

SELECTOS

GAS & OIL BURNERS

SG 42

INSTRUCTION MANUAL

for

SELECTOS MODEL SG.42/FD.35 and
SG.42/FD.44 AUTOMATIC GAS BURNER.

Contents.

<u>Text.</u>	<u>Page.</u>
1. Foreword.	1.
2. Technical Data.	2.
3. Installation.	3.
4. Commissioning.	4.
5. Service.	6.
6. Fault Finding.	7.
7. General Information.	8.

<u>Illustrations.</u>	<u>Fig.</u>
Combustion Head SG.42/FD.35.	1A.
Combustion Head SG.42/FD.44.	2A.
Nozzle Sizes and Pressure SG.42/FD.35.	1B.
Nozzle Sizes and Pressure SG.42/FD.44.	2B.
Wiring Diagram.	3.
Gas Control.	4.
Photograph.	5.
Pressure and Gas Rate Setting Chart.	6A & 6B.
Excess Air / CO ₂ Relationship.	7.

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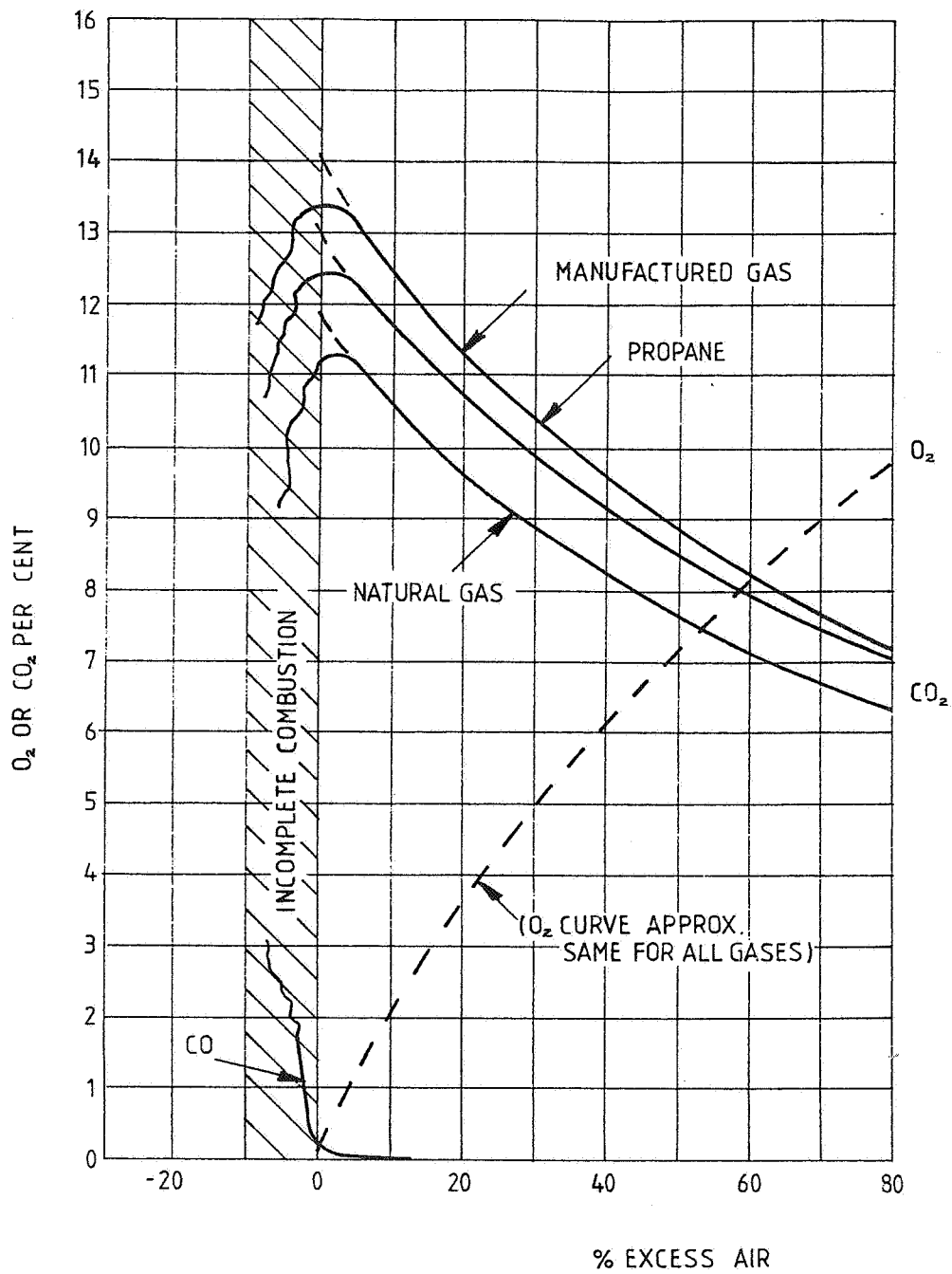
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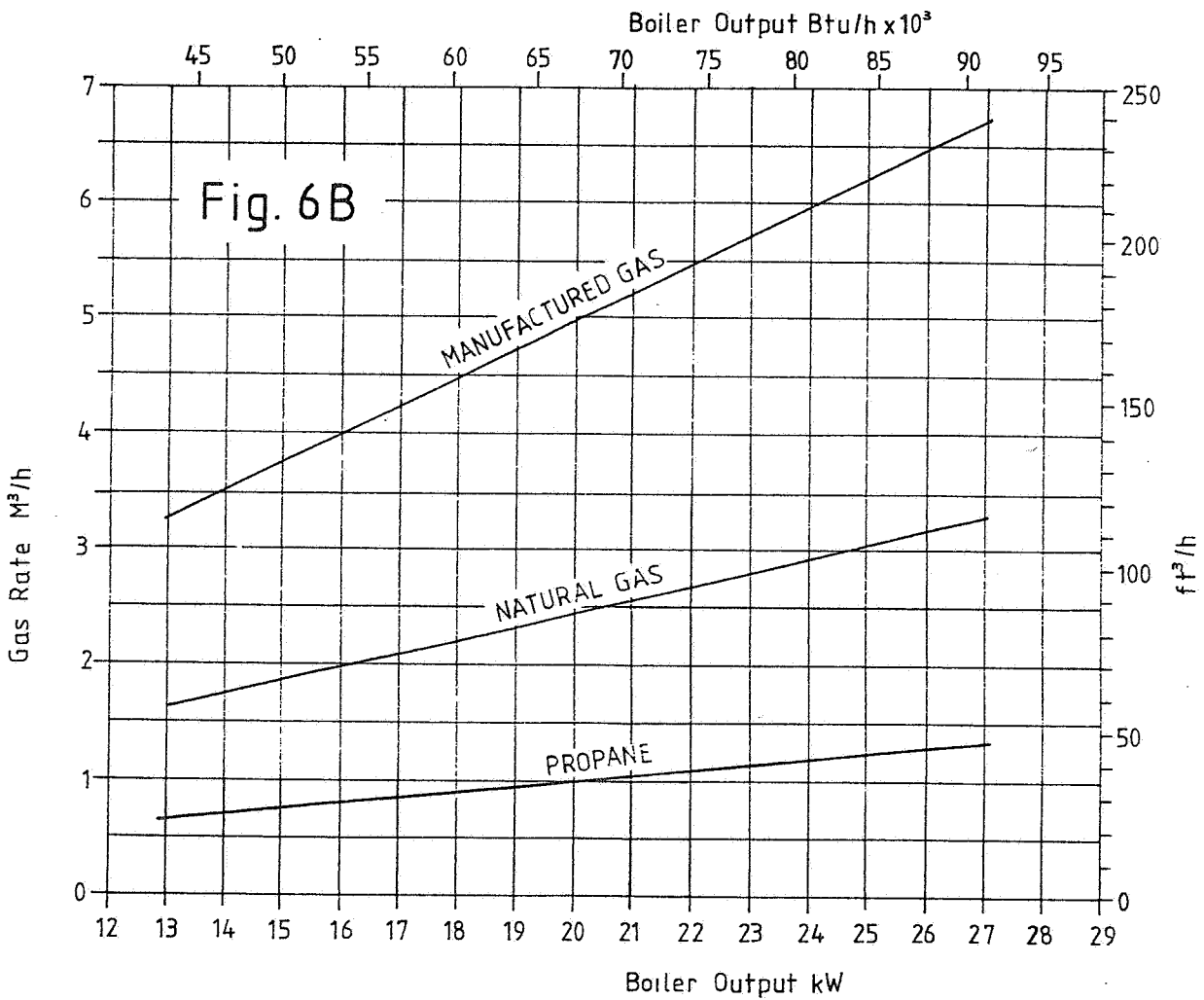
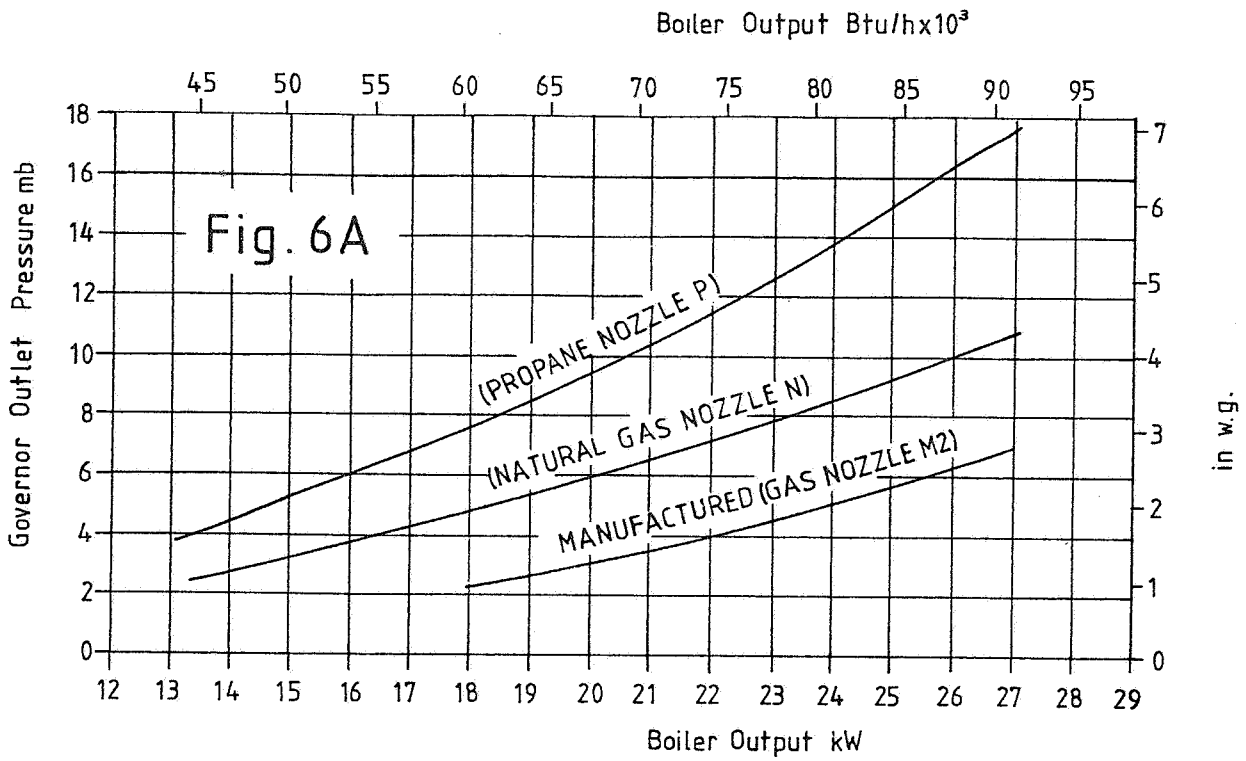
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RELATIONSHIP BETWEEN CO₂ AND EXCESS AIR.



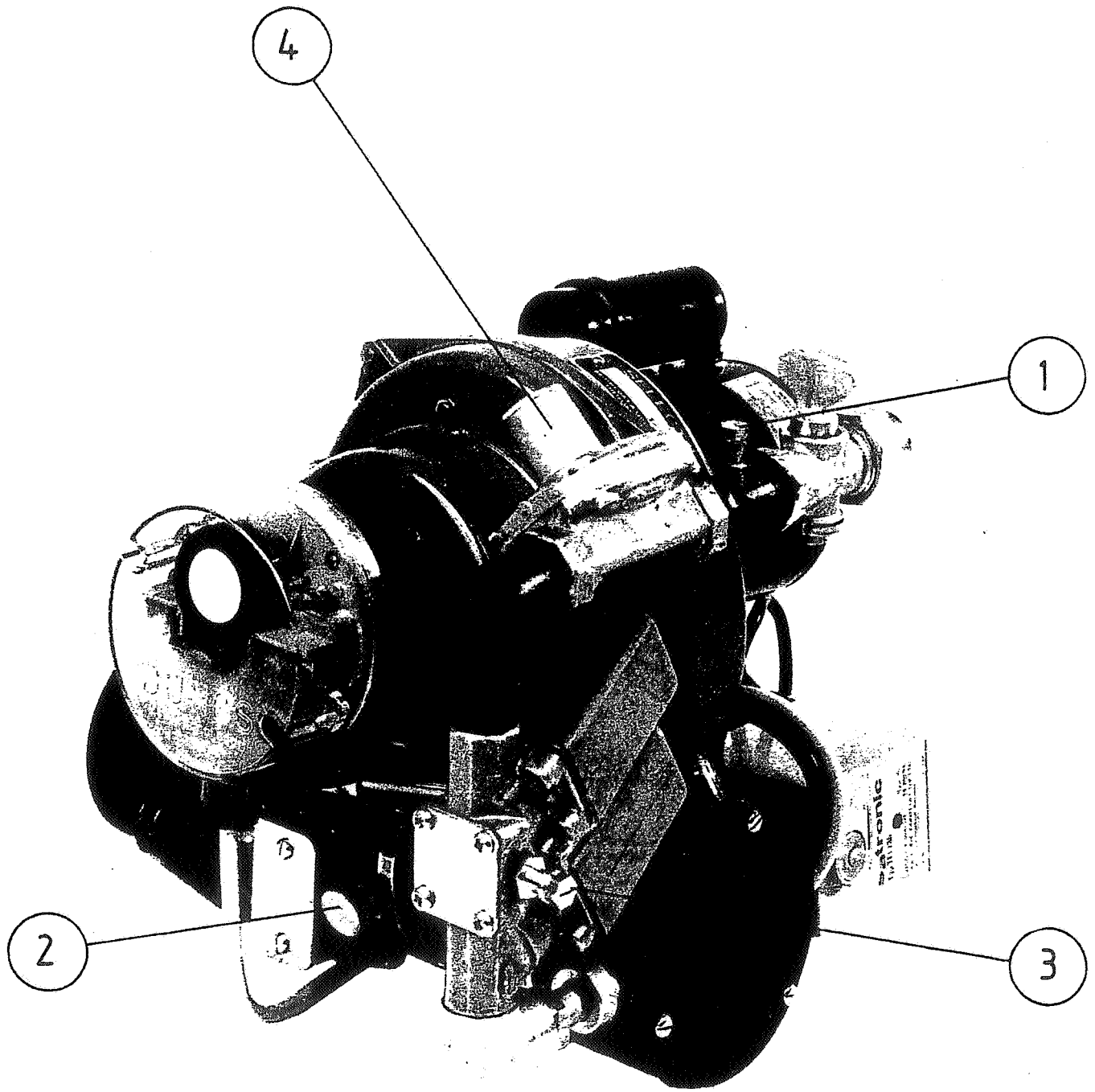
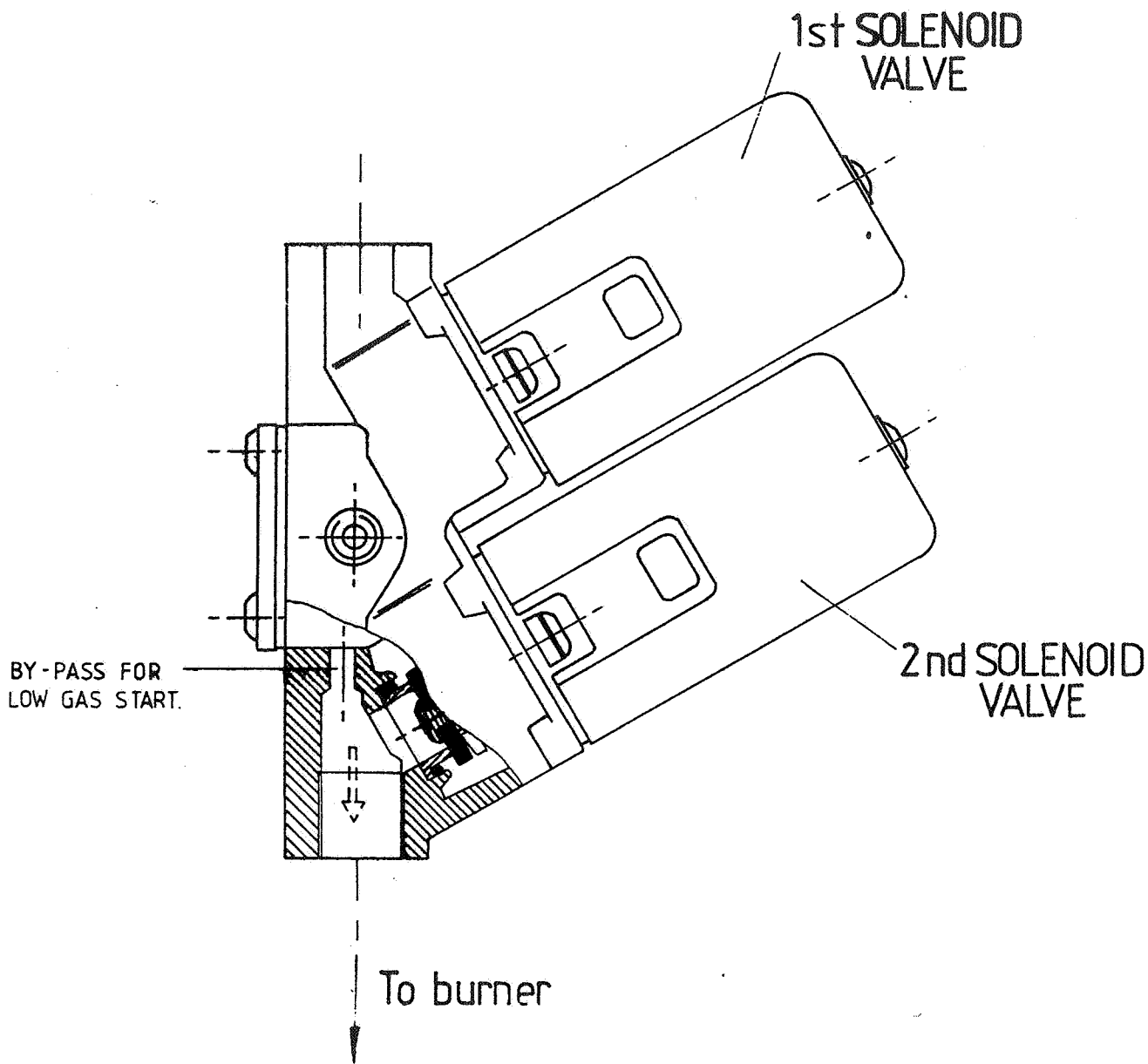
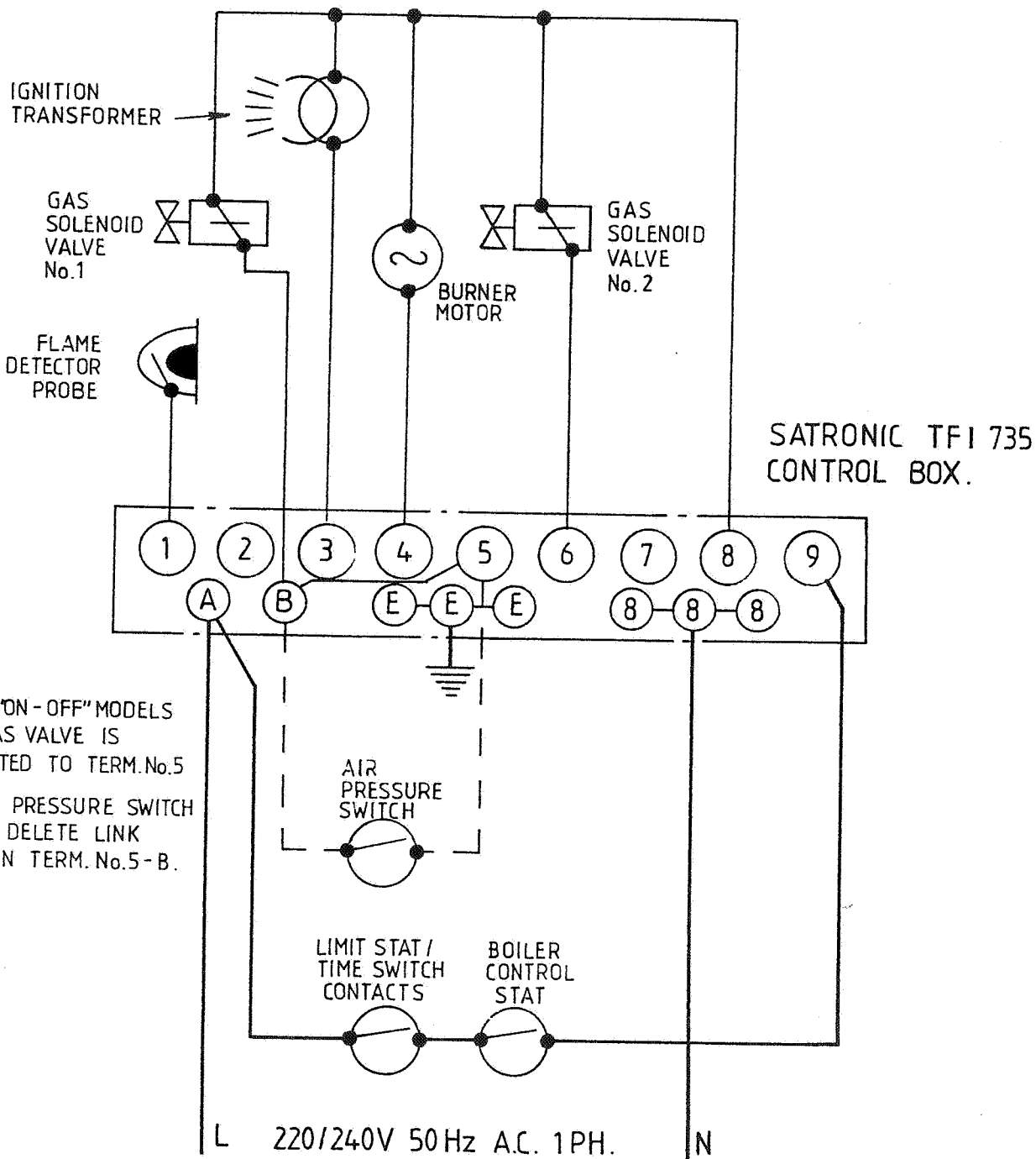


Fig. 5



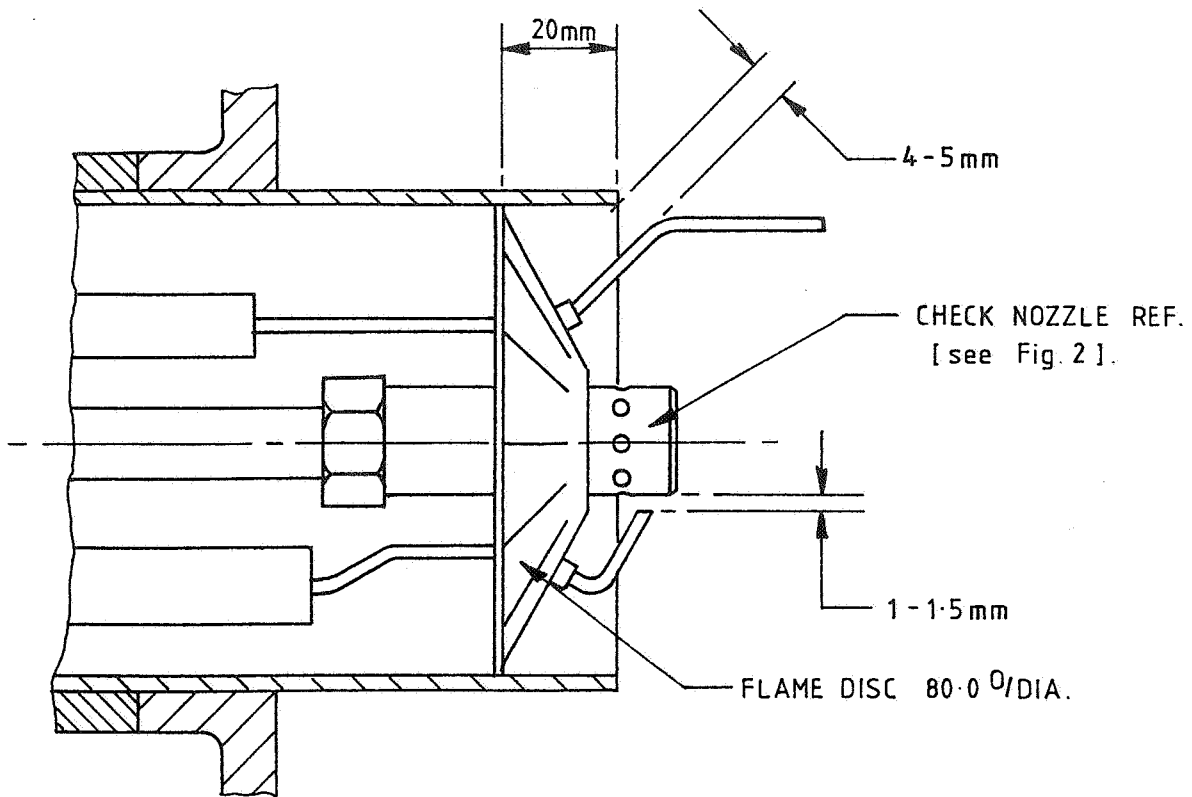
SPERRYN G1400 SERIES DOUBLE SOLENOID GAS VALVE

FIG 4



NOTE - ON "ON-OFF" MODELS
 2nd. GAS VALVE IS
 CONNECTED TO TERM.No.5
 IF AIR PRESSURE SWITCH
 FITTED DELETE LINK
 BETWEEN TERM.No.5-B.

— PRE-WIRED
 — WIRED ON SITE
 - - ONLY IF SPECIFIED



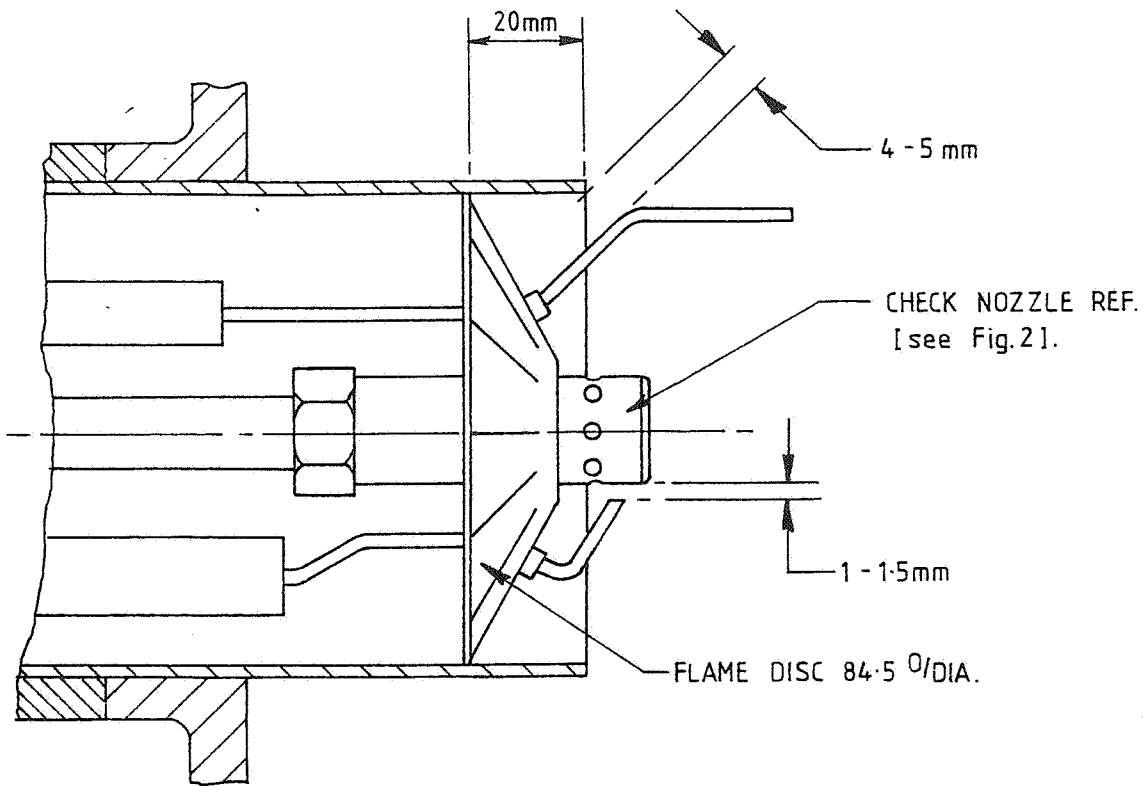
SG 42 FD 44 COMBUSTION HEAD SETTINGS

Fig. 2A

TYPE OF GAS	NOZZLE		MAX. FIRING RATE		MIN. SUPPLY PRESSURE	
	DRILL SIZE	REF. MARK	kW	Btu/h	mbar	in. wg.
NATURAL	12x No. 4	4	44	150 000	17.5	7

SG 42 FD 44 COMBUSTION HEAD DETAILS

Fig. 2B



SG 42 FD 35 COMBUSTION HEAD SETTINGS

Fig. 1A

TYPE OF GAS	NOZZLE		MAX. FIRING RATE		MIN. SUPPLY PRESSURE	
	DRILL SIZE	REF. MARK	kW	Btu / h.	mbar	in.w.g.
NATURAL	12 x No. 52	52	35	120 000	17.5	7
MANUFACTURED GAS	12 x No. 28	28	23	79 000	7.5	3
	12 x No. 28	28	35	120 000	17.5	7
PROPANE	12 x No. 56	56	35	120 000	30	12

SG 42 FD 35 COMBUSTION HEAD DETAILS

Fig. 1B

7. GENERAL INFORMATION.

Typical Properties of Gaseous Fuels.

	<u>Natural Gas.</u>	<u>Manufactured Gas.</u>	<u>Propane.</u>
Calorific Value (gross) Btu/ft. ³	1025	500	2500
(MJ/m ³)	(38.2)	(18.7)	(93)
Specific Gravity.	0.6	0.5	1.52
Combustion air req'd. Vol/Vol.	9.84	4.5	23.8
ft ³ /1000 Btu.	9.6	9.0	9.5
m ³ /MJ.	(0.26)	(0.24)	(0.25)
Approx. Inflammability limits % gas in air	5 to 15	4 to 40	2.4 to 9.5

The relationship between CO₂ or O₂ readings and excess air (i.e. excess over and above the theoretical requirements shown above) is given in Fig. 7.

REFERENCES.

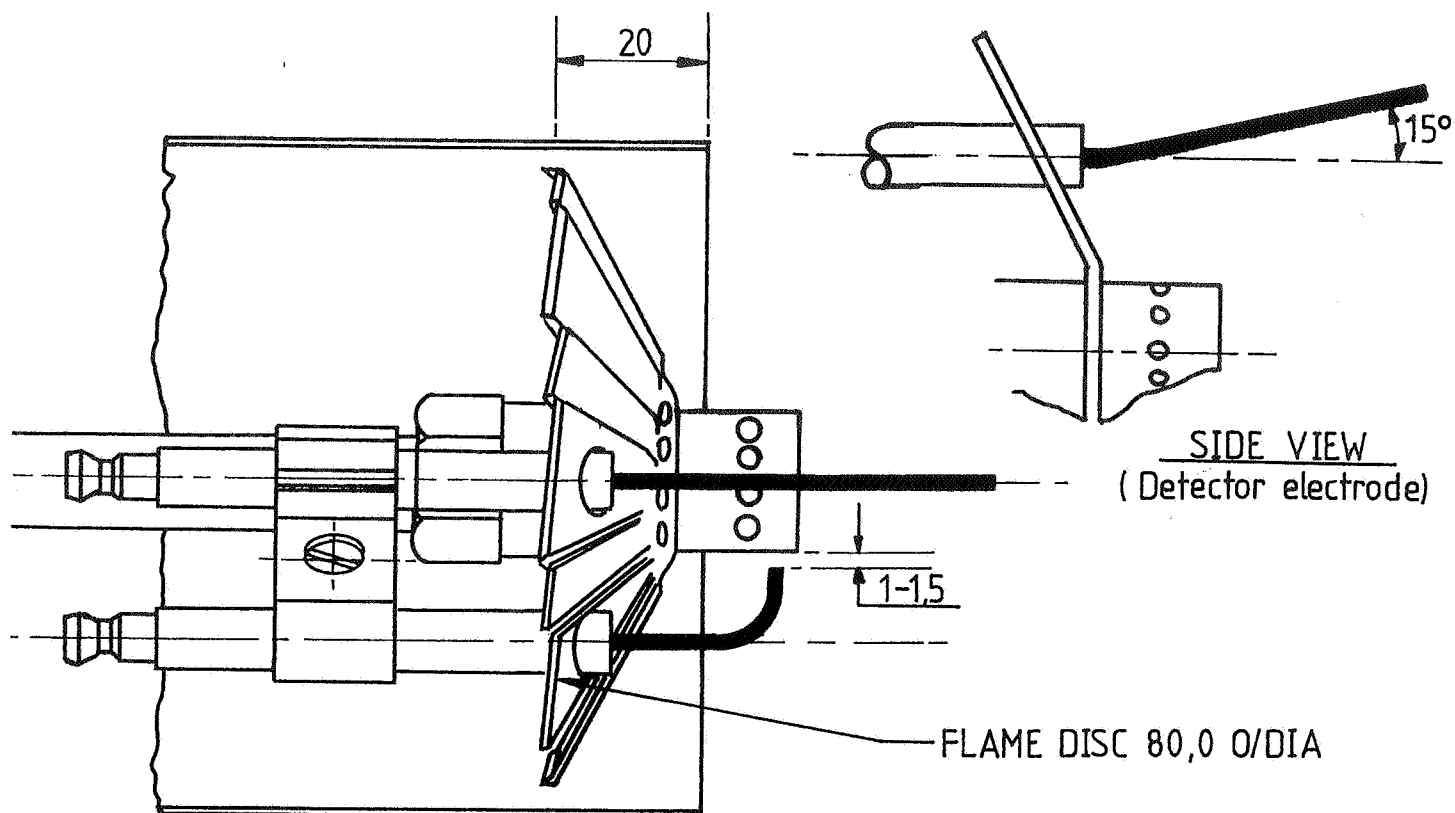
(i) "A Guide to Installation Practice"

Published by:- Confederation for the Registration of Gas Installers,
326 High Holborn,
London WC1V 7PT.

(ii) "IHVE Practice Notes"

1. Combustion and Ventilation air for boilers and other heat producing appliances; installations not exceeding 45 kW (150,000 Btu/h).

Published by:- The Institution of Heating and Ventilating Engineers,
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London SW1X 0JB.

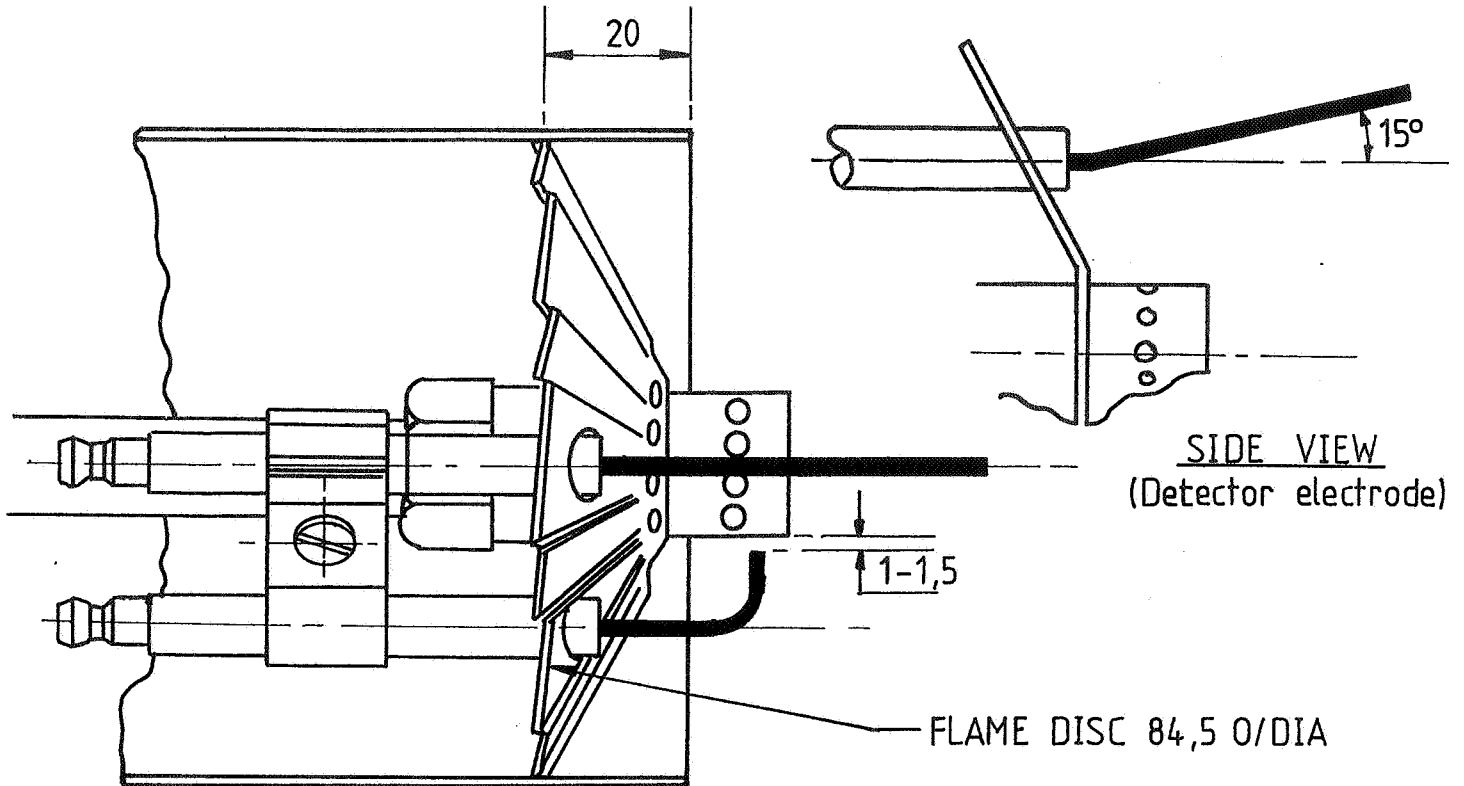


SG42 FD44 COMBUSTION HEAD SETTINGS Fig.2A

TYPE OF GAS	NOZZLE		MAX FIRING RATE		MIN SUPPLY PRESSURE	
	DRILL SIZE	REF MARK	kW	Btu/h	m bar	in.wg.
NATURAL	12 × No 40	40	44	150 000	17,5	7

SG 42 FD 44 COMBUSTION HEAD DETAILS Fig. 2B

THIS ASSEMBLY APPLIES TO ALL BURNERS AFTER SERIAL Nº 314814



SG 42 FD 35 COMBUSTION HEAD SETTINGS Fig 1A

TYPE OF GAS	NOZZLE		MAX FIRING RATE		MIN SUPPLY PRESSURE	
	DRILL SIZE	REF MARK	kW	Btu/h.	m bar	in.wg.
NATURAL	12×No52	52	35	120 000	17,5	7
MANUFAC'T GAS	12×No 28	28	23	79 000	7,5	3
	12×No 28	28	35	120 000	17,5	7
PROPANE	12×No56	56	35	120 000	30	12

SG 42 FD 35 COMBUSTION HEAD DETAILS Fig 1B

THIS ASSEMBLY APPLIES TO ALL BURNERS AFTER SERIAL N° 314814

6. FAULT FINDING.

<u>Symptoms.</u>	<u>Possible Fault.</u>	<u>Remedy.</u>
Does not start.	Locked out (red light on)	Press re-set button.
	No electricity.	Remove control box top and check (with mains tester) that terminal 9 is live. Check fuse. Check that any thermostats or time switches are 'on'.
Starts/Does not ignite/ Lockout.	No gas.	Check that gas taps are open and that there is gas pressure at governor outlet test point.
	No ignition spark.	Ignition electrode displaced or shorting. (Check ceramic insulating collar where electrode passes through flame disc.).
	Air pressure switch (if fitted) set too high.	Re-adjust setting as under section 4.5.
Starts/Ignite/Lockout.	Detector probe displaced or shorting to earth.	Check location of probe and particularly ceramic insulating collar where probe passes through flame disc.
	Polarity of mains connections to control box incorrect.	See Fig. 3.
Goes out on change from low to full gas rate.	Combustion air not set correctly.	Check CO ₂ , O ₂ etc. as in section 4.4.
	Gas rate too high.	Reduce gas governor setting and check pressure or rate as in section 4.3.

5. SERVICE.

Very little service attention is required except for cleaning any dust from the burner fan and combustion head. The intervals between service depends on the frequency of use but it is recommended that the burner should be checked two to three times a year.

- a) Note setting of air control knob.
- b) Turn off gas and switch off electricity.
- c) Remove burner from boiler.
- d) Undo 4 screws retaining motor and withdraw motor sufficiently to clean fan.
- e) Undo 3 countersunk screws securing draught tube and remove this to allow inspection and cleaning of combustion head.
- f) Re-assemble and re-install burner.
- g) Go through the procedure as for COMMISSIONING in section 4.

4.3.1. Estimation by Pressure.

- a) Connect Pressure gauge to test nipple (3).
- b) Remove cap (4) from governor and turn adjustment screw (5) clockwise to increase or anti-clockwise to decrease the pressure.
- c) Adjust pressure to the appropriate value for the gas being used and the boiler output required by reference to Fig. (6a).
- d) If the gas rate is not then to be checked by meter remove pressure gauge and replace test nipple sealing screw and governor cap.

4.3.2. Measurement by Meter.

- a) Check that any other appliances supplied through the same meter are turned off.
- b) With a stop watch, time a whole number of revolutions of the meter test dial and calculate the hourly flow rate.
- c) By turning the governor adjusting screw clockwise to increase, or anti-clockwise to decrease, the flow rate adjust by trial until the measured flow rate is within 2% of the required value.

4.4. Adjusting Combustion Air.

The combustion air control must be adjusted to give 20 to 30% excess air which must be done by using combustion testing instruments to measure the CO₂ (carbon dioxide) and preferably also O₂ (oxygen) and CO (carbon monoxide) percentage in the flue gases.

Fig. (7) shows that the required setting corresponds to CO₂ readings of about 9%, 10% or 10½% for Natural Gas, Manufactured Gas and Propane respectively or alternatively 4½ to 5% O₂ in all cases if an instrument is available to measure the latter.

Fig. (7) also makes it clear why it is necessary to make an independent test for presence of CO and the ratio of CO/CO₂ should not exceed .02.

4.5. Setting the Air Proving Switch (if fitted).

With the air damper and gas rate adjusted correctly set the Pressure Switch by turning its adjusting screw or dial so as to increase the reading on the air pressure scale until the gas valve closes. Note the scale reading in mbar and then re-adjust to about one third of that scale reading and the burner should re-cycle.

4. COMMISSIONING.

It is recommended that the burner should be put into operation by a competent engineer and that recognised combustion testing instruments should be used. The normal procedures are:- The number references relate to Fig.(5).

4.1. Testing the Shut off Valve.

- a) Connect pressure gauge to test nipple (1).
- b) Turn on gas, wait a few seconds until the reading on the pressure gauge is steady, then turn off.
- c) Check that the reading on the pressure gauge does not fall (at least by not more than 0.5 mbar in 1 min.) indicating that the solenoid shut off valve is not letting by.
- d) Remove gauge and replace nipple sealing.

4.2. Starting Up.

- a) Set combustion air control knob (2) about three quarters open.
- b) Turn on gas tap.
- c) Check that any thermostats or time switches etc. on the installation are in the 'on' position.
- d) Switch on electricity and the burner should start and run through the normal sequence:-

burner runs for 10 to 12 seconds on pre-purge, ignition and first solenoid valve are energised simultaneously and burner should light on low fire (or at full rate if wired for on off operation). After about 18 seconds solenoid valve is energised and burner runs on high flame.

Note. if burner does not light the control will lock out within 8 to 10 seconds as indicated by the red light in the re-set button. Wait 60 seconds, then press re-set button to re-start. If burner does not ignite after two or three attempts refer to section 6 - FAULT FINDING.

4.3. Setting the Gas Rate.

The gas rate may be set approximately by estimation from the governor outlet pressure by reference to Fig. (6a) or, where a gas meter is fitted, more accurately by measuring the flow rate and adjusting to the rate specified by the appliance manufacturer or by reference to Fig. (6b).

3. INSTALLATION.

The installation should conform to good current practice (e.g. see 'A Guide to Installation Practice' (i) and 'IHVE Practice Notes 1' (ii)) and comply with any local Gas Board regulations.

It is recommended that the installation should be carried out by a CORGI registered Installer.

3.1. Pre Installation Check.

Check that the burner has not been damaged in transit and that the correct nozzle is fitted for the gas to be used in accordance with Fig. (1) and (2).

3.2. Burner Mounting.

The burner should be securely mounted on the appliance by means of the fixing flange, and using the gasket provided.

3.3. Gas Supply.

The gas supply should be of adequate size to ensure a working pressure not less than the minimum values shown in Fig. (2).

The supply should be terminated as close to the burner as possible with a gas cock. The final connection to the burner should be provided with unions to facilitate easy removal or may be run in an approved type of flexible pipe.

3.4. Electric Supply. (220/240v. 50 Hz. single phase AC).

All wiring should conform to IEE regulations and an isolating switch should be fitted adjacent to the appliance, the supply being protected by a 5 amp fuse.

At least the last 45 cm. (18") of the main supply to the burner, and also any connections to a boiler thermostat should be run in flexible conduit.

The supply must be properly earthed and the connections should be made in accordance with wiring diagram Fig. (3).

3.5. Ventilation.

To ensure an adequate supply of air for combustion the room in which the burner is installed should have some permanent ventilation in the order of at least 550 mm² per kW (equivalent to 1 in² per 4000 Btu/h) of boiler output.

3.6. Flue Connection.

The appliance manufacturers recommendations should be followed whenever possible.

Although a draught diverter or draught stabiliser may be desirable on some installations this substantially increases the combustion noise and the SG.42/FD.35 burner is capable of operating on appliances connected to airtight flues provided that the net working draught is within the range from zero up to about 40 Pa (0.16" w.g.) normally obtained with domestic chimneys.

1. FOREWORD.

The model SG.42/FD.35 is a small fully automatic gas burner for lower capacities up to a maximum firing rate of 35 kW (120,000 Btu/h) which is suitable for firing small domestic boilers (of the type hitherto fired mainly by pressure jet oil burners) with output ratings up to 26 or 28 kW (88 or 95,000 Btu/h) depending on their thermal efficiency.

It has been designed as a direct replacement of the widely used Selectos D.42/T.34 oil burner either for conversion of existing boilers in the field or for boiler manufacturers to offer as original equipment. Special features of the SG.42/FD.35 burners are:-

It can be adapted to burn Natural Gas, Manufactured Gas or Propane by a simple nozzle change only.

It can be set to operate 'on off' or as a 'low gas start' burner, to suit different applications, by a simple on site change in the wiring connections.

The high stability combustion head enables the burner to fire modern airtight boilers connected to flues without a draught break.

Flexibility of adjustment allows the burner to be set to any firing rate within its range, thus matching the boiler load closely, whilst at the same time the combustion air can be set to the optimum value (20 to 30% excess air) thereby maintaining the maximum boiler efficiency.

The noise level is no greater than comparable oil burners when firing the types of boilers which have already gained wide acceptance for kitchen installation.

The model SG.42/FD.44, available for Natural gas only, has an extended range up to 44 kW (150,000 Btu/h.) making it suitable for larger boilers up to about 35 kW (120,000 Btu/h.) It is intended for conversion of older type boilers, and where a draught stabiliser or draught diverter is fitted in the flue.

It should be noted that the capacity range of these burners is outside the scope of the industrial orientated Gas Corporation 'Standards for Automatic Gas Burners, Forced and Induced Draught' thus enabling the substantially cheaper types of control boxes and shut off valves approved for domestic use to be fitted.

2. TECHNICAL DATA.

SG.42/FD.35.

SG.42/FD.44.

CAPACITY

Firing rate 17 to 35 kW
(58,000 to 120,000 Btu/h)

Firing rate 35 to 44 kW
(120,000 to 150,000 Btu/h)

GAS SUPPLY.

Natural Gas, Manufactured Gas
or Propane.

Natural Gas.

Inlet pressure 40 mbar (16" w.g.)
maximum.

GAS INLET.

R 1/2" *

ELECTRIC SUPPLY.

220/240 volt, 50 Hz single phase A.C.
Maximum Power required 375 VA.

MOTOR.

75w. Cap start. 2800 rev/min.

CONTROL BOX.

Satronic type TFI 735 Flame Ionisation type.

GAS CONTROL.

Sperryn G.1445 Double solenoid valve.

MAXIMUM AMBIENT TEMPERATURE.

50°C.

*(This is on the universal model with Satchwell Combination Control. For maximum rating on Manufactured Gas at only 3" w.g. inlet pressure a special burner with R 3/4" governor and separate solenoid valve can be supplied).