



LFE MKII
ROYAL BELMONT

USERS (Pages 2-3) / INSTALLATION (Pages 4-8)
AND SERVICING INSTRUCTIONS

THIS CAT I_{2H} APPLIANCE IS FOR USE
ON NATURAL GAS G20 AT A SUPPLY
PRESSURE OF 20 mbar IN GB and IE

HAND THESE INSTRUCTIONS TO THE USER

USERS INSTRUCTIONS

DESCRIPTION

This Royal Cozy Fires Inset Live Fuel Effect gas fire has been developed to give a realistic coal burning appearance with the instant control and convenience of gas. The fire has been constructed to enable it to be installed into most applications where the warmth and comfort of an open fire with high radiant and convection heat is required. The coal bed uses ceramic simulated 'coals' and is to give a realistic appearance and to allow secondary air to be entrained into the bed to ensure clean combustion. An aerated twin ported steel burner is used, running parallel across the front of the fire combined with a single gas control with a variable high / low setting. This is fitted with a Flame Supervision Device (FSD) to ensure that should the pilot flame be extinguished for any reason, (including turning off the appliance), the gas supply to the burner is cut off until a full lighting sequence is repeated. A separate Piezo igniter is used to ignite an oxy-pilot sensor (ODS), this will cause the appliance to 'shut off' in the event of the flame extinguishing and also in the event of continued spillage occurring under hazardous or blocked flue conditions. The fire bed consists of ceramic fibre components and coals, all are removable for cleaning purposes when required. It is important when relaying the coal bed and coals to follow the instructions correctly.

IMPORTANT NOTES

This appliance has been designed and manufactured to the requirements of the British Standards Institution BS 5258 Part 16 1990 and is for use on Natural Gas Only.

All gas appliances must be installed by a competent person in accordance with the current Gas Safety (Installation and Use) Regulations 1994 (as amended) or the rules in force and in accordance with the manufacturers instructions, failure to do so could lead to prosecution.

The chimney or flue (unless new) must be swept before installation. It is recommended that the appliance is serviced annually by a competent person and the flue checked for satisfactory clearance of products and that there is no excessive build up of soot. The curing effect of heating the coals will cause an initial odour which, although not harmful, may require additional ventilation until the odour has disappeared.

The appliance has a naked flame, a fireguard conforming to BS 6539 or BS 6778 should be used for the protection of the very young, elderly and infirm. Combustible materials should not be put on or left in the hearth nor should the coal bed be used to burn rubbish or other materials.

Care must be taken on the selection of wall coverings within close proximity of the fire as some vinyl and embossed materials may become discoloured by convection heat. Soft furnishings must be kept clear from the radiant heat of the fire and from impinging the hearth area. The hearth must not be covered by any combustible materials such as carpets etc.

This product uses fuel effect pieces, gaskets and insulation material containing Refractory Ceramic Fibre (RCF), which are man-made vitreous silicate fibres. **Excessive** exposure to these materials may cause temporary irritation to eyes, skin and respiratory tract, consequently, it makes sense to take care when handling these articles to ensure that the release of dust is kept to a minimum.

This fire will run for 5.4 hours on one therm of gas with the gas control on the high setting.

TO LIGHT THE APPLIANCE

1. Remove the fret by lifting upwards (controls cover).
2. Press and turn the gas control until the indicator mark is opposite to IGN keeping the control fully depressed. Press and release the ignition button. Check that the pilot flame has lit at all ports. Keep the gas control depressed for a further 20 seconds. Release the gas control and check the pilot remains alight.
3. Depress the gas control slightly and turn fully anti-clockwise until the indicator is opposite the small flame symbol. The burner will now ignite from the pilot assembly and run at the low rate.

4. Depress the gas control slightly and turn clockwise until the indicator mark is opposite to the large flame symbol. The burner will now run at its maximum rate.
5. To turn the appliance 'off', return the control to the 'off' position.
6. If for any reason the fire cuts out, return the control knob to the 'off' position and wait **3 minutes** before re-lighting.

REMOVAL OF DEBRIS OR SOOT DEPOSITS

Allow the appliance to cool sufficiently before removing all of the coals and firebed components for cleaning purposes. Once all the ceramics are removed from the firebed check that no debris is located in the burner slots (both front and rear). If any debris is present it may easily be removed by using a small piece of thin cardboard to ease out any foreign matter. Be sure to remove the cardboard after use. Should any soot accumulation become excessive, the fuel effect pieces should be removed from the fire for cleaning. Cleaning should be carried out in a well-ventilated area or in the open air, by gently brushing with the pieces held away from your face so that you avoid inhaling the dust. We do not recommend the use of a normal domestic vacuum cleaner, which may blow dust back into the air. Any sooty deposit on the thermocouple probe can be cleaned off using a non-fluffy cloth.

ASSEMBLY OF THE FUEL BED COMPONENTS

1. Locate the fibre back/side cheeks in position.
2. Place the coal support shelf on the stainless steel channel, (the machined groove on the underside of the shelf is located on the rear flange of the channel), two additional location dowels are fitted to prevent the shelf being incorrectly placed.
3. Place the two shaped burner inserts in channel between the two burner flame ports, (check that a minimum gap of approx. 6mm is maintained between the rear of the burner insert and the front edge of the coal support shelf).
4. Position the front simulated coal on the shelf provided above the control fascia panel.

COAL LAYOUT

Position 3 large coals, 2 triangular and 4 large coals on edge (straddle the gaps of the coal support shelf and run the strata front to rear) as the first layer (fig. 21). Place 4 medium as a second layer sitting on the gaps of the front coals and resting against the rear coals.(fig 22). Finally place the remaining 5 small coals as shown in fig 23. Small adjustments to the coal layout may be made to give the best visual appearance however, **additional coals must not be used**. If any fibre component is lost or broken the appliance must not be used until a replacement is obtained.

VENTILATION

Additional purpose built ventilation is not required for this appliance in GB only, for Ireland (IE) ventilation is required with a minimal cross sectional area of 100 sq. CMS and should be checked regularly to ensure that it is free from obstruction.

CLEARANCE TO SIDE (timber surrounds etc)

Minimum clearance required to any combustible material to the side of the appliance must be 150mm.

CLEARANCE TO SHELVES

Minimum clearance to the underside of a 150mm deep combustible shelf from the hearth must be 833mm. Add 12.5mm to this clearance for every 25mm increase in depth of shelf.

INSTALLATION AN SERVICING INSTRUCTIONS THE FOLLOWING SECTION LISTS THE INSTALLATION REGULATIONS AND REQUIREMENTS

All gas appliances must be installed by a competent person in accordance with the current Gas Safety (Installation and Use) Regulations 1994 (as amended) or the rules in force and in accordance with the manufacturers instructions, failure to do so could lead to prosecution

The following are the relevant Codes of Practice and British Standards.

BS 8303 1986	BS 5440 Pt1 1990 & Pt2 1989	The Building Regulations issued by the
BS1251 1987	BS 5871 Pt2 1991 & Pt3 1991	Department of the Environment. The
BS 6891 1988	BS 6461 Pt1 1984	Building Standards Scotland)(Consolidation)
BS 715 1989	BS 1289 Pt1 1986	Regulations issued by the Scottish Development
BS 7566 Pts 1-4 1992		Department.

TECHNICAL DATA

Overall height of fire	= 614 mm
Minimum height of opening required	= 550 mm
Maximum height of opening	= 590 mm
Minimum width of opening required	= 395 mm
Maximum width of opening with spacer	= 470 mm
Forward projection from opening (With controls cover)	= 140 mm
Min depth of openings	See Figs 1-8
TYPE OF GAS G20 Only	Supply Pressure 20 mbar +/- 1mbar (Cold)
GAS INPUTS (Gross)	Maximum 5.42 kW (18500 Btu/h) Minimum 2.34 kW (8000 Btu/h) Pilot 0.26 kW (890 Btu/h)
Main Injector Type	Bray Cat 82/380 Or Stereomatic 046/19/196/68M
Pilot Assembly	SIT Oxy/Pilot NG 9022
GAS CONNECTION	8 mm O/D Tube
WEIGHT	22 kg

Note: None of the materials used in the manufacture of this appliance contain asbestos.

INSTALLATION NOTES

Care should be taken to ensure when the appliance is installed into a Pre-cast flue, the chimney breast is lined to prevent the plaster etc, cracking through excessive temperatures.

A certain amount of discolouration (blueing) may be seen on the stainless steel combustion chamber, this is normal due to the temperatures produced in the fire bed.

A hearth must always be provided, a minimum of 340mm and a minimum of 150mm either side of the fire opening with a minimum thickness of 12mm and a perimeter height of 50mm. This is to deter combustible materials, carpets etc, being placed on the hearth.

The area under the firebox must have a minimum non-combustible thickness of 25mm.

In most installations a back panel will be required, this will also need a minimum fire resistance rating of Class O (100 C).

Check that the chimney and flue structure are sound and conform to the following flue requirements:

1. A conventional brick or stone chimneys with a minimum effective cross sectional dimension of 225x225 mm. A lined flue with a minimum diameter of 175 mm having a chair brick and throat forming lintel conforming to BS 1251 or a builders opening measuring 550 mm high x 400/470 mm wide with a sufficient depth for debris collection. If a chair brick is fitted, a minimum depth requirement for the appliance is shown in Figs 2 & 3, if insufficient depth is available, the chair brick will have to be removed.
2. A twin walled metal flue box manufactured to BS 715 with a twin walled 125 mm diameter flue and a minimum effective flue height of 3 metres. See Figs 4 & 5.
3. A pre-cast flue conforming to the requirements of BS 1289 Pt 1 1986 and BS 1289 1975 including properly constructed pre-cast flues with a cross sectional area of 13000sq mm. See Figs 6 - 8.

NOTE

Dampers, register plates or incorrect flue terminals, must not restrict the flues listed above. The flue must only service a single appliance and not have any branches or traps that may impede the natural draught. Any flue damper plate or restrictors shall be removed or fixed in the fully opened positions.

The front and base of the fire opening must be flat and square to ensure a good seal with the appliance; this is to ensure that there is no reduction in draught through the fire, which may cause spillage to occur.

CONTENTS CHECK LIST

Convactor Box and Front Trim (Goal Post)	Burner Unit
Burner Inserts	Coal Support Shelf
Fibre Back	Set of Coals – 7 Large, 4 Medium, 2 Triangular and 5 Small.
Front and Fret	Concealed Supply Pipe
Short length of Bundy 43mm	RH Conversion Supply Pipe
In-line Connector	Plastic Fixing Plugs 4 off
Users / Installation and Servicing Instructions	Installation Brackets
Wood Screws 4 off	
M4 x 10 Screws	

FIRE SURROUND AND OPENING REQUIREMENTS

7in Diameter Flue, Chair brick and Builders opening (Class 1). See Figs 2 & 3.

5in Diameter Flue and Metal Flue Box (Class 2). See Figs 4 & 5.

Pre-cast Flues. See Figs 6 – 8.

INSTALLATION USING A 5" DIAMETER METAL FLUE BOX

IMPORTANT: Restrictor plates must be removed. See Fig 15.

When the metal flue box is to be built-in as a false chimney-breast using timber stud work with a plasterboard facing, the metal flue box should be enveloped with insulation material such as Rockwool or similar to prevent a build-up of heat within the structure. Either an air gap of 75mm should be maintained between any combustible materials and any part of the metal flue box or a minimum of 25mm of insulation material between the metal flue box and the combustible material. It is important that both the back panel and the appliance are sealed to the metal flue box to prevent any leakage of flue products or reduction in the flue draught. See Figs 4 & 5.

PRE-CAST FLUE INSTALLATIONS

IMPORTANT: Restrictor Plates must be removed. See Fig 15.

See Figs 6 – 8.

CHECKING CONDITION AND COMPATIBILITY OF THE CHIMNEY

Check that the chimney conforms to the required specifications as previously stated. Examine the condition and carry out any remedial work as necessary, if the flue has been used for solid fuel it should be swept and a smoke test carried out to check that satisfactory smoke clearance has been established. If all the smoke is not drawn into the flue, pre-heat the flue with a blowtorch or similar and re-check. If there is any uncertainty examine for the cause and if necessary seek expert advice.

GAS SUPPLY

BEFORE COMMENCING WORK, TURN OFF ANY APPLIANCES THAT ARE FED BY THE METER AND ISOLATE THE GAS SUPPLY BY TURNING OFF AT THE METER

The gas connection to this appliance is made with 8mm o/d rigid or semi rigid tube to a pressure test elbow situated on the L/H side of the burner as shown below. It is advisable to provide a means of isolating the gas supply to the appliance for servicing with either a restrictor elbow or isolation cock such as shown below. Provision is made in the rear L Hand corner of the outer casing to allow a gas supply to be fed to the burner assembly. A blanking plate and gasket is supplied with cutouts and slots that will enable a seal to be made around the supply pipe. If a restrictor elbow is to be used, it will be necessary to cut and form the bundy pipe supplied. Any pipe used under the burner must be in rigid tube such as Bundy, 3 pieces of Bundy are included in the fitting kit to assist the installer. (a) A short piece for use with a restrictor elbow. (b) A formed section for connection to an isolation cock, and (c) a formed section for R Hand supply using the inline connector supplied. The inlet pipe support bracket can be removed if necessary to gain greater access, by unscrewing the Control mounting lock nut and lifting over the spindle, as shown in Fig 9.

Where a concealed gas supply is used, the installer is reminded of the requirements of BS 6891 1988 dealing with enclosed pipes. The Standard requires that when a gas pipe is fed through a wall, the pipe should be enclosed in a tight sleeve to protect against failure caused by movement and shall be constructed to prevent passage of gas either between the pipe and sleeve or sleeve and wall.

Permanent sealant e.g. fire cement etc. should not be used as these would prevent removal of the firebox if so required.

DISMANTLING THE FIRE PRIOR TO INSTALLING

The lower front panel assembly is removed by lifting upwards and pulling forwards. Remove the canopy to gain access to the Bezel or (Goal post trim) securing screws. The canopy is held in position by dimpled spring clips on both the side flanges, remove by exerting an even pull forward. See Fig 11.

Remove the outer bezel/Goal post trim by unscrewing the four M4 taptite screws on the inner flanges and the four No 8 self tapping screws in the corners.

It will be necessary to dismantle the burner from the convector box before installing the box in the opening, to remove the burner, unscrew the two screws securing the fibre back/ side cheek assembly in position and remove, remove the coal support shelf and burner inserts. Unscrew the two screws at the base of the aperture in the fascia panel and withdraw the burner.

INSTALLING THE APPLIANCE IN POSITION

With the gas supply pipe laid to the required position and the surround fitted and sealed to the chimney correctly – this is to prevent any seepage of the flue products and to prevent any ingress of air into the flue from anywhere other than the flue outlet of the fire. The method to be used to secure the appliance in position is either screwed directly onto the front face of the back panel through the mounting brackets or fixed to the internal side walls of the builders opening using the four fixing brackets provided. These can be rotated to accommodate most openings, as shown in Fig 14: plastic plugs and wood screws are supplied for these brackets.

It is very important when fitting the trim, that when it is secured in position, that the rear of the trim has an effective seal with the back panel or fixing wall. (A seal is fitted to the trim during manufacture).

Continue the supply and replace the burner ensuring that the rear legs locate in the two up-formed tags in the base plate and complete the gas connection to the burner. Replace the canopy.

NOTE: Before offering the convector box into the opening, the hearth should be protected from damage or scratches that may occur during installation.

The complete installation should be tested for Gas soundness.

IT IS VERY IMPORTANT THAT THE RESTRICTOR PLATES ARE REMOVED AND THE SCREWS REPLACED WHEN THE APPLIANCE IS INSTALLED INTO EITHER A PRE-CAST OR A 5in (125mm) DIAMETER FLUE.

ASSEMBLY OF THE FUEL BED COMPONENTS

1. Locate the fibre back/side cheek assembly in position.
2. Place the coal support shelf on the stainless steel channel, the machined groove on the underside of the shelf is located on the rear flange of the channel.
3. Place the two shaped burner inserts in channel between the two burner flame ports, (check that a minimum gap of approx. 6mm is maintained between the rear of the burner insert and the front edge of the coal support shelf).
4. Position the front simulated coal on the shelf provided above the control fascia panel. See fig 20.

COAL LAYOUT

Position 3 large coals, 2 triangular and 4 large coals on edge (straddle the gaps of the coal support shelf and run the strata front to rear) as the first layer (fig. 21). Place 4 medium as a second layer sitting on the gaps of the front coals and resting against the rear coals.(fig 22). Finally place the remaining 5 small coals as shown in fig 23. Small adjustments to the coal layout may be made to give the best visual appearance however, **additional coals must not be used.** If any fibre component is lost or broken the appliance must not be used until a replacement is obtained.

CHECKING OPERATION OF FIRE

Turn on the Gas supply at the meter and to the appliance at the isolating cock. Purge the air to the appliance. Rotate the control knob to the ignition position, depress the control and push the piezo to ignite the pilot. Check that the electrode is sparking between the tip of the thermocouple and continue until a pilot ignition is established. Depress the control knob slightly and rotate anti-clockwise until the index symbol is aligned with the small flame symbol on the indicator label, release and rotate the control knob to the high position (large flame symbol). Check that the flame picture is satisfactory prior to carrying out the spillage test.

To check the gas pressure at the appliance, allow the coals and the coal bed to cool and turn off the gas supply at the isolating cock. Remove the hexagon headed screw and connect a manometer to the pressure test point, turn on the gas and ignite the fire, allow to heat up and check that the gas pressure is 20 +/- 1 mbar - any appreciable drop may indicate losses through the pipework. The pressure test point may also be used to check for leakage of the joints to the appliance. Allow the coal bed to cool before replacing the screw.

Turn the gas control to the OFF position, wait for 90 seconds, fully depress the gas control, turn to the ignition position and release the control. Attempt to light the pilot with an already prepared match or taper. If the pilot lights the FSD is faulty.

SPILLAGE CHECK

Light the appliance and set to the maximum setting, locate the front and fret in position and leave to warm up for approx. 5 minutes. Check for satisfactory clearance of combustion products by inserting a lighted smoke match on a vertical plane 30mm down, 10mm inside the rear edge of the inner canopy and 70mm from the left hand side of the opening. All the smoke must be drawn into the flue. If spillage occurs, allow a further 10 minutes. Should spillage still occur, examine the chimney for the fault and rectify. The test should be carried out with all windows and doors closed, if an extractor fan is situated in the room, this test should be repeated with the fan running. If there is a connected room with an extractor fan, the test should be repeated with all the doors to that room opened and the extractor fan running.

Demonstrate the lighting and extinguishing procedures to the user.

ADVISE THAT:

The curing effect of heating the coals will cause an initial odour which, although not harmful, may require additional ventilation until the odour has disappeared.

Any debris or soot is cleaned from the appliance. Advise the customer that they should read their Users Instructions before operating the fire and always follow the advice in the section headed 'Removal of Debris or Soot Deposits'. The appliance must be serviced annually by a competent person in accordance with these instructions and the appliance is checked for spillage in accordance with the method detailed in these instructions.

Complete the section in the enclosed registration leaflet. Advise that any component part of this appliance be guaranteed against defective workmanship or faulty materials for a period of twelve months from the date of purchase.

Any such part will be replaced free of charge on receipt of the purchasers address at the cost of postage only, provided that:

1. It is accompanied by the registration section cut out of the booklet, together with the original purchase receipt, which will be returned with the replacement part.
2. A competent person has carried out installation, repairs and/or adjustments, such as the supplier's representative or a CORGI registered installer.

MAINTENANCE AND SERVICING

GENERAL

A. REMOVAL OF DEBRIS OR SOOT DEPOSITS

Allow the appliance to cool sufficiently before removing all of the coals and firebed components for cleaning purposes. Once all the ceramics are removed from the firebed check that no debris is located in the burner slots (both front and rear). If any debris is present it may easily be removed by using a small piece of thin cardboard to ease out any foreign matter. Be sure to remove the cardboard after use. To ensure that the release of fibres from these RCF articles is kept to a minimum, during installation and servicing we recommend that you use a HEPA filtered vacuum to remove any dust and soot accumulated in and around the fire before and after working on the fire. When replacing these articles we recommend that the replaced items are not broken up, but are sealed within heavy duty polythene bags, clearly labelled as RCF waste. This is not classified as "hazardous waste" and may be disposed of at a tipping site licensed for the disposal of industrial waste. Protective clothing is not required when handling these articles, but we recommend you follow the normal hygiene rules of not smoking, eating or drinking in the work area and always wash your hands before eating or drinking. Any sooty deposit on the thermocouple probe can be cleaned off using a non-fluffy cloth. **DO NOT USE ABRASIVE MATERIALS**

B. SERVICING COMPONENTS BELOW THE BURNER ASSEMBLY

TURN OFF THE GAS SUPPLY TO THE APPLIANCE. Remove coals, coal supports, burner inserts, front simulated coal and fibre back/side cheek assembly. To gain access to components below the burner assembly it has to be removed from the vent box case by disconnecting the gas supply at the inlet elbow and unscrewing the two screws at the base of the fascia panel.

- I. **TO CLEAN OR REPLACE THE INJECTOR:** Unscrew the compression nut connecting the gas supply to the elbow injector while supporting the injector. This is to prevent distortion of the framework, unscrew and remove the gas supply tube from the gas control valve, hold the injector lock nut with a spanner and rotate the injector. Replace in reverse order.
- II. **TO REPLACE THE GAS CONTROL (Tap/FSD):** Disconnect the three gas pipes and the thermocouple from the control. Pull off the knob and lay to one side. Undo the retaining nut at the front of the tapping assembly to withdraw control from the mounting bracket. Replace in reverse order.
- III. **TO REPLACE THE PIEZO IGNITER:** Pull off the HT lead from the rear of the igniter, prevent the metal fixing nut from turning, rotate the body of the igniter to unscrew and withdraw the igniter from the front. Replace in reverse order and reconnect the HT lead.
- IV. **TO REPLACE THE OXY-PILOT ASSEMBLY:** The operation of the oxy-pilot depends on the proximity of the spark electrode and the thermocouple tip, if either of these components are defective the assembly must be replaced. This is achieved by removing the tube nut from the base of the pilot and the thermocouple from the FSD also the igniter lead and the two M4 screws securing the bracket to the framework. Replace in reverse order, the spark gap is shown in Fig 18.

SHORT PARTS LIST

For spares contact the manufacturer at the address below.

DESCRIPTION	CROSSLEE No	GC No
Piezo Igniter	40245	397 686
Oxy-Pilot Burner Assy (SIT)	42313	
Control Knob	40232	170 014
Control Valve	42143	
Main Injector Stereomatic	42168	
Coal Support	42981	
Burner Inserts (2)	42952	
Front Coal Mould	40481	
Set of Coals	42937	
Fibre Back Panel	42953	

HEAT INPUT

18,500 Btu/h 5.42 kW (GROSS)

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Royal Cozyfires are manufactured by:

CROSSLEE plc
Aber Park Industrial Estate,
Aber Road, Flint, Flintshire. CH6 5EX
Spares Tel 01422 203963
Fax: 01422 204475
Service (GSA Ltd) 01703 516611
Customer Service 01422 200660
Fax 01422 206304
*Technical Help Line 0906 8633268
*Calls charged at 50p per minute

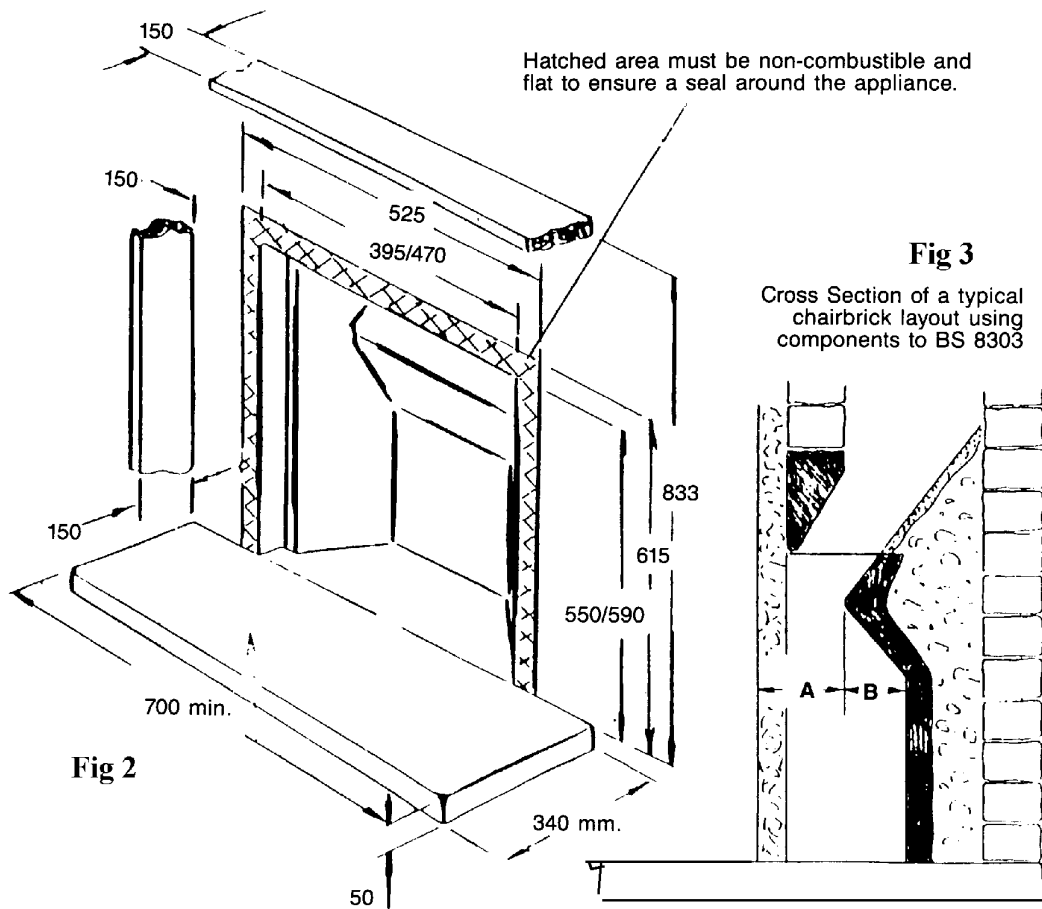
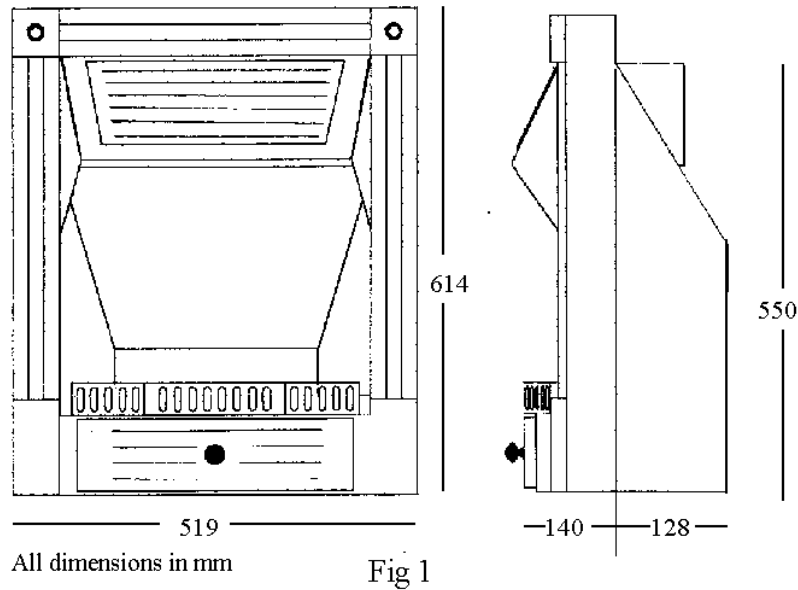
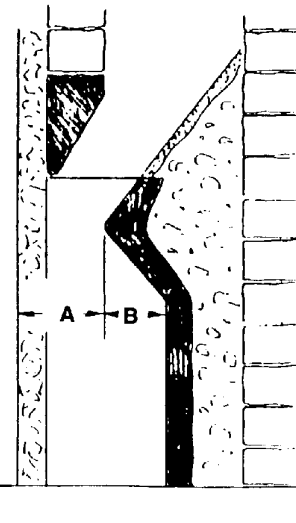
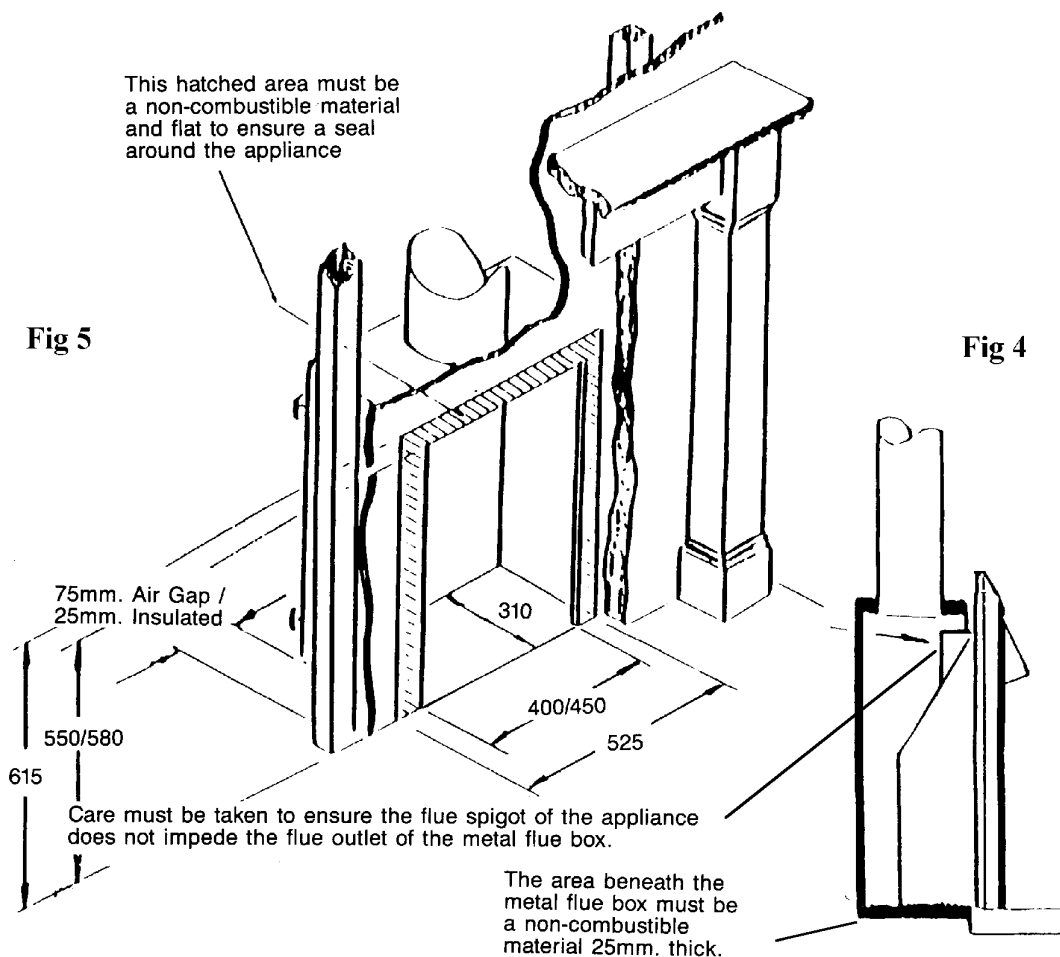


Fig 3

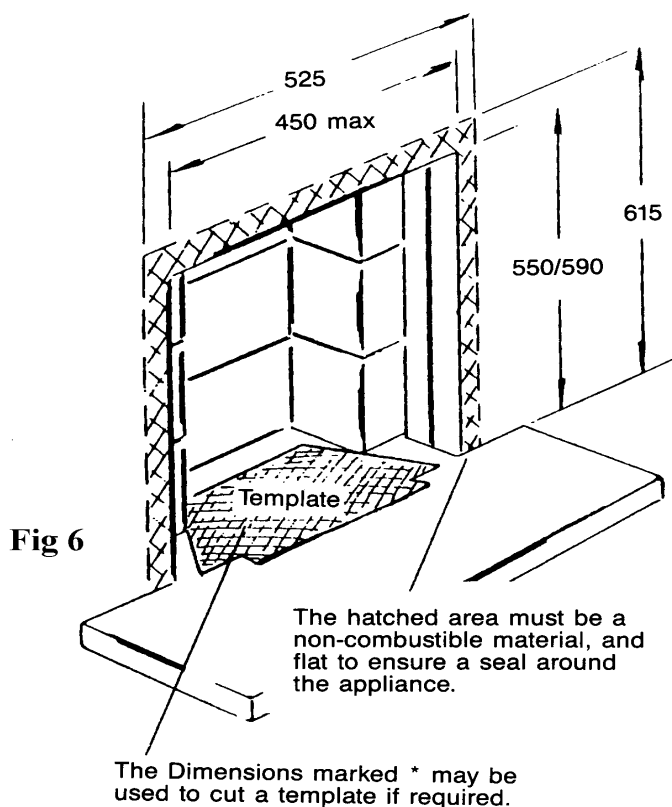
Cross Section of a typical chairbrick layout using components to BS 8303



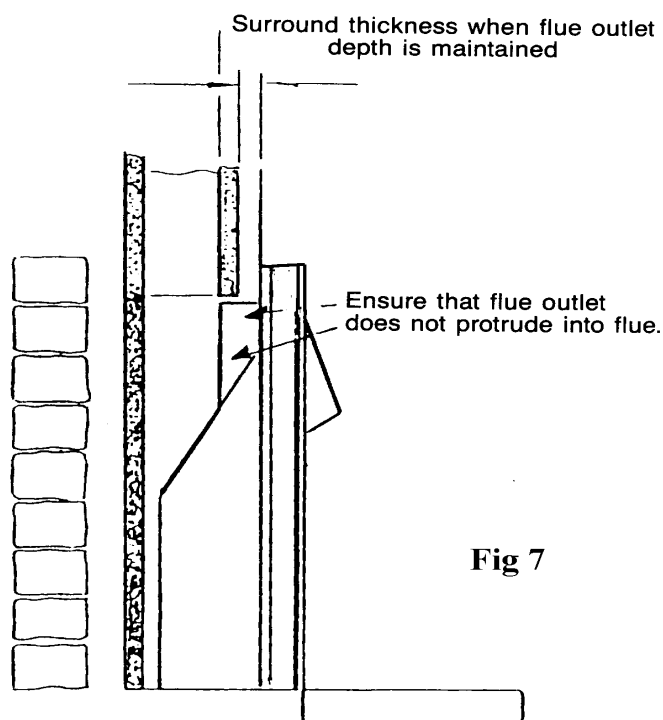
Depth A is to be a minimum of 145 mm from the knee to the front face of the surround to satisfy the debris collection requirement. Depth B is nominally 70 mm. If no chairbrick is fitted, the minimum distance required between the rear of the opening and the front face of the surround is 210 mm without spacer frame fitted.



Pre-Cast Flue Installations



IMPORTANT: The Restrictor Plates must be removed, See Page 10.



A = Depth or thickness of the Back Panel required to ensure a seal with the appliance.

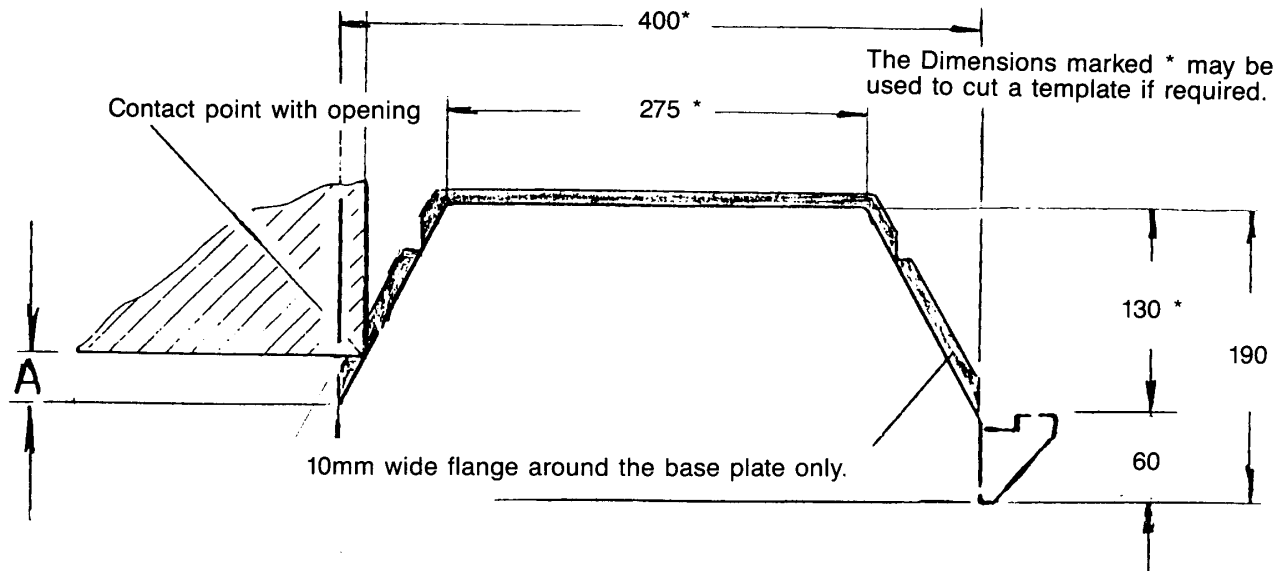


Fig 8

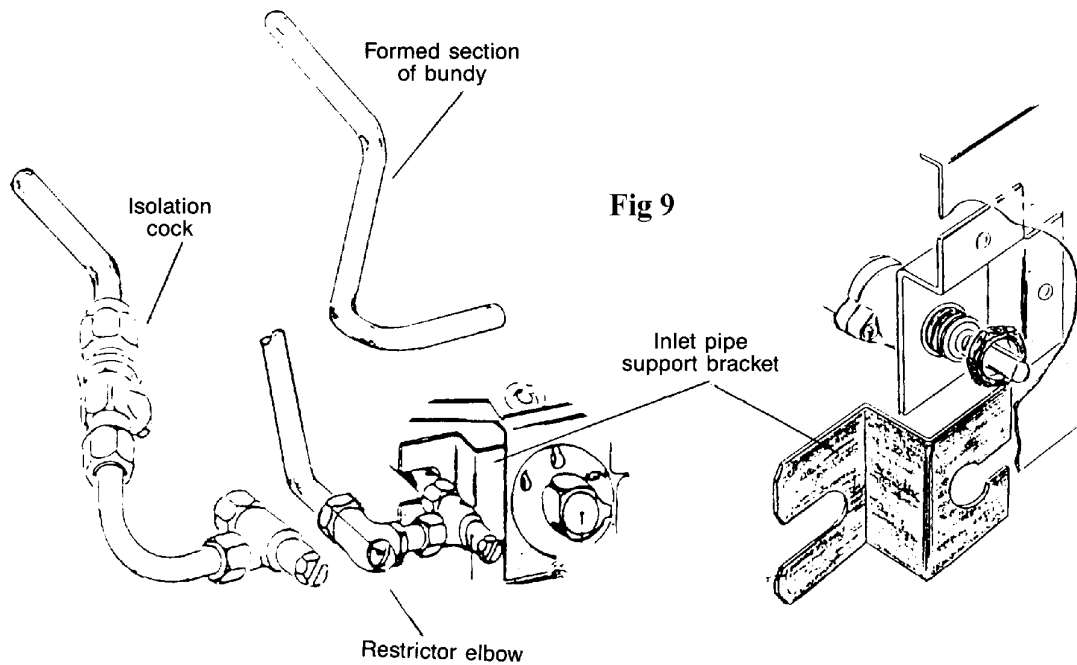


Fig 9

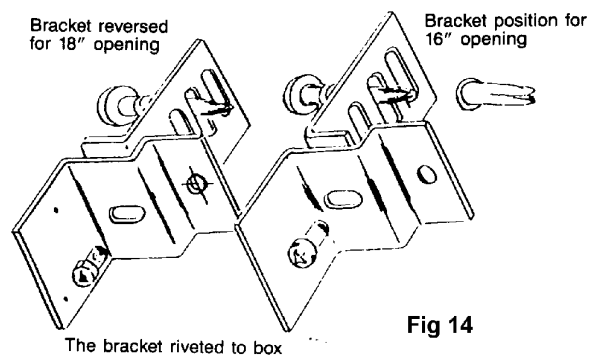
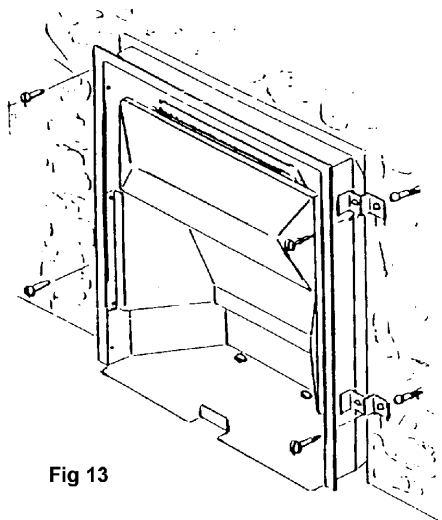
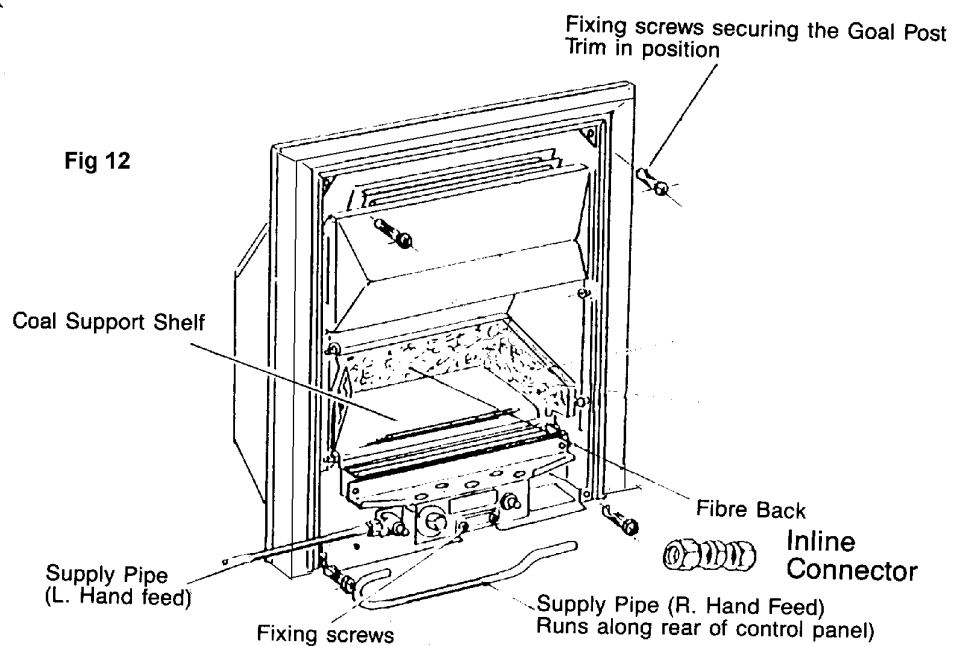
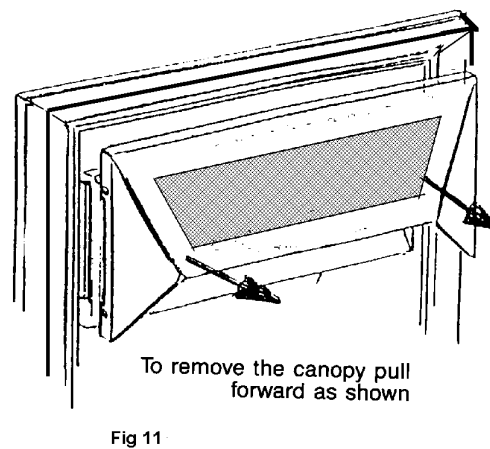
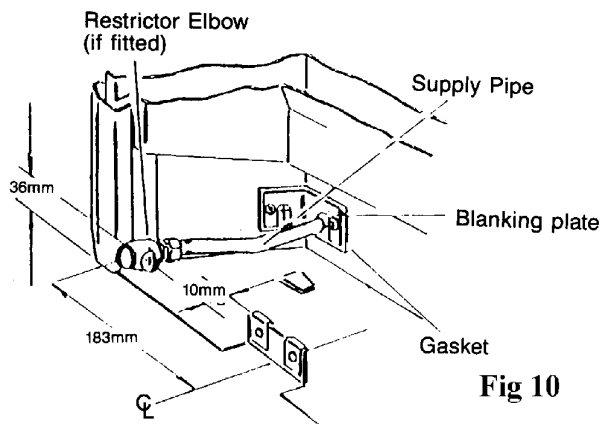
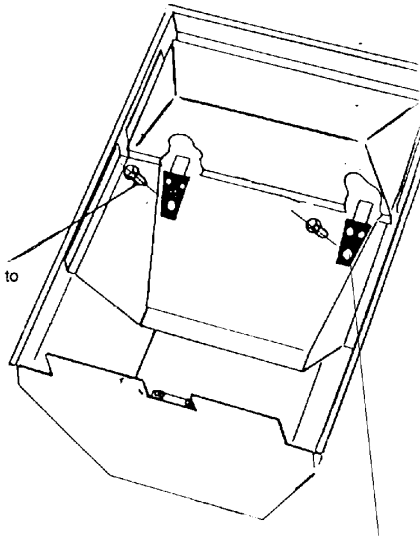


Fig 15

NOTE 2 Screws to
be replaced



Restrictor plates to be removed when the appliance is used on either
a Pre-cast flue or insulated 125mm. Diameter Flue to BS715

Fig 16

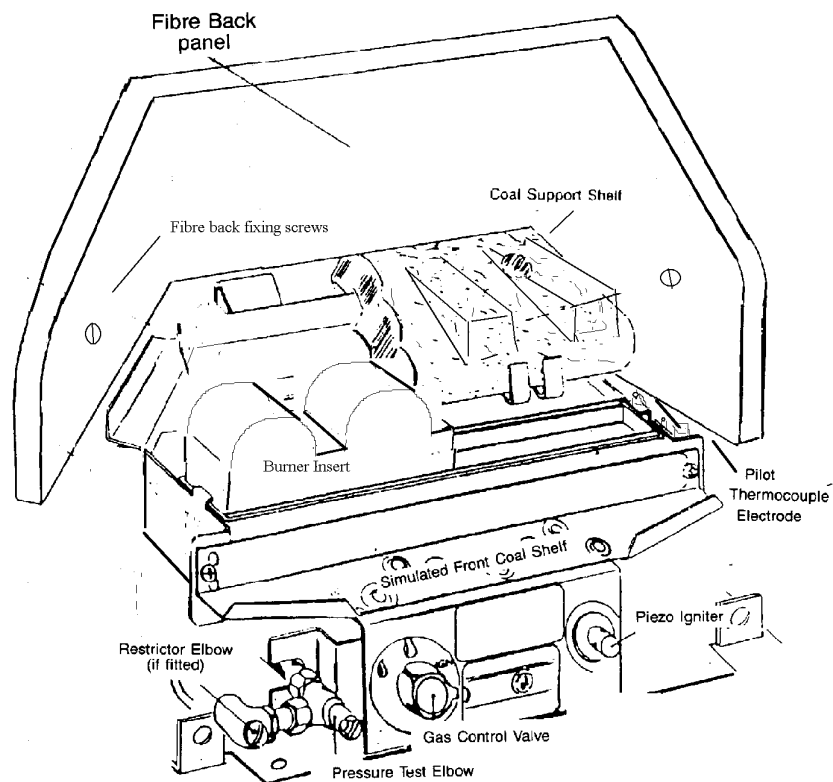
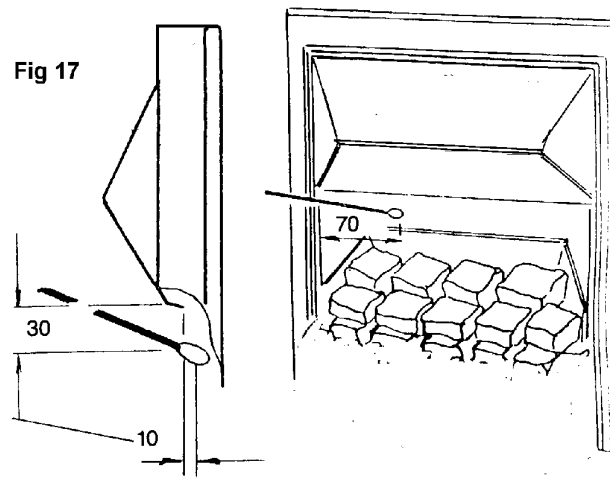


Fig 17



All dimensions are in m.m.

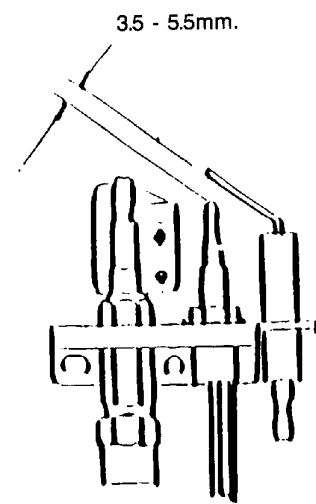


Fig 18

Fig 19

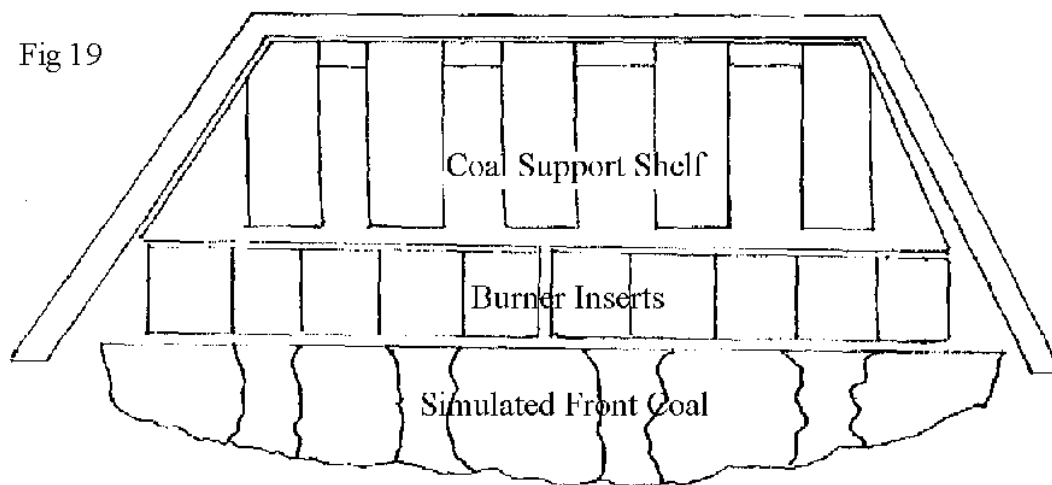


Fig 20

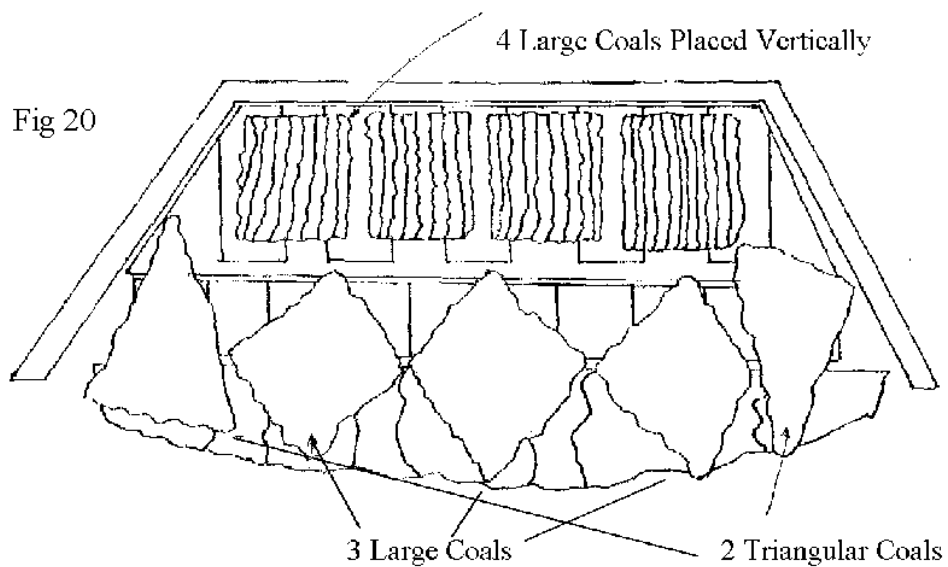
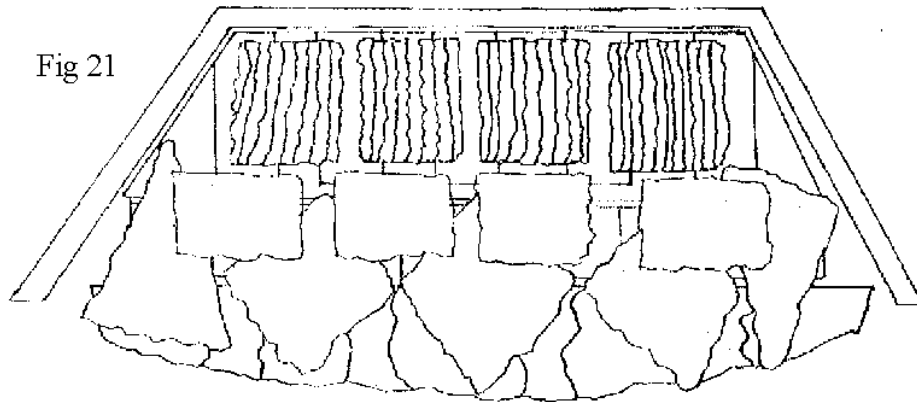
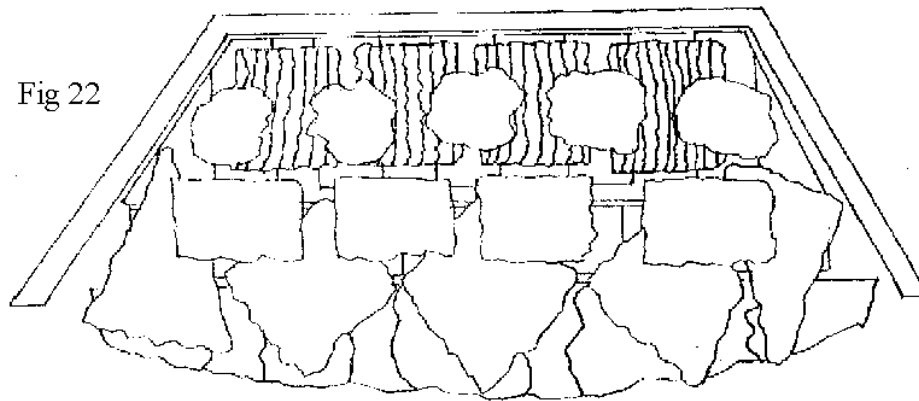


Fig 21



4 Medium Coals sitting on the gaps of the front coals
(resting against rear coals)

Fig 22



5 Small Coals