(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) Publication number: **0 426 625 A1**

(12) EUROPEAN PATENT APPLICATION

(21) Application number: **90830476.9**

(51) Int. Cl.5: **B24B 21/08**

(22) Date of filing: **23.10.90**

(30) Priority: **31.10.89 IT 368089**

(43) Date of publication of application:
08.05.91 Bulletin 91/19

(84) Designated Contracting States:
DE ES NL

(71) Applicant: **DMC S.P.A.**
Piazza Giovanni XXIII, 8
I-40060 Toscanella di Dozza (Bologna)(IT)

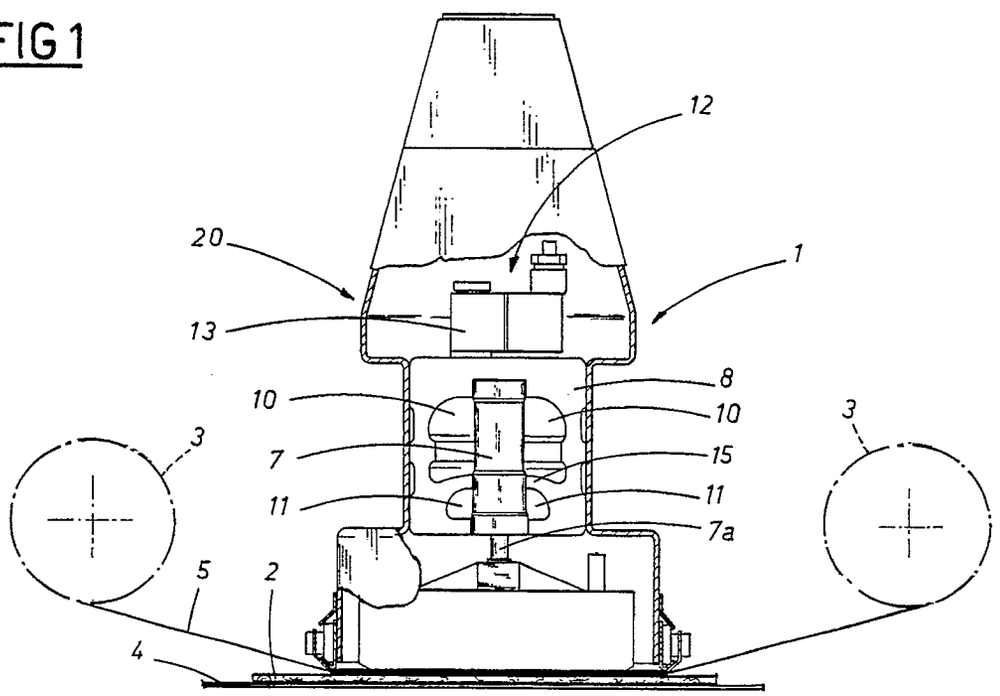
(72) Inventor: **Botteghi, Gino**
Via Ferrario, 1/A
I-47037 Rimini (Forlî)(IT)

(74) Representative: **Lanzoni, Luciano**
c/o BUGNION S.p.A. Via dei Mille, 19
I-40121 Bologna(IT)

(54) Design for a cross-beam to support presser plates used on woodworking machinery.

(57) The structure described in this invention consists of a cross-beam (8) which has a series of enclosed, internal, fixed, sealed seats (9) for housing pneumatic means (7), these seats being situated centrally and crossways to the longitudinal axis of the beam (8). The beam has a first and a second duct (10 and 11) independent from and parallel to each other, running the entire length of the beam (8) which also act as ducts for the entry of air from the outside and for the discharge of air being exhausted from the pneumatic means (7) respectively. Control means (12) can also be located on the beam (8) connected on the inlet side with the first duct (10) and operating, on the outlet side, on each of the pneumatic means (7) in order to enable the latter to move the presser plates (6).

FIG 1



EP 0 426 625 A1

DESIGN FOR A CROSS-BEAM TO SUPPORT PRESSER PLATES USED ON WOODWORKING MACHINERY

This invention concerns a design for a cross-beam structure for supporting presser plates of the type commonly used on woodworking machinery. The woodworking machines involved are known as wide-belt sanders and basically consist of a supporting frame and a workpiece conveyor belt travelling in a longitudinal direction. The sander means consist of a series of parallel-axis rollers positioned above and crossways to the conveyor belt. These rollers carry a closed-loop continuous sanding belt which is tensioned by hydraulic cylinders fitted to the rollers; the sander has presser parts which press a portion of the sanding belt down in the direction of the conveyor belt. Variations in the pressure of the presser parts on the sanding belt cause corresponding variations in the degree of sanding which the workpiece undergoes and also makes it possible to obtain uniform sanding on workpieces where the various surfaces are of differing heights.

The presser parts usually consist of an actuator, such as a pneumatic cylinder, which controls a single plate which in turn presses down on the sanding belt. Each machine does, of course, have several actuators and presser plates fitted alongside each other (the number of actuators and plates varies according to the width of the sanding belt) which operate like the keys of a piano, i.e. each cylinder-presser unit is operated by a single control means as and when the work situation requires.

The cylinder-presser unit is supported by a cross-beam positioned above the sanding belt and located between the rollers which tension the sanding belt; the cross-beam is usually positioned crossways in relation to the conveyor belt transporting the wooden workpieces. This cross-beam is in turn fixed to a supporting frame fitted to the belt sander. The greatest drawback of presser units of the type described above concerns their structure; each cylinder-presser unit is usually positioned on one of the machine's existing cross-beams which means that the machine manufacturer is obliged to design and machine the cross-beam so that it can accommodate and support the various cylinder-presser units required. Machining, such as machining the support seats for the cylinder with openings for the entry and discharge of compressed air, produces an overall cross-beam structure that is insufficiently homogeneous; this leads to a lack of constructional solidity in the entire sander unit and less accuracy in the operation of the entire presser unit.

The Applicant therefore felt the need for a specific component, i.e. a cross-beam, which was designed to satisfy the structural requirements of the sanding unit of such a machine and to provide great solidity, homogeneity and operational precision.

The aim of the invention described in the claims below is to provide a design for a cross-beam where the cross-beam has an internal, fixed, sealed seat for each of the pneumatic means present; this seat being situated centrally and crossways to the longitudinal axis of the cross-beam. The beam has a first and a second duct independent from and parallel to each other, running the entire length of the beam which act, respectively, as a pocket for air entering from the outside and a pocket for the air being exhausted from the pneumatic means respectively. Control means can also be fitted to the beam and connected to the first duct and operate on each of the pneumatic means in order to enable the latter to move the presser plates. One of the advantages obtained through this invention is that it is possible, using an extrusion, to produce a beam which has been designed exclusively for the support (and obviously movement) of the various presser-pneumatic units and to provide a homogeneous structure without any structural shortcomings and with obvious advantages for the mounting of the aforementioned units (quicker assembly and guaranteed centring of the pneumatic means on the cross-beam).

The invention is described in greater detail below with the aid of drawings which show one possible form of the invention and are not intended as restrictive in any way; the drawings are as follows:

figure 1 shows a side view of a sander unit with the cross-beam described in this invention; some parts have been removed for thel sake of clarity;

figure 2 shows a side view of the cross-beam in figure 1; some parts have been removed for the sake of clarity.

The attached drawings show the cross-beam described in this invention on a wide-belt sander machine with a sander unit, 1 indicating the entire unit, for sanding pieces of wood 2, consisting of a series of rollers 3 (shown by the broken line in figure 1) on parallel axes to each other and positioned crossways and above a conveyor belt 4 for transporting wood pieces 2. The said rollers 3 carry and tension a closed-loop continuous sanding belt 5 in contact with a series of plates 6 positioned alongside each other, each controlled (and supported by) pneumatic means 7. The said pneumatic means are independent from each other and each moves its corresponding plate 6 in the direction of the sanding belt 5.

The various units formed by the plate 6 - pneumatic means 7 pair are supported by a cross-beam 8 which is positioned between the rollers 3 and extends parallel to these; the beam is supported at its ends by a fixed frame (not shown here because it is of a known type) on the belt sander machine. The design in this invention specifically concerns the aforementioned cross-beam 8 (with a quadrangular external profile when seen in cross section) consisting of an aluminium extrusion; inside this beam there is a series of enclosed, sealed, fixed seats 9 for holding the pneumatic means 7; obviously the seat 9 is manufactured (as can clearly be seen in the two drawings enclosed) with its bottom part open in order to house the pneumatic means 7 which, in the example shown here, consists of a pneumatic piston fitted with a central actuating rod 7a which screws into the plate 6. Each seat is located centrally and crossways to the longitudinal axis of the beam 8 and thus forms a supporting "jacket" for the plate 6 - piston 7 unit.

Referring to the two drawings once again, it will be noted that the cross-beam 8 has a first and second duct 10 and 11 which are independent and run parallel to one another along the entire length of the beam 8. The first duct 10 has a greater volume than the second duct 11 (the reason for this will be explained later) and is above it. The two ducts and 11 are each divided into two equal parts by each of the pistons 7 when the latter are inserted in their seats 9; the two ducts are separated from each other by a bridging structure 15 which is part of the cross-beam 8 and where the two halves of the bridge structure divide the two ducts from each other by starting from the internal side walls of the cross-beam to meet, at their free ends, with the pistons 7, which in turn are fitted at this point with seal components 16 such as Seeger washers or 'O' rings.

In figures 1 and 2, the number 12 indicates the control means which are housed in the upper part of the beam 8 and which, through a connectipn to the first duct 10, act individually on each piston 7 so as to cause the latter to move the corresponding plate 6. The control means 12 consists of a solenoid valve 13, one for each of the pistons fitted to the machine, which is housed in a seat 14 (see figure 2) made in the surface of the cross-beam 8 which is counter-opposed to the face of the beam facing the plate 6. The solenoid valve 13 is connected to the first duct 10 by a special conduit 14a made in the cross-beam 8, which starts from the seat 14 and leads into the first duct 10.

Figure 2 shows a detailed view of a piston 7; pistons 7 are of the single-acting type and are fixed, singly for greater safety, inside a corresponding seat 7 by screw means 17 and have a series of seal rings 21 positioned uniformly along the entire length of the piston 7 in order to ensure the complete sealing of the cross-beam; each of these pistons 7 has a pair of internal air-discharge ducts 18 and 19 which lead to the second duct 11 and exit there at two diametrically opposed points.

It will already be evident from the description given so far that the sander unit 1 of this type operates in the following way: each solenoid valve 13 is operated externally by an operator from a central control unit (not shown here because it is of a known type); when an impulse is transmitted to a solenoid valve 13, the solenoid valve operates to withdraw air from inside the first duct 10 and feeds it into the piston 7 so that the piston then pushes the plate 6 towards the sanding belt 5. When the operator deactivates the solenoid valve 13 and the supply of air to the piston 7 is interrupted, the piston will be returned to its starting position by a spring 22 inside the piston and the remaining air will be discharged by the ducts 18 and 19 into the second duct 11 of the cross-beam 8. The advantages of a structure of this type are obvious; a beam of this design is structurally very solid and components can be fitted rapidly and accurately thanks to the fact that the internal seat is already centrally located in relation to the beam. The operation of the entire piston-plate unit is, furthermore, very reliable and precise (a very important characteristic for the type of work performed by this machine) thanks to two ducts for the infeed and outfeed of air which ensure a constant flow of air and thus guarantee continuous piston positioning accuracy.

A further advantage of the invention is that this type of cross-beam can be fitted with a protective casing 20 (see figure 1) which is in direct contact with the outer sides of the cross-beam profile and which extends both upwards and downwards from the beam so that it then covers the solenoid valves 13 and the slides 6; this type of cover makes a considerable improvement in the aesthetic appearance of the sander unit 1 and, more importantly, considerably increases the safety of those operating around the machine.

This invention can be subjected to numerous modifications and variations, all of which are within the terms of this invention. Any or all of these details can be replaced by their technical equivalents.

Claims

1) Design for a cross-beam to support presser plates used on woodworking machinery such as belt sander machines with a sander unit (1) for sanding pieces of wood (2) consisting of a series of roller (3) on parallel axes and positioned crossways

and above a conveyor belt (4) for transporting the said pieces of wood (2); a closed-loop continuous sanding belt (5) runs on and is tensioned by the said rollers (3); the said sanding belt (5) is in contact with a series of plates (6) positioned alongside each other, each one controlled and supported by pneumatic means (7), operating independently from each other, which move the plate in the direction of the said belt (5); the said plates (6) and the said pneumatic means (7) are supported by a cross-beam (8) positioned between the two rollers (3), running parallel to these, whose ends are supported by the fixed frame of the belt sander machine, wherein the said cross-beam (8) has inside it a first and second duct (10 and 11), which are independent and run parallel to one another along the entire length of the beam (8) which act, respectively as a duct for air entering from the outside and a duct for air being discharged; the said cross-beam (8) has a series of enclosed, fixed, sealed seats (9) for each of the said pneumatic means present (7) said seats being situated centrally and crossways to the longitudinal axis of the crossbeam(8); control means which can be housed on the said beam (8) connected on the inlet side to the said first duct (10) and acting on the outlet side on each of the said pneumatic means (7) so that the latter can move the said plate (6); the discharge of said pneumatic means (7) being positioned in the said second duct (11).

2) Design according to claim 1, wherein the said control means (12) consist of a solenoid valve (13), one for each of the pneumatic means (7) fitted to the machine, housed in a corresponding seat (14) made in the surface of the cross-beam (8) counter-opposed to the face of the beam facing the plates (6) and connected to the said first duct (10) by means of a special conduit (14a) made in the cross-beam (8) starting from the said seat (14) of the solenoid valve (13)

3) Design according to claim 1, wherein the said first and second ducts (10 and 11) are each divided in two equal halves by each of the said pneumatic means (7) inserted in the corresponding seat (9) and are separated from each other by a bridging structure (15) which starts from the internal side walls of the said cross-beam (8) and whose free ends meet the said pneumatic means (7) fitted at this point with sealing parts (16).

4) Design according to claim 1, wherein the said pneumatic means (7) consist of single-acting pistons each fixed inside the said seat (9) by screw means (17) and fitted with a least a pair of ducts (18 and 19), diametrically opposed to each other, which permit the discharge of air into the second said duct (11).

5) Design according to claim 1, wherein the said cross-beam (8) is fitted with a protective casing (20) positioned in contact with the outer sides of the said cross-beam (8) and extending both upwards and outwards of the said cross-beam (8) in order to cover the said control means (12) and the said plates (6) respectively.

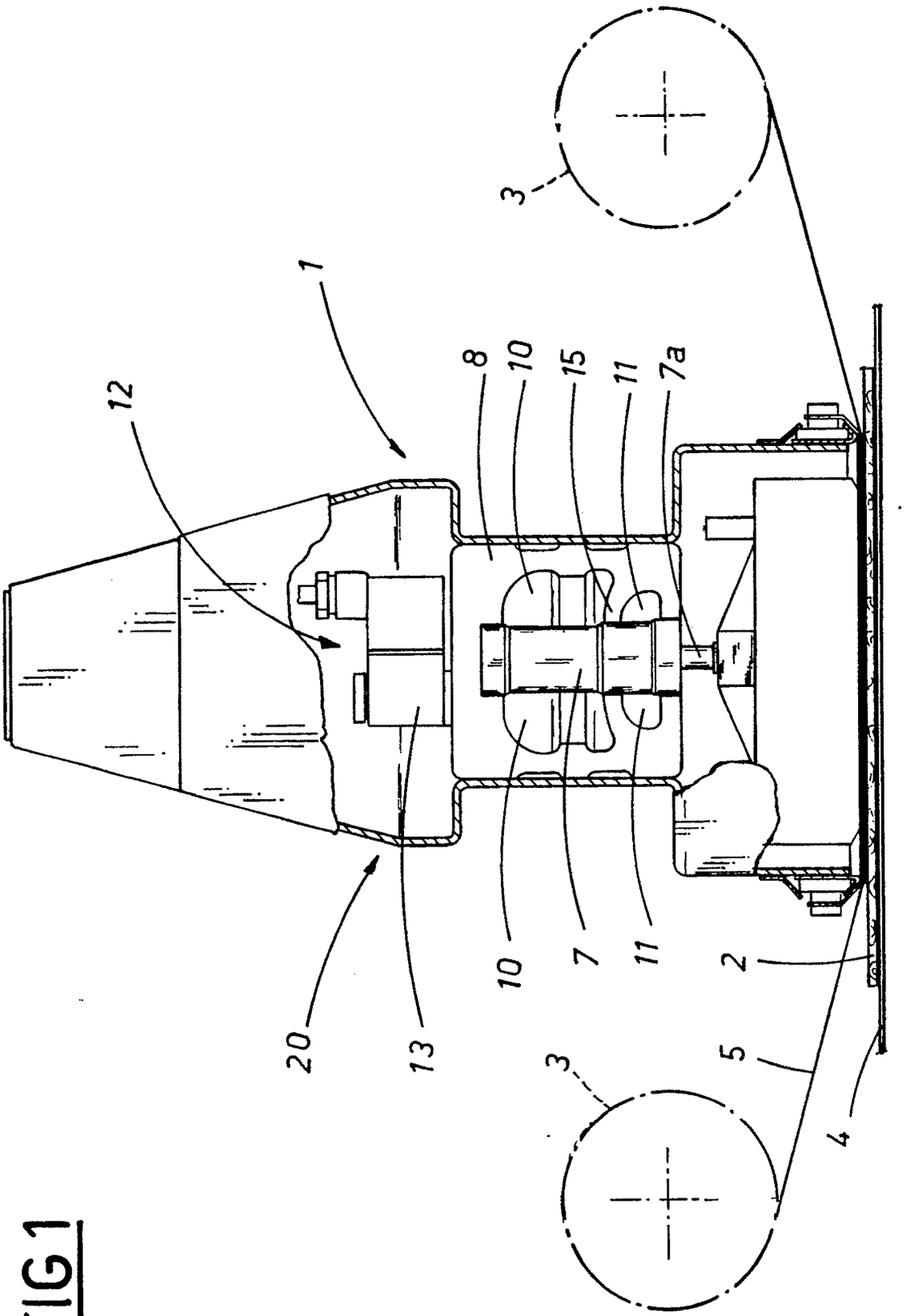
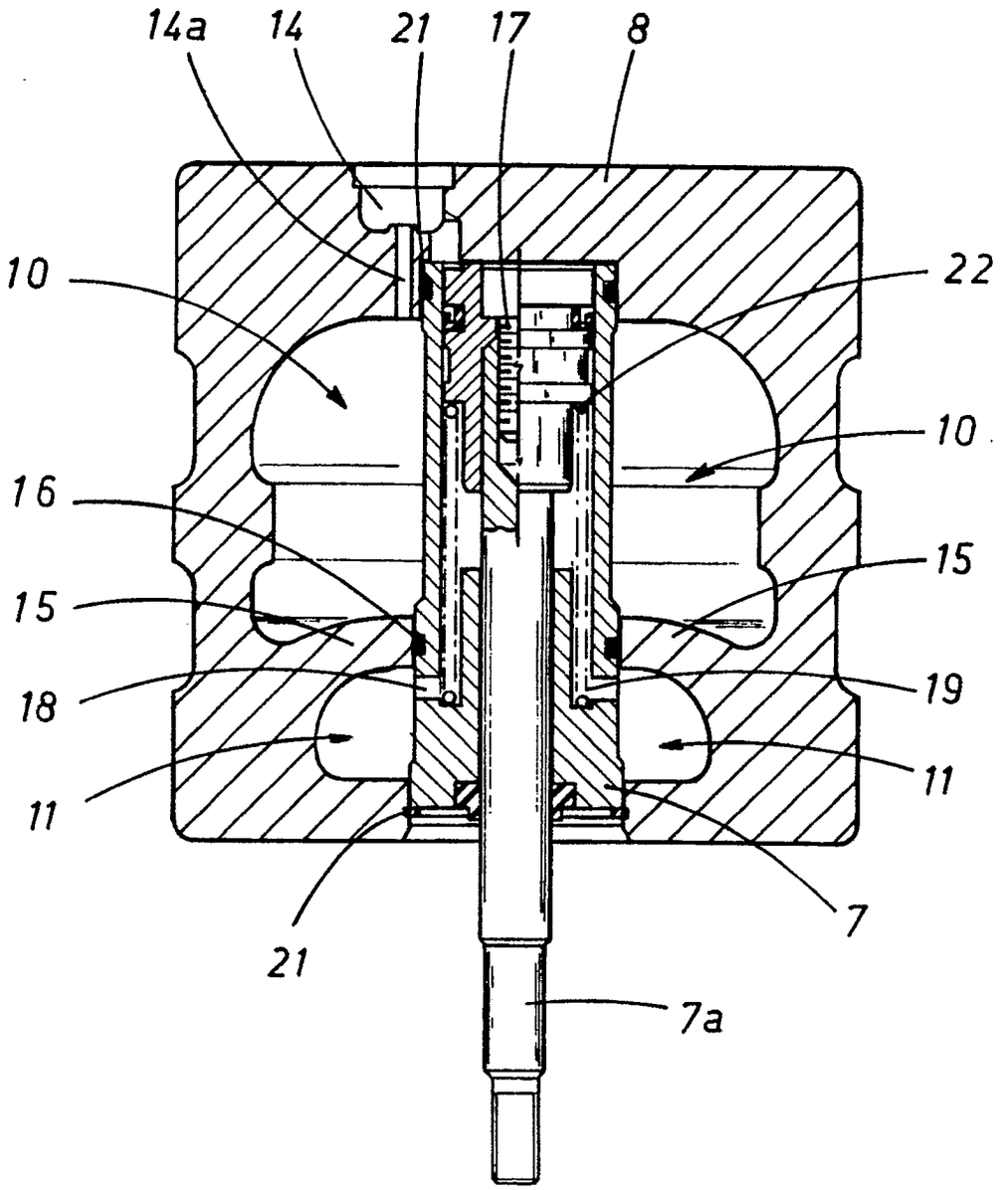


FIG1

FIG 2



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EUROPEAN SEARCH REPORT

Application Number

EP 90 83 0476

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
A	US-A-4 527 359 (STUMP ET AL.) * column 5, line 43 - column 6, line 65; figure 3 *	1,2	B 24 B 21/08
A	US-A-3 049 839 (O.W.SMITH) * claims ; figures *	1	
A	DE-A-2 635 473 (BÖTTCHER & GESSNER GMBH)		

TECHNICAL FIELDS SEARCHED (Int. Cl.5)
B 24 B

The present search report has been drawn up for all claims

Place of search	Date of completion of search	Examiner
The Hague	07 February 91	ESCHBACH D.P.M.

CATEGORY OF CITED DOCUMENTS

X: particularly relevant if taken alone
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