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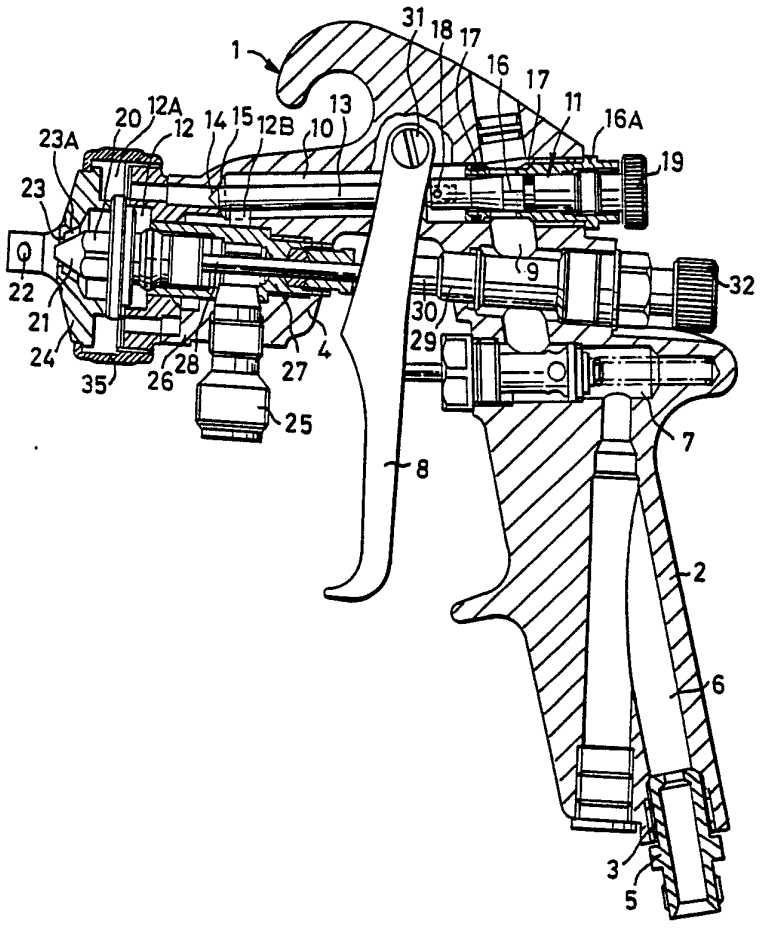
(54) Title: SPRAYGUN

(57) Abstract

A spraygun (1) operable by low pressure high volume air is described comprising a body (4) and a nozzle (21) having a fluid orifice for discharging a fluid jet and an air cap (24) attached to the front of the body by a retaining ring (35), the air cap (24) defining an annular orifice about the fluid nozzle (21) for discharging atomised air, wherein the air inlet for supplying air to the spraygun (1) has a first restricting means (3) to reduce the pressure of air to the spraygun and a second restricting valve means (11) to control the flow of air to the air cap (24).



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SPRAYGUN

This invention relates to a spraygun, and more particularly to a spraygun that is operable by high volume low pressure air.

In known sprayguns which utilise air from a compressor the air is typically supplied at between 60 to 90 psi and a control unit is used to step down the pressure of the supply air to 10 psi which is the working pressure of the spraygun.

To reduce pollution into the atmosphere caused e.g. by excess paint from the spraygun escaping into the surrounding air when used for paint spraying, certain countries have strict controls to ensure that the paint spraying equipment is operated at a pre-defined pressure.

An aim of the present invention is to provide an improved spraygun which meets the above requirements.

Accordingly, the present invention provides a spraygun operable by low pressure high volume air comprising a body and a nozzle having a fluid orifice for discharging a fluid jet and an air cap attached to the front of the body, the air cap defining an annular orifice about the fluid nozzle for discharging atomisation air, wherein the air inlet for supplying air to the spraygun has a first restricting means to reduce the pressure of air to the spraygun and a second restricting means to control the pressure of air to the air cap.

In one preferred embodiment the first restricting means is a screw-threaded replaceable unit, dimensioned to provide a predetermined restriction of the air inlet pressure, conveniently the unit can be provided with an indication of the predetermined air inlet pressure.

Conveniently, the second restricting means is a flow restricting valve being axially adjustable by a knurled headed screw-threaded member.

Embodiments of the invention will now be described by way of example only, with reference to the accompanying drawings, in which:

Fig. 1 is a vertical cross-section through a hand-held spraygun; and

Fig. 2 is a similar cross-section to Fig.1 of a modified construction of a spraygun according to the invention.

With reference now to the drawings in detail, Fig.1 shows a first embodiment of a hand-held spraygun generally indicated at 1. The spraygun is operable by high pressure air fed from an industrial compressor (not shown) at a typical pressure of between 60 to 90 psi, and at a flow rate of about 15 cubic feet per minute. Air enters the gun 1 at the lower end of a handle 2 via a first air restricting means 3 screwed into the handle which may be made integral with the gun body 4 or of plastics or other non-metallic material.

The restricting means 3 is flanged at 5 intermediate its ends to support the handle 2. The air pressure to the spraygun is reduced to an intermediate pressure e.g. 30 psi, depending upon the flow and pressure restricting dimensions of the air restricting means 3. The air flows via the restricting means into a passage 6 in the handle and into an air space 7 controlled by the operation of the spraygun trigger 8. The air then flows via passage 9 surrounding the trigger mechanism to a large bore air passage 10 in which is located a second air restricting means 11 to control the air supply at a reduced pressure to distribution chambers 12 and 12A at the front of the gun body 4.

The second air restricting means comprises a flow restricting valve 16 which controls the pressure in the chamber 10. The valve is sealed in the body by O-ring seals 17 in sub-body 16A. The air valve 16 is axially adjustable by a screw threaded member which has a knurled head 19 which can be turned to adjust the valve 16. A needle 13 is secured to the front of valve 16 by a pin 18 so that axial adjustment of the valve 16 engages the needle point 14 with a seat in the body to adjust the amount of air passing to chamber 12A. This air is termed

spreader air and flows from the chamber 12A through feeder holes to horn holes 22.

The regulated air from valve 16 also passes through passage 12B into chamber 12 and out through annulus 23A and cleaner holes 23.

In a conventional spraygun of which this is one embodiment, the control of air to the horn holes 22 via the control needle 13 can result in an increase of pressure in chambers 12 and 20. According to the present invention adjustment of the flow of air at valve 16 and needle point 14 as simultaneously controlled by the screw threaded adjustment 19 to automatically maintain a constant pressure in chambers 12 and 20. By this means the air pressure existing at the spraygun aircap 24 is controlled to a predetermined level e.g. 10 psi.

The fluid medium enters the gun body 4 via the inlet 25 which is screwed into the head 26 of the gun body and makes a cone to cone seal with a sleeve 27. The supply of fluid medium to the spray nozzle 21 is controlled by a needle 28 which enters the gun body at the upper end of the handle and is mounted in a body bush 29, it also carries a collar 30 which provides an abutment against which the trigger 8, pivoted to the body at 31 acts.

A knurled fluid adjustment knob 32 which threadedly engages in body bush 29 which also serves to provide a moveable abutment for limiting the rearward movement of the needle 28 by the trigger 8 in the conventional manner.

The air cap 24 fits over the spray-nozzle 21 and is secured to the spraygun by a retaining ring 35.

In a second embodiment of the hand-held spraygun shown in Fig. 2 like parts have the same reference numerals as the embodiment of Fig. 1.

To provide a controlled volume of pressurised air at the gun handle 2 the first restricting means takes the form of a tube 36 mounted in the passage 6 and sealed in position by a threaded plug 37. The tube 36 is provided

with a series of holes 38 to allow the initial air pressure to be reduced to an intermediate air pressure e.g. 30 psi by the restricting orifice 36A. This tube and its restricting orifice 36A can be replaced by alternative restricting tubes allowing for different levels of intermediate pressure.

In this second embodiment, the restricting means 3 is replaced by a connector 35 without a restricting orifice for connecting the airline to the spraygun.

The spraygun can be appropriately marked on its outer surface with the input and operational pressure of the spraygun, viz "90 psi input - 10 psi at air cap", to satisfy the standards laid down for a particular country or the state laws of a state in the USA.

In operation the input air pressure from the compressor may vary. The improved spraygun of the present invention provides two levels of restriction of the input air pressure, firstly to reduce the flow of air entering the spraygun to an intermediate pressure level and secondly to provide a simultaneous reduction in air pressure to a controlled level through all normal adjusting ranges using a conventional spraygun.

CLAIMS:

1. A spraygun operable by low pressure high volume air comprising a body (4) and a nozzle (21) having a fluid orifice for discharging a fluid jet and an air cap (24) attached to the front of the body, the air cap (24) defining an annular orifice about the fluid nozzle (21) for discharging atomisation air, characterised in that the air inlet for supplying air to the spraygun has a first restricting means (3) to reduce the pressure of air to the spraygun and a second restricting means (11) to control the pressure of air to the air cap (24).

2. A spraygun as claimed in Claim 1, characterised in that the first restricting means (3) is a screw-threaded replaceable unit, dimensioned to provide a predetermined restriction of the air inlet pressure.

3. A spraygun as claimed in Claim 1 or 2, characterised in that the first restricting means (3) can be provided with an indication of the air inlet pressure.

4. A spraygun as claimed in any preceding claim, characterised in that the first restricting means (3) communicates with the second restricting means (36) installed in the handle (2) of the spraygun.

5. A spraygun as claimed in Claim 4, characterised in that the second restricting means (36) is a tube with a plurality of apertures (38) formed in the tube and a restricting orifice (36A) at its leading end.

6. A spraygun as claimed in any preceding claim, characterised in that the second restricting means (11) comprises a flow restricting valve (16) sealed in the spraygun body (4), a needle (13) connected to the front of the valve (16), axial adjustment means (19) for the valve (16) to simultaneously adjust a point (14) of the needle with a seating (15) to adjust the flow of air passing the valve (16) and needle (13) to the spray nozzle (21).

7. A spraygun as claimed in Claim 6, characterised in that the axial adjustment means (19) is a screw-threaded member having a knurled head (19).

member having a knurled head (19).

8. A spraygun as claimed in Claim 6 or 7, characterised in that the screw-threaded member is sealed in the spraygun body by O-ring seals (17).

9. A spraygun as claimed in any preceding claim, characterised in that the outside of the spraygun is marked to denote the input and operational pressure of the spraygun.

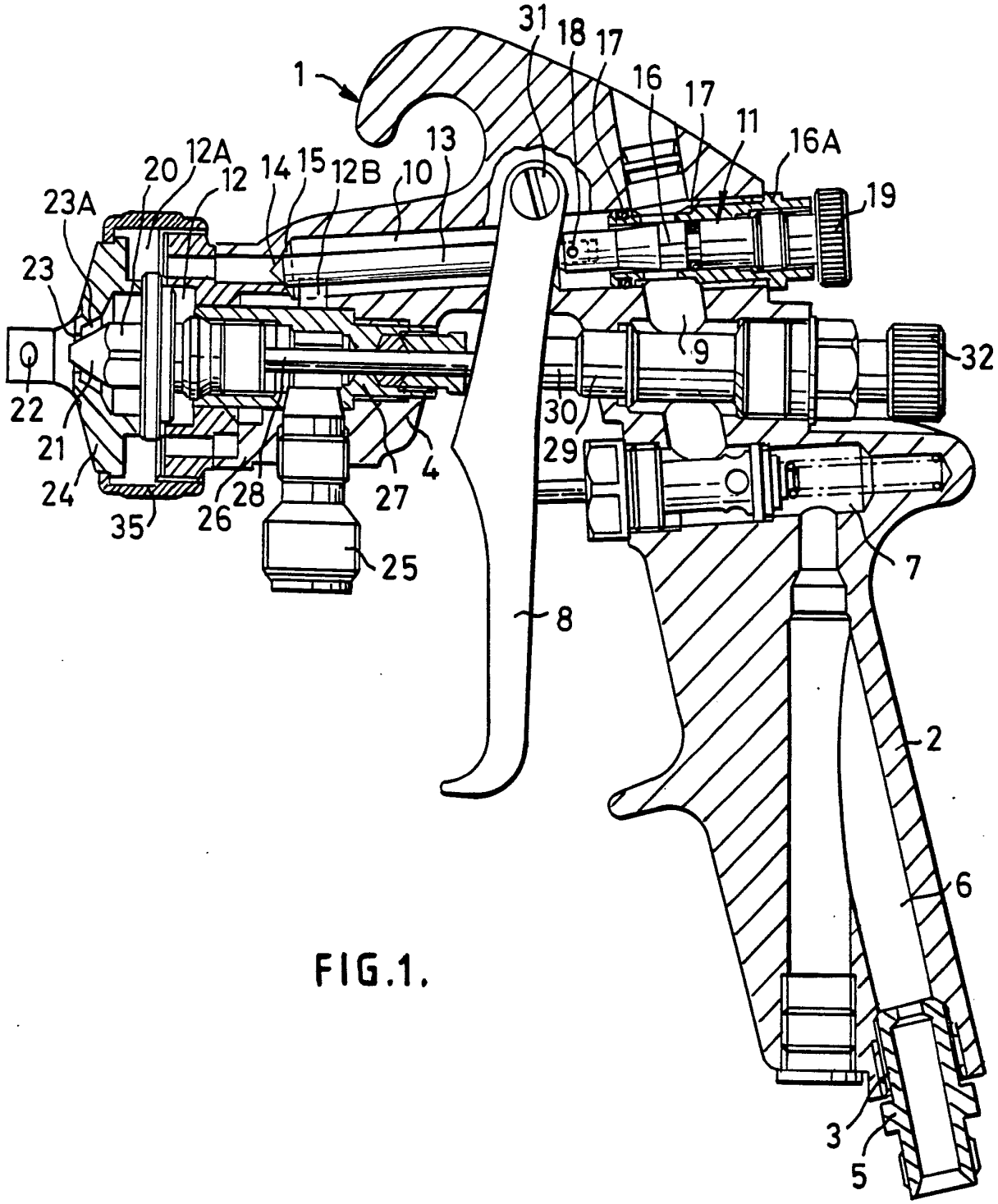
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FIG.1.

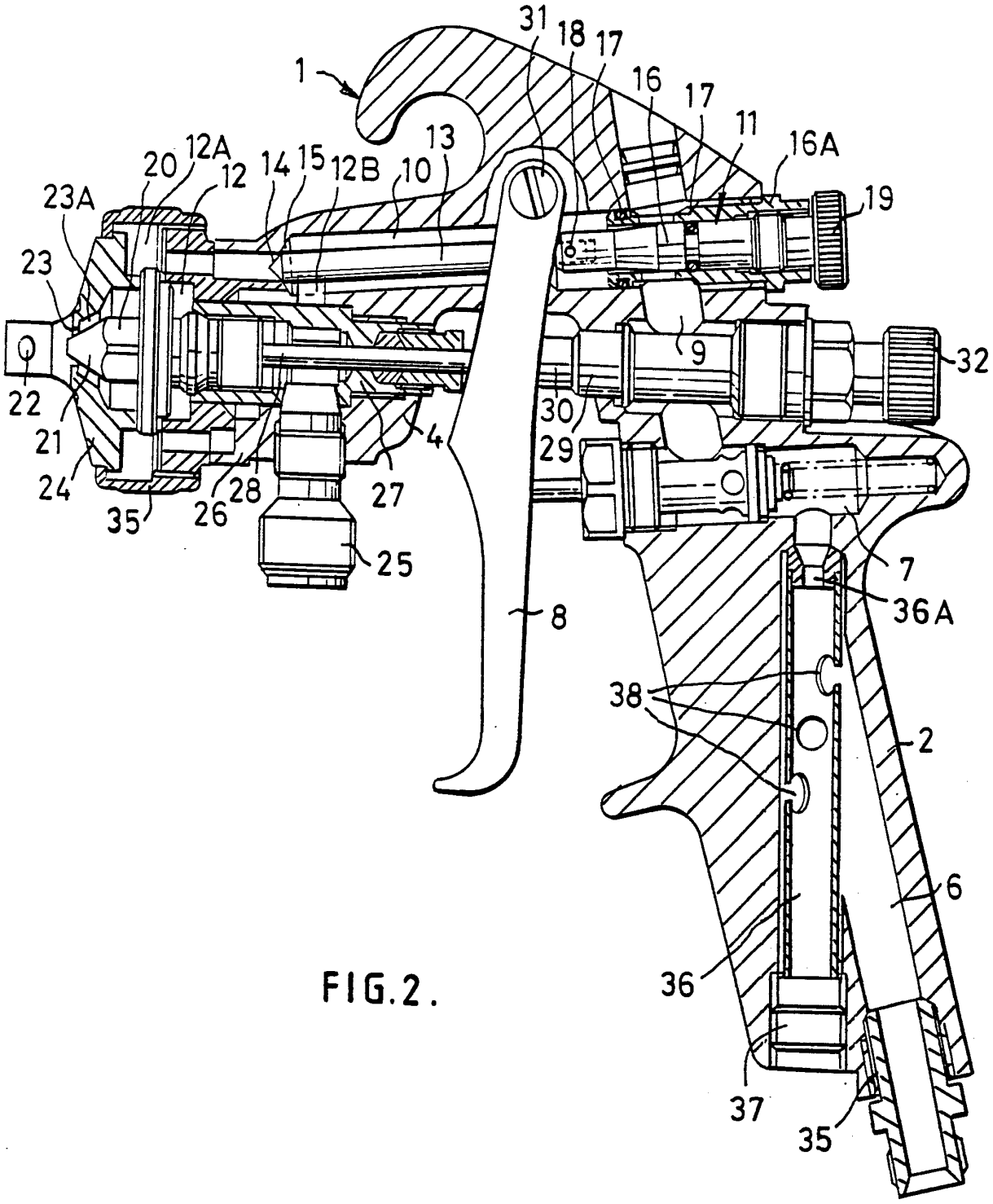
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FIG.2.

INTERNATIONAL SEARCH REPORT

International Application No PCT/GB 90/01368

I. CLASSIFICATION OF SUBJECT MATTER (if several classification symbols apply, indicate all)[6]

According to International Patent Classification (IPC) or to both National Classification and IPC

IPC5: B 05 B 7/12

II. FIELDS SEARCHED

Minimum Documentation Searched[7]

Classification System	Classification Symbols
IPC5	B 05 B

Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in Fields Searched[8]

III. DOCUMENTS CONSIDERED TO BE RELEVANT[9]

Category *	Citation of Document,[11] with indication, where appropriate, of the relevant passages[12]	Relevant to Claim No.[13]
X	GB, A, 2180778 (OFFICINA MECCANICA AZZIMONTI GIOVANNI S.R.L.) 8 April 1987, see page 2, line 28 - line 33; figures 1,2	1-2
A		5,6
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A	US, A, 4817872 (ROY D. MATTSON) 4 April 1989, see figure 1	1
	--	
A	GB, A, 2138706 (THE COMMONWEALTH INDUSTRIAL GASES LIMITED) 31 October 1984, see page 1, line 24 - line 25; figure 1; claim 1	1,6
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* Special categories of cited documents: [10]

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IV. CERTIFICATION

Date of the Actual Completion of the International Search	Date of Mailing of this International Search Report
30th November 1990	18 DEC 1990
International Searching Authority	**Signature of Authorized Officer**
EUROPEAN PATENT OFFICE	MISS T. TAZELAAR

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III. DOCUMENTS CONSIDERED TO BE RELEVANT (CONTINUED FROM THE SECOND SHEET)

Category *	Citation of Document, with indication, where appropriate, of the relevant passages	Relevant to Claim No
A	EP, A1, 0140547 (THE DEVILBISS COMPANY LIMITED) 8 May 1985, see figure 1; claim 10	1
A	Derwent's abstract No. D27 44 B/15, SU 608 557, publ. week 7915	1
A	DE, B, 1055459 (KARL SCHMIDT METALLSCHMELZWERK G.M.B.H.) 16 April 1959, see figure 1; claims 1,2	1-2

ANNEX TO THE INTERNATIONAL SEARCH REPORT ON INTERNATIONAL PATENT APPLICATION NO.PCT/GB 90/01368

SA 40117

This annex lists the patent family members relating to the patent documents cited in the above-mentioned international search report.
The members are as contained in the European Patent Office EDP file on 01/11/90
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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
GB-A- 2180778	08/04/87	DE-A-C- 3632269	02/04/87
		FR-A- 2587631	27/03/87
		SE-B- 462584	23/07/90
		SE-A- 8603991	25/03/87
US-A- 4817872	04/04/89	US-A- 4934602	19/06/90
GB-A- 2138706	31/10/84	AU-D- 1325483	11/10/84
		JP-A- 59196770	08/11/84
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		GB-A-B- 2146271	17/04/85
		JP-A- 60156575	16/08/85
		US-A- 4606501	19/08/86
DE-B- 1055459	16/04/59	NONE	