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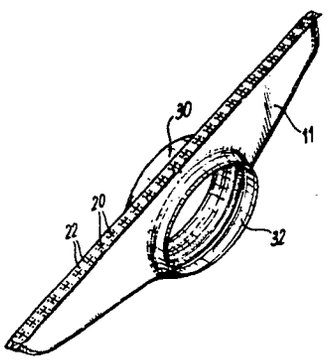
(54) Improvements in or relating to a gas burner.

(57) The invention is concerned with a gas burner formed by the connection together of a plurality of blade members (11) each of which is formed by the folding of a blank pressed from a sheet of material. Each blade member (11) has a pair of extruded openings (24, 26) which align with one another after folding of the blank, each of the openings having a lip (30, 32), and the lips being of different dimensions, such that the lip (30) of one blade member can fit within the lip (32) of an adjacent blade member. In this way the blade members (11) are mounted together and define an integral mixing chamber for gas and air. The upper edge of each blade member (11) is formed with an outlet aperture arrangement (20, 22) and the other edges of the blade member are sealed together. To complete the burner, a cap is mounted over the outwardly extending lip of the blade member at one end, while a gas inlet pipe is mounted adjacent to the outwardly facing opening of the blade member at the other end.



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Improvements in or relating to a Gas Burner

The invention relates to a gas burner of the bladed type, for use particularly in domestic gasfired appliances, to the blade members of the burner, and to the method of manufacture of the blade members.

In conventional bladed burners the individual blades are mounted in a parallel, closely spaced relation on a common mixing chamber such that internal cavities of the blades communicate with the chamber. Gaseous fuel is passed into the chamber and entrains primary air therewith, the fuel and air being mixed in the chamber and passing through these blades to outlet apertures where the mixture is ignited, secondary air being available at the outlet apertures. Each blade is secured to the mixing chamber for example by welding.

According to the invention there is provided a blade member for use in a gas burner, the blade member having an internal cavity defined by a pair of side walls, each side wall having an opening therein coaxial with an opening in the other side wall to provide a passage through the blade member which is in communication with the internal cavity, the openings having outwardly extending lips of different dimensions, the side walls having one connecting edge portion formed with an outlet aperture arrangement, and the internal cavity being closed along the other connecting edge portions of the side walls.

Preferably the blade member is formed of stainless steel.

Preferably also said other connecting edge portions of the side walls are clinched together. Alternatively said other connecting edge portion may be spot welded.

The present invention also provides a gas burner comprising a plurality of blade members according to any of the preceding claims, the blade members being connected together by the lip of each blade member having the smaller dimension being fitted within the other of the lips of an adjacent blade member, such that the blade members are retained substantially parallel to one another with said one connecting edge portions facing in the same direction, an end one of the plurality of the blade members being provided with means for closing the outwardly facing opening thereof, and the other end one of the blade members having means for mounting a gas inlet adjacent to the outwardly facing opening thereof.

The present invention further provides a method of manufacturing a blade member for use in a gas burner, the method comprising pressing a blank out of a sheet of material, forming an outlet aperture arrangement over a longitudinally extending area of the blank, forming a pair of openings one on either side of said area, and forming each opening with a projecting lip, the lips being of different dimensions, the pressing of the blank being such that the edges are displaced relative to the remaining part of the blank in a direction opposite to that in which the lips extend, the blade member being formed by folding along each side of said area such that the openings are coaxial and the edges engage together and are sealed.

Preferably the displaced edge to one side of the central area has a width greater than the other, such that the edges can be clinched together for sealing. Alternatively the edges can be sealed for example by spot welding.

An embodiment of the present invention will now be described by way of example only with reference to the accompanying drawings in which:-

Fig. 1 is a plan view of a blank for a blade member at an intermediate stage in the production thereof;

Fig. 2 is an elevation of a formed blade member;

Fig. 3 is a perspective view of the blade member of Fig. 2; and

Fig. 4 is a sectional view of a burner apparatus utilising a plurality of the blade members.

Referring to the drawings, a blank 10 for a blade member 11 intended to be used in a gas burner is pressed from a sheet of material such as low grade stainless steel, and is of substantially diamond configuration, this being a suitable shape for pressing a plurality of blanks from the sheet with minimum wastage of material.

The area of the blank 10 inwardly of the edges thereof is embossed relative to the edges to define relatively displaced peripheral areas 12, 14 for a purpose hereinafter described. At each end of the blank on the longitudinal centre line 16 thereof, the peripheral areas are separated by a section 18 which is embossed together with the remaining area of the blank.

Along the centre line 16 of the blank an area of a width corresponding to that of the sections 18 is formed along its length with an outlet aperture arrangement. This arrangement comprises a plurality of cross shaped flame ports or apertures 20 and smaller flame retention holes or ports 22 provided around each of the apertures 20, although it should be appreciated that the ports 20 may be of other shapes.

The blank 10 is further provided with a pair of extruded openings 24, 26 whose axes lie on a transverse centre line 28 of the blank and are equispaced to either side of the central area having the outlet aperture arrangement. Each of the openings 24, 26 is formed with an annular lip 30, 32 respectively projecting from the blank in the direction of embossing. Although the openings 24, 26 are the same diameter, the lip 30 has a smaller diameter than the lip 32 and an inwardly turned free edge for a purpose hereinafter described.

To complete the forming of the blade member the blank is folded along each side of the central area defined by the outlet aperture arrangement, such that the openings 24, 26 are coaxial with one another and the peripheral areas 12, 14 abut and are secured together in a sealing manner, for example, by spot welding. At the ends of the blank, walls 34, 36 defined between the peripheral areas 12, 14 respectively and the sections 18 are folded inwardly relative to one another on to the inner faces of the sections 18 and abut one another for spot welding. The embossing of the main area of the blank thus defines in the final form of the blade member an internal cavity defined by side walls 38, 40 which provides communication between the

openings 24, 26 and the outlet apertures 22.

To form a burner particularly suitable for domestic gas fires and boilers, a plurality of the formed blade members 11 are connected together as shown in Fig. 4. The blade members 11 are arranged parallel to one another with their larger diameter lips 32 on corresponding sides such that, to connect one blade member to another, the smaller diameter lip 30 of one blade member is fitted within the larger diameter lip 32 of the adjacent member. The inwardly turned edge facilitates the lead in. The dimensions of the lips 30, 32 are such that a tight fit is provided and no further connections are necessary for sealing because of the low pressure of the gas being used and also the fact that the burner apparatus is located within a surrounding chamber. To complete the burner, the outwardly extending lip of the blade member at one end receives an end cap 42 to close the opening, and the blade member at the other end is arranged to mount a gas inlet pipe, on a connection 44 having an injector 45, by means of a bracket 46 in a conventional manner, such that primary air is entrained when the gas passes from the inlet in to the adjacent opening of the end blade member. A venturi arrangement comprising ports 48, 50 is provided in the opening adjacent to the gas inlet for even distribution of the gas and air mixture to all the blade members 11.

The burner so formed thus has a chamber for mixing of the gas and air defined by the co-operating lips of the openings and no separate mixing chamber is required. The burner is therefore

considerably easier and cheaper to make than the conventional burner where individual blade members have to be fixed to a common mixing chamber by welding or the like. The burner formed by the blade members 11 arranged in a parallel closely spaced relation provides good gas distribution and a good flame, additional apertures assisting in holding down the flame as necessary. It will be appreciated that a burner having any desired number of blade members 11 is easily produced and also in the event of damage to a blade member it will be possible to dismantle the burner and replace the damaged blade member.

In a modification, the peripheral areas 12, 14 may be formed of different widths such that the peripheral area of greater width can be clinched over the other area as an alternative to brazing or the like. The advantage of this is that the blade member can be manufactured to its finished form in the one workshop.

Various other modifications may be made without departing from theinvention. For example it will be appreciated that the shape of the blank would not be limited to that shown. Any suitable arrangement of retention ports may be provided.

1. A blade member for use in a gas burner, characterised in that the blade member (11) has an internal cavity defined by a pair of side walls (38, 40), each side wall (38) having an opening (24), therein coaxial with an opening (26) in the other side wall (40) to provide a passage through the blade member (11) which is in communication with the internal cavity, the openings (24, 26) having outwardly extending lips (30, 32) of different dimensions, the side walls (38, 40) having one connecting edge portion formed with an outlet aperture arrangement (20, 22), and the internal cavity being closed along the other connecting edge portions of the side walls (38, 40).

2. A blade member according to claim 1, characterised in that the blade member (11) is formed of stainless steel.

3. A blade member according to claim 1 or 2, characterised in that said other connecting edge portions of the side walls (38, 40) are clinched together.

4. A blade member according to claim 1 or 2, characterised in that said other connecting edge portions of the side walls (38, 40) are connected together by spot welding.

5. A blade member according to any of the preceding claims, characterised in that the outlet aperture arrangement comprises a plurality of apertures (20) provided along the length of said one connecting edge portion, and a plurality of ports (22) arranged around each of the cross-shaped apertures (20).

6. A gas burner characterised by a plurality of blade members (11) according to any of the preceding claims, the blade members (11)

being connected together by the lip (30) of each blade member having the smaller dimension being fitted within the other (32) of the lips of an adjacent blade member, such that the blade members are retained substantially parallel to one another with said one connecting edge portions facing in the same direction, an end one of the plurality of the blade members being provided with means (42) for closing the outwardly facing opening thereof, and the other end one of the blade members having means for mounting a gas inlet (44) adjacent to the outwardly facing opening thereof.

7. A gas burner according to claim 6, wherein the closing means comprises a cap (42) fitted on the lip (30 or 32) of the outwardly facing opening.

8. A gas burner according to claim 6 or 7, characterised in that a venturi (48) is provided in the outwardly facing opening adjacent to the gas inlet (44).

9. A method of manufacturing a blade member for use in a gas burner, characterised by pressing a blank (10) out of a sheet of material, forming an outlet aperture arrangement (20, 22) over a longitudinally extending area of the blank (10), forming a pair of openings (24, 26) one on either side of said area, and forming each opening with a projecting lip (30, 32), the lips (30, 32) being of different dimensions, the pressing of the blank (10) being such that the edges are displaced relative to the remaining part of the blank (10) in a direction opposite to that in which the lips extend, the blade member (11) being formed by folding along each side of said area such that the openings (24, 26) are coaxial and the edges engage together and are sealed.

10. A method according to claim 9, characterised by forming the openings (24, 26) with their axes equally spaced from, and in a line extending substantially at right angles to, a longitudinal centre line of the blank (10).

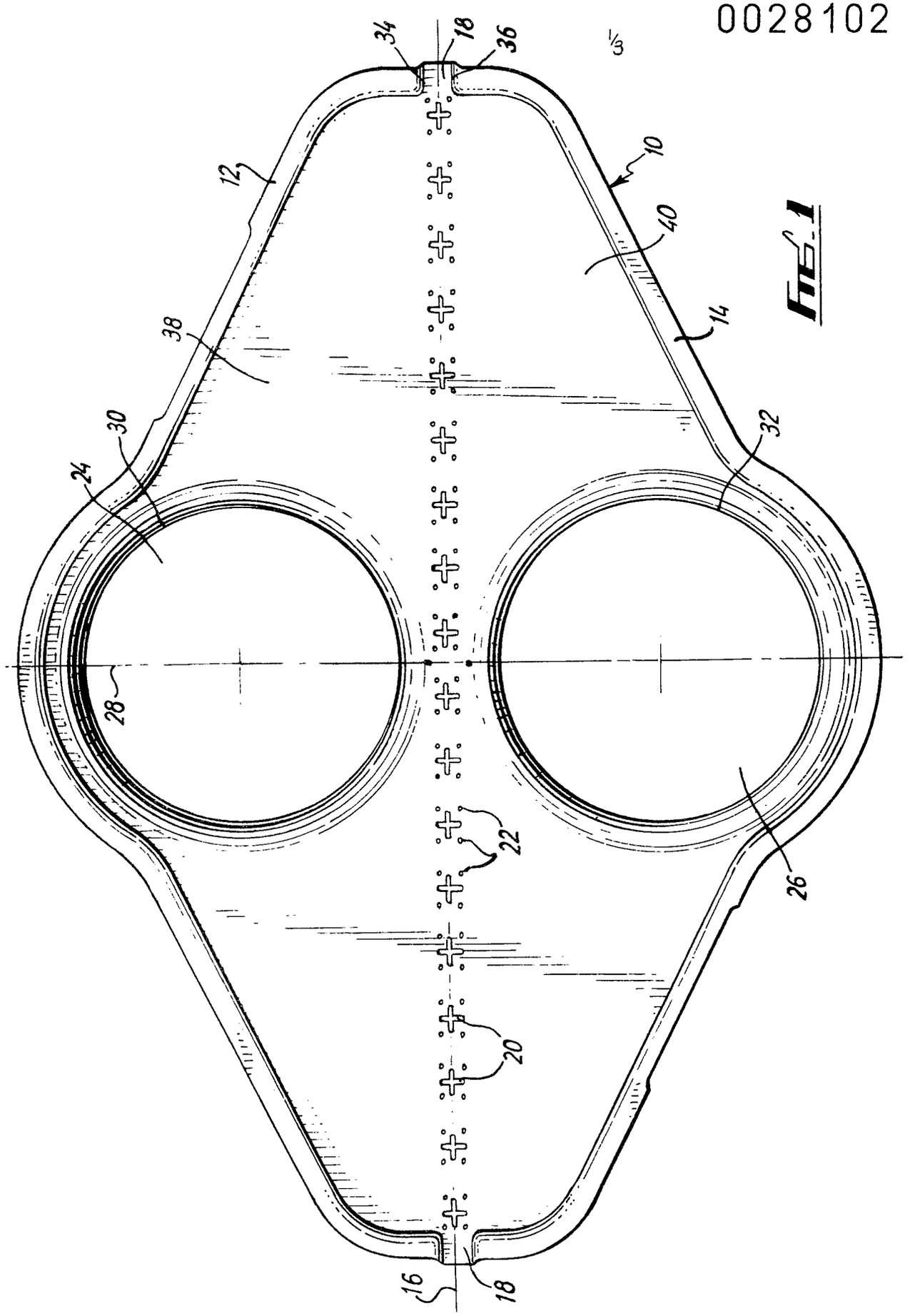

FIG. 1

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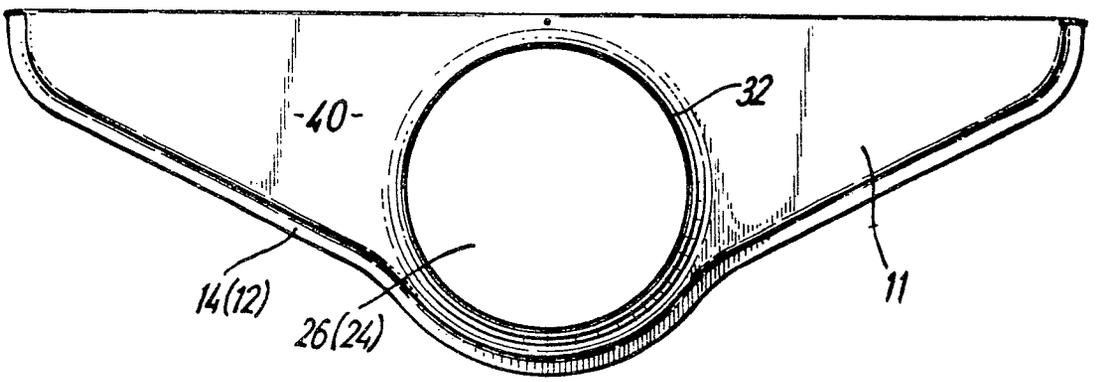

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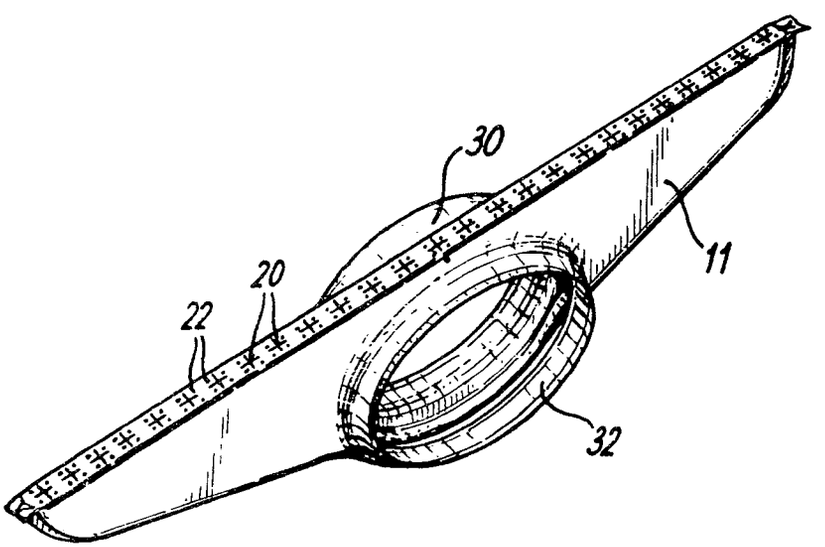

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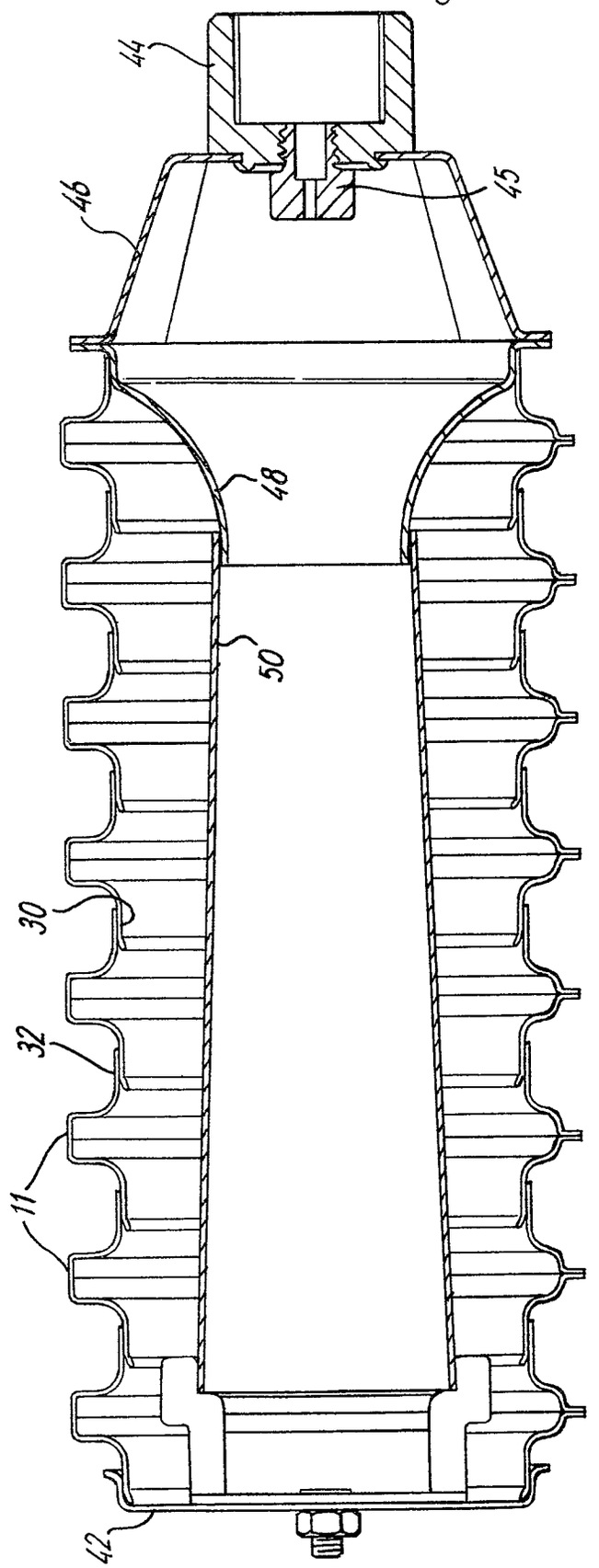

Fig.4