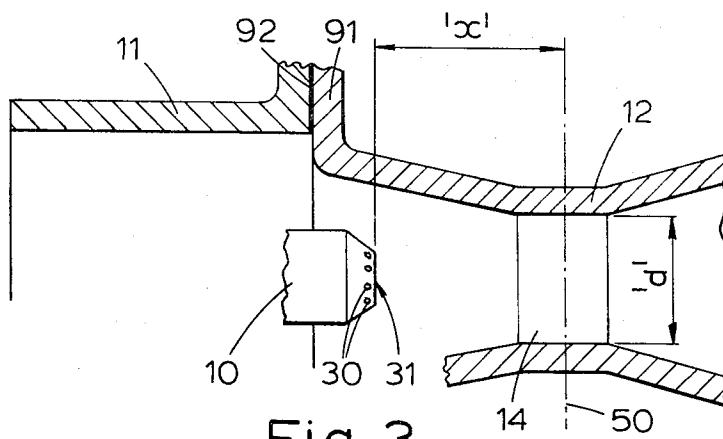


Fig. 3.

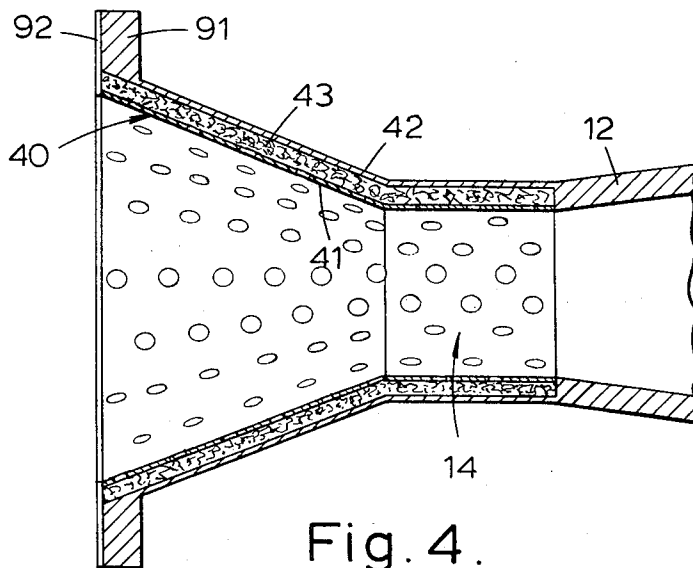


Fig. 4.

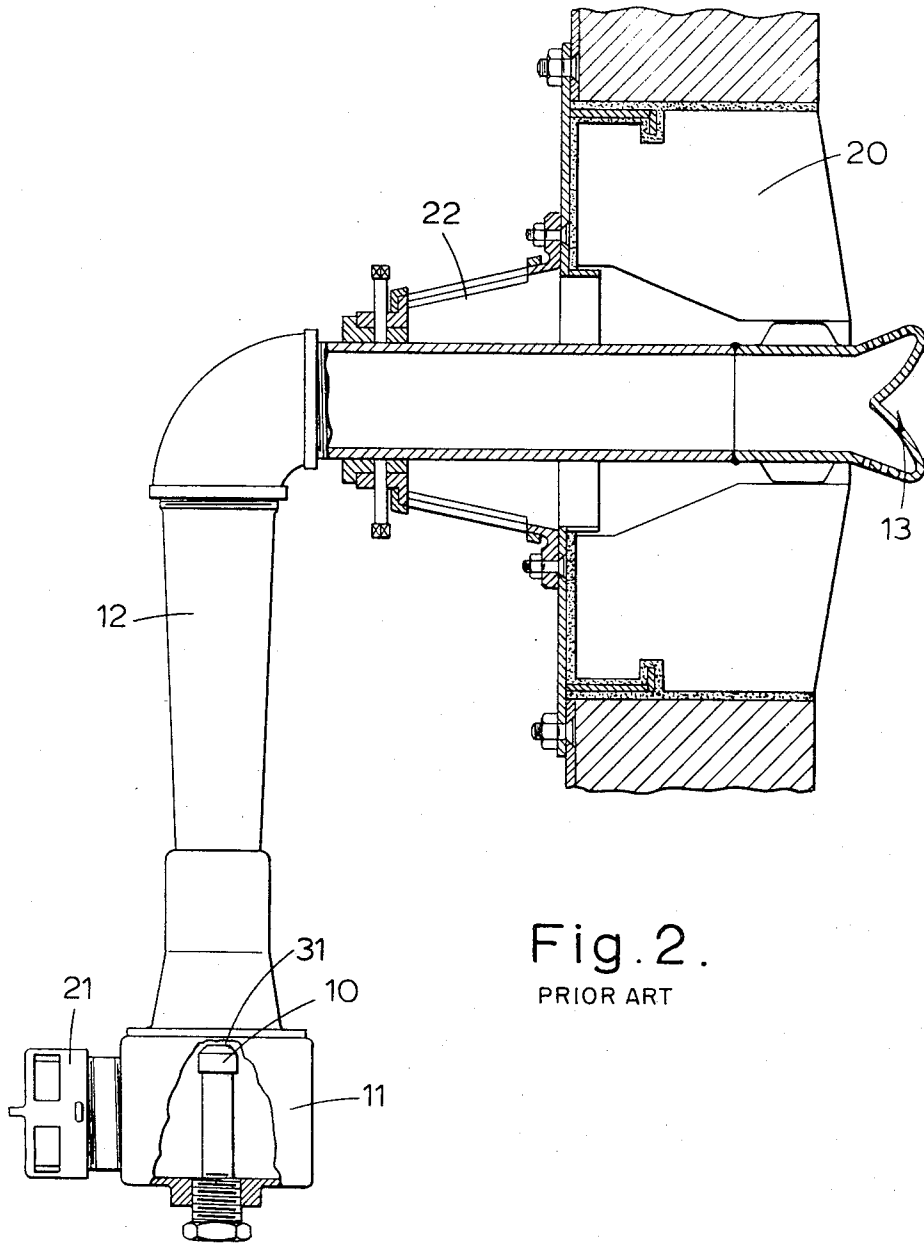


Fig. 2.  
PRIOR ART

## FUEL BURNER ASSEMBLIES

## BACKGROUND TO THE INVENTION

The present invention relates in general to a fuel burner assembly and has for its object the reduction of operating noise.

It is known to provide a burner assembly composed of a venturi and fuel nozzle arranged to discharge fuel into said venturi so that air will be inspirated into the venturi. The venturi may be of various configurations, for example, the venturi may have a throat in the form of a longitudinal section of constant minimum diameter or else the venturi can converge to a point of minimum diameter forming the throat.

## SUMMARY OF THE INVENTION

In its broadest aspect, the invention is based upon the discovery that by using a number of jets such as 4, 6 or more in the nozzle and advancing the nozzle forwardly towards the venturi from the position that it would normally adopt a significant reduction in operating noise can be achieved.

According to the invention there is provided a burner assembly composed of a venturi and a fuel nozzle arranged to discharge fuel into said venturi so that air will be inspirated into the venturi, wherein the nozzle has a plurality of jets through which said fuel is passed and the distance between the fuel-emitting end of the nozzle and the centre of the venturi throat is within the range 0.5 to 1.5 venturi throat diameters.

A further reduction in noise can be achieved by additionally forming the inlet portion of the venturi facing the nozzle from a hollow member filled with an acoustic damping material.

## BRIEF DESCRIPTION OF DRAWINGS

The invention may be understood more readily from consideration of the following description in conjunction with the accompanying drawings, wherein:

FIG. 1 is a schematic sectional side view of part of a known fuel burner assembly;

FIG. 2 is a part sectional side view of another known fuel burner assembly employing an elbow venturi;

FIG. 3 is a diagrammatic and enlarged view of part of a fuel burner assembly made in accordance with the invention and particularly depicting the relative positions of the nozzle and venturi throat; and

FIG. 4 is a schematic sectional side view of an alternative venturi throat construction for use in an assembly made in accordance with the invention.

## DESCRIPTION OF PREFERRED EMBODIMENT

As shown in FIG. 1 a known burner assembly is composed of a fuel nozzle 10 disposed in a casing 11 to which a venturi 12 is attached. At the end of the venturi 12 remote from the casing 11 there is disposed a flame nozzle 13. In known manner the venturi 12 would be supported in the wall of a furnace so that a horizontally disposed combustion flame is established by the nozzle 13 within the furnace. Fuel, more usually gas is fed to the nozzle 10 and the propulsion of the fuel from a single jet or orifice in the nozzle 10 serves to inspirate primary combustion air into the casing 11 from whence the fuel/air mixture passes through the throat 14 of the venturi 12 for subsequent combustion.

In FIG. 2 a complete burner assembly employing an elbow venturi instead of a straight venturi is shown and for convenience like numerals denote like parts to FIG. 1. The operation of the assembly of FIG. 2 is essentially as described in connection with FIG. 1 but additionally illustrated in FIG. 2 are the walls 20 of a furnace, a device 21 for adjusting the quantity of primary air, and a device 22 for adjusting the quantity of secondary air.

Assemblies of this general type are well known in this art. In these prior art assemblies the end 31 of the nozzle 10 would either be aligned with the outer surface 92 of the inlet flange 91 of the venturi 12, as depicted by the dotted line in FIG. 1, or else this end 31 would be disposed outwardly from the surface 92, i.e., to the left of FIG. 1, as shown in the full lines in FIGS. 1 and 2. Also in venturi type burners the nozzle 10 normally only has a single central orifice or jet.

The present invention is based upon the somewhat surprising discovery that by modifying the position of the nozzle 10 in relation to the venturi 12 and by increasing the number of jets in the nozzle 10 the burner will operate at a reduced noise level.

In general, it has been found that by displacing the nozzle 10 forwardly (arrow A FIG. 1) from the position which it normally adopts, and by employing a plurality of jets in the nozzle 10 instead of a single jet an improvement in the noise characteristics of the burner assembly of around 10 to 20 dBA can be achieved.

FIG. 3 depicts, in schematic form, a typical arrangement made in accordance with the invention. In this case, in contrast to FIGS. 1 and 2, there are a number of jets 30 in the nozzle 10 and the distance 'x' between the end 31 of the nozzle 10 and a reference point 50 in the venturi 12, conveniently taken as the centre of the parallel throat section 14 of the venturi 12 is within the range 0.5 to 1.5 venturi throat diameters 'd.' The dimension 'd' can be taken as the smallest internal diameter of the venturi 12. The nozzle 10 has a plurality of jets 30 preferably exceeding four. The collective area of such holes is equivalent to the area of a single conventional jet and is chosen to match the particular fuel flow rate in question.

The operating noise of the assembly can be further reduced by modifying the inlet part 40 of the venturi 12 as shown in FIG. 4. The inlet part 40 of the venturi 12 is formed from a hollow member with a perforated inner wall 41 and an outer wall 42. A fibre-glass material 43 or similar acoustic absorbing material is sandwiched between the walls 41, 42.

We claim:

1. A burner assembly composed of a venturi and a fuel nozzle arranged to discharge fuel into said venturi so that air will be inspirated into the venturi, wherein the nozzle has a plurality of jets through which said fuel is passed, the distance between the fuel-emitting end of the nozzle and the center of the venturi throat is within the range of 0.5 to 1.5 venturi throat diameters, and the inlet portion of the venturi facing the nozzle is formed as a hollow member with an acoustic absorbing material within the member.

2. An assembly according to claim 1, wherein the inner wall of the inlet portion of the venturi is perforated.

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