

Forms 7 and 8

AUSTRALIAPatents Act 1952DECLARATION IN SUPPORT OF A CONVENTION OR NON-CONVENTION
APPLICATION FOR A PATENT OR PATENT OF ADDITION

no. 27269/88

Name(s) of Applicant(s) In support of the application/made by PAUL HETTICH
GMBH & CO.

Title for a patent for an invention entitled FURNITURE HINGE

Name(s) and address(es) of person(s) making declaration I/We, Wilfried Oepping, In der Horst 66, 4983 Kirchlingern
Rainer Engelke, Mühlenfeldstraße 15, 4980 Bunde

do solemnly and sincerely declare as follows:-

1. I am/we are the applicant(s) for the patent, or am/are authorised by the abovementioned applicant to make this declaration on its behalf.
2. The basic application(s) as defined by Section 141 of the Act was/were made in the following country or countries on the following date(s) by the following applicant(s) namely:-

Country, filing date and name of Applicant(s) for the or each basic application	Federal Rep. of Germany	09. December	87
	in <u>Paul Hettich GmbH & Co.</u>	on	19
	by		
	in	on	19
	by		

3. The said basic application(s) was/were the first application(s) made in a Convention country in respect of the invention the subject of the application.

Name(s) and address(es) of the or each actual inventor

4. The actual inventor(s) of the said invention is/are Ulrich BENEKE, Ahlerstrasse 19, D-4980 Bunde, Germany;
Jurgen GROSS, Brunnenstrasse 32, D-4904 Enger, Germany;
Wilfried OEPPING, In der Horst 66, D-4983 Kirchlingern, Germany;
Manfred SCHNELLE, Heidkampstrasse 66, *****
5. The facts upon which the applicant(s) is/are entitled to make this application are as follows:-
The said applicant is the assignee of the said inventors

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DECLARED at Kirchlingern this 9th day of August 1989

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Handlungsbevollmächtigter

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(57) Claim

1. A furniture hinge with hinge components which can be attached to the body of an article of furniture or to a door or a shutter and at least one lever connected in an articulated manner with the hinge components, comprising a damping device having an incompressible hydraulic medium between the lever and one of the hinge components, wherein said damping device has a piston rod linked to the lever, a piston attached to the piston rod and a cylinder for receiving the piston; and wherein the cylinder is provided with an end covering cap having a central opening for passage of the piston rod and the cap, and forms two chambers with the piston and the cylinder, and wherein there is provision for overflow openings or ducts for the hydraulic medium in the region of the piston, and wherein the cylinder or the piston or the cylinder and the piston comprises a material which is elastically deformable under the influence of an increased pressure of the hydraulic medium.

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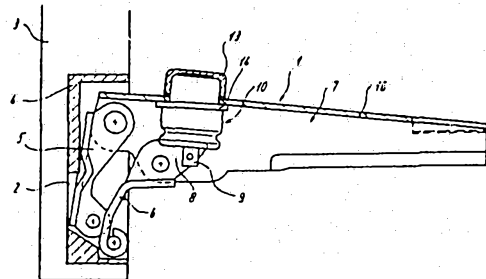
Mit internationalem Recherchenbericht.

(54) Title: FURNITURE HINGE

(54) Bezeichnung: MÖBELSCHARNIER

(57) Abstract

A furniture hinge (1) comprises hinge parts which can be attached to the body of a piece of furniture and to a door (3) and at least one lever (6) connected in an articulated manner with these hinge parts. The aim of the invention is to achieve a furniture hinge (1) of the above-mentioned type which is silent and which dampens the effect of increased external opening and closing forces. For this purpose, a damping device (10) is arranged between the functional parts of the hinge. The damping device comprises a piston rod (9) connected in an articulated manner to a lever (6) of the furniture hinge and to a bellows-shaped covering cap (11) of a cylinder which slides in a piston. The cover cap is made of rubber or rubber-like plastic and is elastically deformable. In order to dampen the peak stresses on a damping device (10) or the furniture hinge during the closing stroke of the piston, parts of the damping device can be elastically deformable independently of the pressure, in order to briefly increase the flow cross-section between the two chambers of the cylinder of the damping device. Application in the furniture making industry.



(57) Zusammenfassung

Das Möbelscharnier (1) ist mit am Möbelkorpus und an einer Tür (3) festlegbaren Scharnierteilen und mindestens einem gelenkig mit diesen Scharnierteilen verbundenen Hebel (6) ausgestattet. Der Erfindung liegt die Aufgabe zugrunde, ein Möbelscharnier (1) der genannten Art so zu gestalten, dass störende Schliessgeräusche vermieden werden und die Wirkung von aussen aufgebener erhöhter Schliess- oder Öffnungskräfte gedämpft wird. Diese Aufgabe wird erfindungsgemäss durch die Anordnung einer Dämpfeinrichtung (10) zwischen den Funktionsteilen des Scharniers gelöst. Diese Dämpfeinrichtung weist eine an einem Hebel (6) des Möbelscharniers angelenkte Kolbenstange (9) auf, die mit einer balgförmig gestalteten Abdeckkappe (11) eines Zylinders verbunden ist, in dem der Kolben gleitbar gelagert ist. Die Abdeckkappe ist aus Gummi oder gummiähnlichem Kunststoff gefertigt und ist elastisch verformbar. Um beim Schliesshub des Kolbens der Dämpfeinrichtung (10) bzw. des Möbelscharniers Belastungsspitzen begegnen zu können, können Teile der Dämpfeinrichtung druckabhängig elastisch verformbar sein, um kurzzeitig den Strömungsquerschnitt zwischen den beiden Kammern des Zylinders der Dämpfeinrichtung zu vergrössern. Möbelindustrie.

The present invention relates to a furniture hinge with hinge components which can be attached to the body of an article of furniture and to a door or a shutter and at least one lever connected in an articulated manner with these hinge components.

Most of the furniture hinges of this type are furnished with a spring mechanism which automatically closes the door, shutter or the like. The closing movement which is determined by the force of the spring frequently leads to disturbing rattling noises.

In many cases, the closing force determined by the spring mechanism is frequently over-ridden by forces acting externally, for example those arising from manual operation of the leaf of the door. This can intensify the noises made by closing the door or the like.

The present invention attempts to overcome one or more of the above problems.

According to the present invention there is provided a furniture hinge with hinge components which can be attached to the body of an article of furniture or to a door or a shutter and at least one lever connected in an articulated manner with the hinge components, comprising a damping device having an incompressible hydraulic medium between the lever and one of the hinge components, wherein said damping device has a piston rod linked to the lever, a piston attached to the piston rod and a cylinder for receiving the piston; and wherein the cylinder is provided with an end covering cap having a central opening for passage of the piston rod and the cap, and forms two chambers with the piston and the cylinder, and wherein there is provision for overflow openings or ducts for the hydraulic medium in the region of the piston, and wherein the cylinder or the piston or the cylinder and the piston



comprises a material which is elastically deformable under the influence of an increased pressure of the hydraulic medium.

In the case of the furniture hinge in accordance with the present invention, the damping device may be located between functional components of the furniture hinge, without the need to make any alterations to the dimensions and/or structural design of the hinge components to be attached to the body of the article of furniture and to the door or shutter.

Since the furniture hinges are mass-produced articles which, from the price-structure point of view, sets limits to the allowable expense, it is preferable for the manufacture and install the damping device to be cost-effectively.

The damping device should preferably not only be able to withstand the normal stresses which arise when the door, the shutter or the like is closed with the relatively small force of the closing spring of the furniture hinge, but it should preferably also be able to withstand the exceptional stresses imposed upon it when the door or the like is manually closed or opened at an increased rate and with increased operating force.

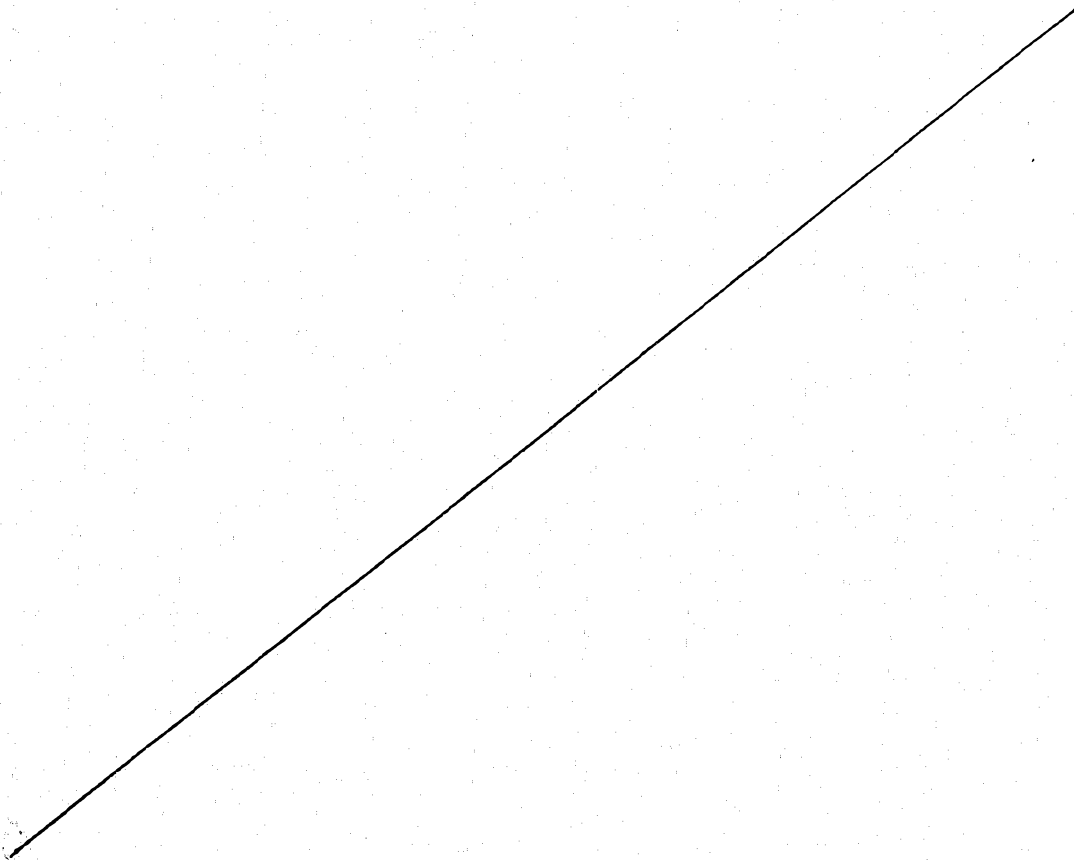
In an advantageous preferred embodiment of the furniture hinge in accordance with the present invention, the end covering cap of the end of the cylinder is configured as an elastically deformable bellows which has a central passage for the piston rod to which it is attached in a leak-proof manner. The passage may have an inwardly-projecting annular beading which engages in an annular groove in the piston rod to provide a seal.

Due to the elasticity of the material of the bellows-shaped



end covering cap and the presence of the inwardly-projecting annular beading in the preferred embodiment, there is a positively locking frictional connection between the end covering cap and the piston rod. Owing to the nature of this connection, there is an absence of sliding abrasive friction between the piston rod and the end covering cap during operation of the damping device. Furthermore, during the closing stroke of the hinge, there is deformation of the end cap in the direction towards the cylinder.

Before initiation of the opening movement of the door and the hinge, the damping fluid is present in the chamber which is delimited by the bellows-shaped end cap and the piston. In so far as the opening of the door is effected rapidly by hand, the end covering cap is elastically deformed so that the piston rod can follow the rapid opening stroke. This causes a fall in pressure in the second chamber in the cylinder, producing a vapour bubble



and forcing the hydraulic fluid to flow with increased velocity from the first to the second chamber, so that the elastic deformation of the end covering cap decreases and the opening stroke can occur substantially without any damping effect.

- 5 In so far as a peak stress is developed during the closing movement of the furniture hinge, which is subject to braking by the damping device, it is possible for the flow cross-sectional area to be increased between the two chambers of the damping device because of the deformation of the cylinder and/or of the
10 piston or of a portion of the piston. After the stress peak dissipates, this enlargement of the flow cross-sectional area is reversed.

Additional details of the invention may be gleaned from the subsidiary Claims and the following description of ^{a preferred} ~~an advantageous~~
15 form of embodiment, given by way of example, with reference to the accompanying drawings, in which:

- Fig. 1 a furniture hinge provided with a damping device, in the closed position,
Fig. 2 the furniture hinge shown in Fig. 1, in the open position,
20 Fig. 3 a perspective view, partly in section, of a ^{preferred} ~~form of~~ embodiment of a damping device,
Fig. 4 a part view in the direction of the arrow in Fig. 3,
Fig. 5 the damping device shown in Fig. 3, during the opening
25 movement,
Fig. 6 a vertical section through the damping device shown in Figs. 3 to 5, in the closed position on the left-hand side and, on the right-hand side, in the open position of the furniture hinge,
30 Fig. 7 a view of part of a damping device which is a variation of the embodiment shown in Figs. 3 to 6, and
Fig. 8 an additional example of embodiment of a damping device shown in perspective and partly in section.



The furniture hinge 1 depicted in Figs. 1 and 2 has a pan-shaped housing 4 which is securely fixed into a matching recess in the door 3 of an article of furniture and said housing is articulated, by way of levers 5 and 6, with the arm 7 of the hinge which is attached to the body of the article of furniture.

The lever 6 is in the form of a two-armed lever and has one lever arm 8 with which the piston rod 9 of a damping device 10 is articulated. This piston rod extends into a housing of the damping device which consists of a bellows-shaped covering cap 11, a cylinder 12 and a cup-shaped cap 13 placed upside-down over the cylinder.

The cylinder 12 has an annular flange 14 and said cylinder extends through a circular opening 15 in a wall 16 of the hinge arm 7. The annular flange 14 is seated against the inner surface of the wall 16 of the hinge arm 7 and the rim of the cup-shaped cap 13 is almost in contact with the outer surface of the wall 16.

It can be seen from Fig. 1 and 2 that the damping device 10 is integrated into the construction of the furniture hinge and does not necessitate any substantial alteration to the configuration of the functional components of this hinge.

The cylinder 12 which extends out from the annular flange 14 has a cylindrical portion 17 which is open at the end and which is provided with circumferential anchoring ribs 18, 19 around its outer surface over which the internally-ribbed fastening flange 20 of the end covering cap 11 is forced on, where it is held securely in position.

The end covering cap 11 has a short central turned-in collar 21 which provides the passage for insertion of the piston rod 9.

The collar 21 has an inwardly-projecting annular beading 22 which engages firmly in an annular groove 23 in the piston rod 9.



In the example of embodiment shown in Fig. 6, the outer end of the collar 21 is supported against a shoulder 24 on the piston rod 9.

Between the fastening flange 20 and the turned-in collar 21, the wall of the covering cap 11 acts as a bellows. It is made from elastically deformable material, for example rubber or a synthetic plastics material with rubber-like properties. The cap can be deformed by altered pressure of the damping fluid and, because of its flexibility, it can take on the shape that follows the movement of the piston rod between the open and closed positions of the furniture hinge.

In the example of embodiment of the damping device 10 shown in Figs. 3 to 6, a piston 25 is attached near the free end of the piston rod 9 where it is supported on the shoulder 26 of said piston rod and is held in position by the snap-fit retaining ring 27 which is pushed on over the end of the rod. The retaining ring 27 has a detent shoulder 28 which engages with the undercut counter-thrust surface 29 on the piston rod.

The external diameter of the piston 25 and also of the retaining ring 27 is slightly smaller than the internal diameter of the cylinder 12.

Flow-through ducts 30, 31 are provided in the piston 25 and in the retaining ring 27.

The piston 25 and the retaining ring 27 together define the intermediate groove 32 to accommodate a piston ring 33 which can move axially in this groove.

On the side facing towards the retaining ring 27, the piston ring 33 is provided with a spacer boss 34 which comes into contact with the underside of the retaining ring 27 during the opening stroke of the piston and ensures a flow connection between chamber 35 and chamber 36 of the cylinder. In this operating situation, the piston ring 33 allows free flow through the duct(s) 30 in the piston.



On the side facing towards the piston, the piston ring 33 is provided with a boss 37 which engages in a flow-through duct 30 in the piston 25 to prevent any rotation of the piston ring in relation to the piston.

- 5 The external diameter of the piston ring 33 corresponds to the internal diameter of the cylinder 12.

10 The piston ring 33 is provided with a radial slot 38 which extends over the entire width of the piston ring. It may be seen from Fig. 4 that there is no flow-through duct 31 provided in the retaining ring 27 in the vicinity of the slot 38 and there is also no flow-through duct 30 in the piston 25 so that, even in the case of a considerable covering-up of the slot 38 by either the retaining ring 27 or by the piston 25, a small portion of the slot 38 remains uncovered to provide a flow-through cross-section which
15 is indicated by the reference number 39 in Fig. 4.

In order to ensure that the flow-through opening 39 of the slot 38 remains unobstructed, that is to say, so that it will not become twisted during any operational phase by any possible lateral play of the piston 25, it is possible to provide the
20 piston 25, on its circumference, with guide cams, recesses and/or flattened surfaces, which are arranged in such a manner that, at least in the vicinity of the flow-through opening 39, a free space is created between the periphery of the piston and the wall of the cylinder.

- 25 It can be seen from Figs. 3 and 6 that, when the piston is moving into the closed (or end) position, the flow-through ducts 30 are closed by the piston ring 33, so that the only remaining flow-through cross-section is part of slot 38, namely the opening 39.

30 Now, if any external force is applied to the door to produce an increased pressure in the damping fluid in the chamber 36, it is possible for the flow-through cross-section to be increased by having the cylinder 12 made from an elastically-deformable material which is deformed at the stress peak so that the wall of



the cylinder is lifted away from the piston ring 33 and an additional flow-through cross-section is created.

5 If the piston is moved from the closed position to the open position, as indicated in Fig. 5, the piston ring 33 assumes a middle position in the accommodation groove 32 which is determined by the spacer boss 34, so that the damping fluid can flow from the chamber 35 by way of the flow-through ducts 30 and 31 into the chamber 36 of the cylinder.

10 In so far as the cylinder 12 is fabricated from a non-elastic material, it is possible to counter any peak stresses arising during the closing stroke of the piston by providing the piston ring 33a with a chamfered outer edge 40 on the side facing towards the chamber 36. During a peak stress this sloping surface is subjected to increased pressure from the chamber 36, so that the
15 piston ring is forced together in the region of the slot 38, thus giving rise to an additional flow-through cross-section between the periphery of the piston ring and the inner surface of the wall of the cylinder.

20 Another example of embodiment of the damping device 10 is depicted in Fig. 8.

In this construction, the piston 41 is provided with flow-through ducts 42 and it is located near the free end of the piston rod 9 so that it can slide between a fixed retaining ring 43 at the end of the piston rod and a cover plate 44 for flow-through ducts 42.

25 During the course of an opening stroke of the piston 41, said piston is forced against the retaining ring 43 so that the damping fluid can flow from the chamber 35, by way of the flow-through ducts 42, into the chamber 36.

30 During the course of a closing stroke, the piston 41 occupies the operating position shown in Fig. 8. The flow-through ducts 42 are closed by the cover plate 44, so that the damping fluid can flow from the chamber 36 into the chamber 35 only when the peripheral



tapered sealing lip 45, which is in contact with the inner surface of the wall of the cylinder, is elastically forced downwards and inwards away from the wall of the cylinder due to increased pressure of the damping fluid in the chamber 36, so that a free
5 flow-through cross-section is created between the sealing lip and the inner surface of the wall of the cylinder.

In this form of embodiment, the piston 41 must also consist of an elastically-deformable material. It is preferably fabricated from rubber or a synthetic material with rubber-like properties.



Reference numbers

	1	Furniture hinge	24	Shoulder
	2	Recess	25	Piston
	3	Furniture article door	26	Shoulder surface
5	4	Housing	27	Retaining ring
	5	Lever	28	Detent shoulder
	6	Lever	29	Counter-thrust surface
	7	Hinge arm	30	Flow-through duct
	8	Lever arm	31	Flow-through duct
10	9	Piston rod	32	Accommodation groove
	10	Damping device	33	Piston ring
	11	Covering cap	33a	Piston ring
	12	Cylinder	34	Spacer boss
	13	Cap	35	Chamber
15	14	Annular flange	36	Chamber
	15	Circular opening	37	Boss
	16	Wall of hinge arm	38	Slot
	17	Portion of cylinder	39	Flow-through opening
	18	Anchoring rib	40	Sloping surface
20	19	Anchoring rib	41	Piston
	20	Fastening flange	42	Flow-through duct
	21	Collar	43	Retaining ring
	22	Annular beading	44	Cover plate
	23	Annular groove	45	Sealing lip



THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS

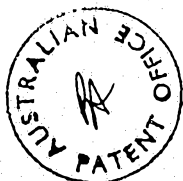
1. A furniture hinge with hinge components which can be attached to the body of an article of furniture or to a door or a shutter and at least one lever connected in an articulated manner with the hinge components, comprising a damping device having an incompressible hydraulic medium between the lever and one of the hinge components, wherein said damping device has a piston rod linked to the lever, a piston attached to the piston rod and a cylinder for receiving the piston; and wherein the cylinder is provided with an end covering cap having a central opening for passage of the piston rod and the cap, and forms two chambers with the piston and the cylinder, and wherein there is provision for overflow openings or ducts for the hydraulic medium in the region of the piston, and wherein the cylinder or the piston or the cylinder and the piston comprises a material which is elastically deformable under the influence of an increased pressure of the hydraulic medium.

2. A furniture hinge according to Claim 1, the end covering cap of the cylinder is configured as an elastically deformable bellows which has a central passage for the piston rod to which it is attached in a leak-proof manner.

3. A furniture hinge according to Claim 2, wherein a collar forming the central passage has an inwardly-projecting annular beading which engages firmly in an annular groove in the piston rod.

4. A furniture hinge according to Claim 3, wherein the inwardly-projecting annular beading is located in a central region of the collar.

5. A furniture hinge according to Claim 3 or 4,



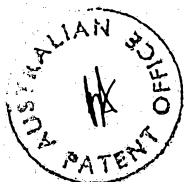
wherein the outer end of the collar is supported against a shoulder on the piston rod.

6. A furniture hinge according to any one of the preceding claims, wherein the end covering cap is fabricated from rubber or a synthetic plastics material with rubber-like properties.

7. A furniture hinge according to claim 1, wherein the cylinder has an annular flange extending from which there is a cylindrical portion which is open at an end thereof and which is provided with circumferential anchoring ribs for a fastening flange of the end covering cap.

8. A furniture hinge according to claim 7, wherein annular flange is seated against the inner surface of a wall of a hinge arm which can be attached to the body of the article of furniture, and the cylindrical portion of the cylinder extends through a circular opening in the hinge arm where a cup-shaped cap is placed upside-down over the cylinder portion, extending down almost to the hinge arm of the furniture hinge.

9. A furniture hinge according to claim 1, wherein, in addition to the piston, there is a retaining ring affixed to the piston rod and said ring together with the piston define an intermediate groove to accommodate a piston ring which can move axially in this groove, said piston ring, of which the peripheral surface is in contact with the internal surface of the wall of the cylinder, being provided with a radial slot, and the external diameter of the piston and also of the retaining ring is slightly smaller than the internal diameter of the cylinder, with flow-through ducts being provided in the piston and in the retaining ring, the ducts in the piston being closed by the piston ring during the closing stroke of said piston.



10. A furniture hinge according to claim 9, wherein the piston ring is provided with at least one boss which engages in one of the flow-through ducts in the piston.

11. A furniture hinge according to claim 9, wherein, on the side facing towards the retaining ring, the piston ring is provided with a spacer boss which comes into contact with the underside of the retaining ring during the opening stroke of the piston.

12. A furniture hinge according to claim 9, wherein the piston ring is provided with a chamfered outer edge on a side facing towards the chamber, a sloping surface of which is subjected to increase pressure from the chamber.

13. A furniture hinge according to claim 1, wherein the piston is provided with axially-directed flow-through ducts located near the free end of the piston rod so that the piston rod can slide between a fixed retaining ring at the end of the piston rod and a cover plate for the flow-through ducts, the piston being provided with a peripheral tapered sealing lip which slopes in the direction towards the chamber.

14. A furniture hinge substantially as hereinbefore described with reference to and as illustrated in the accompanying drawings.

DATED THIS 23RD DAY OF JULY, 1991

PAUL HETTICH GMBH & CO.

By Their Patent Attorneys:

GRIFFITH HACK & CO.

Fellows Institute of Patent
Attorneys of Australia.



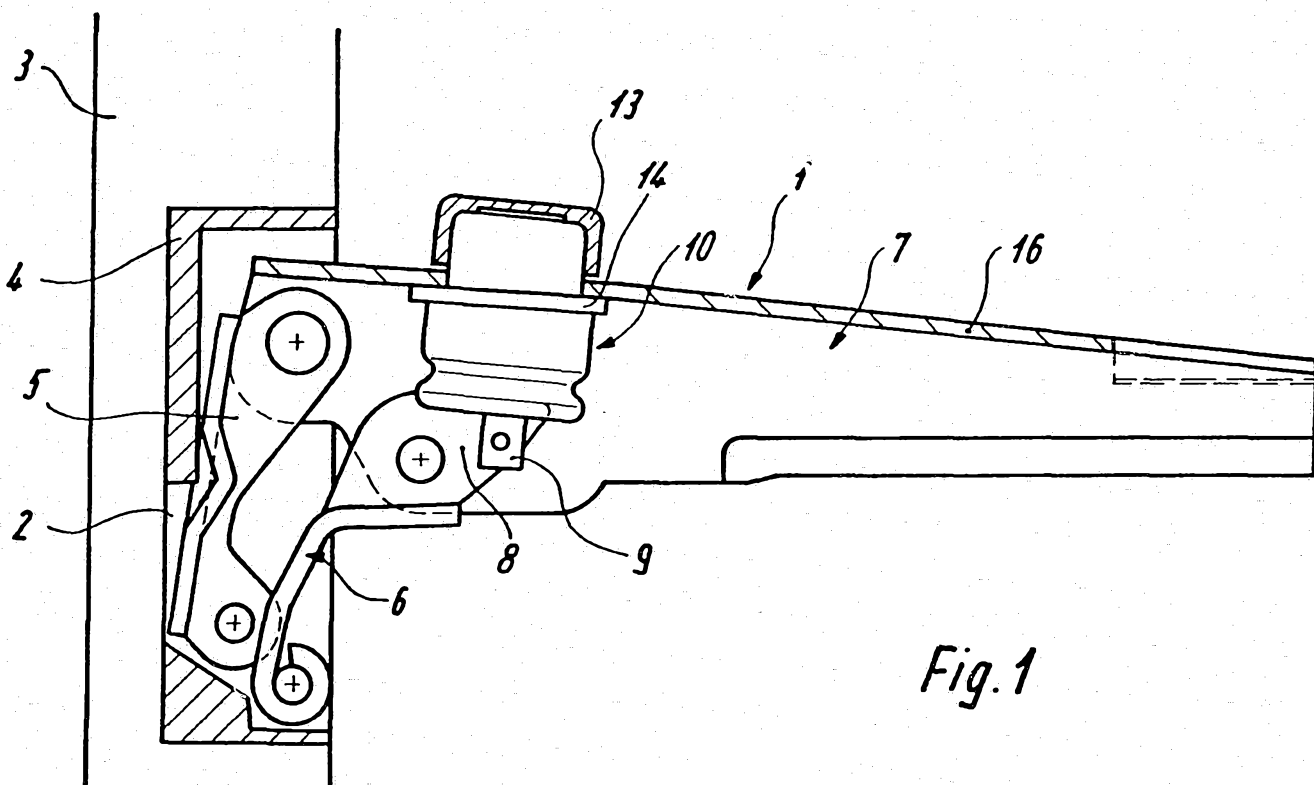


Fig. 1

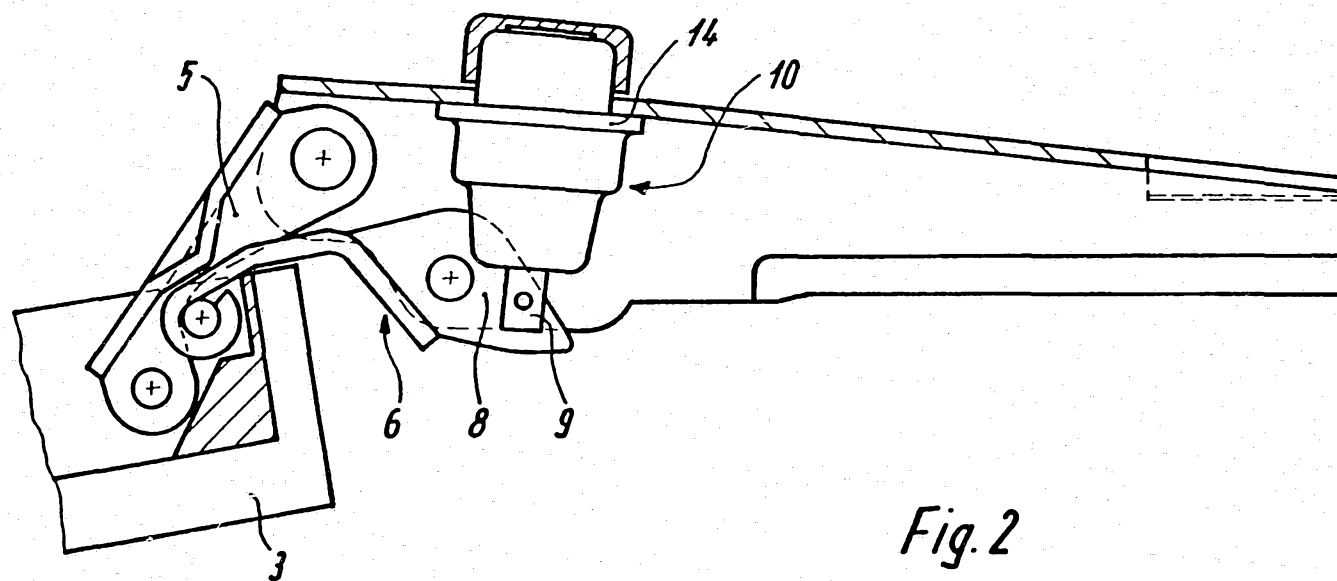


Fig. 2

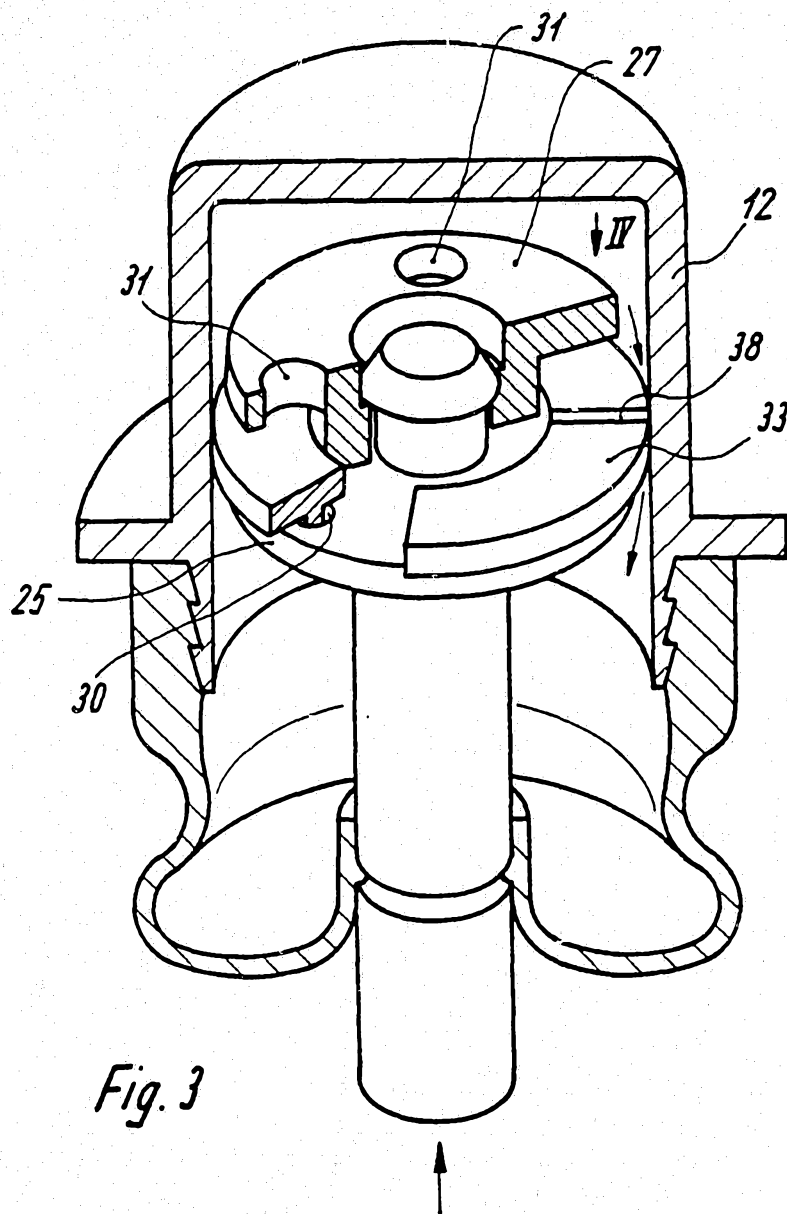
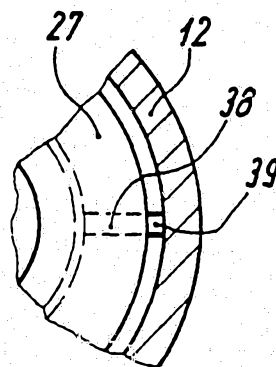
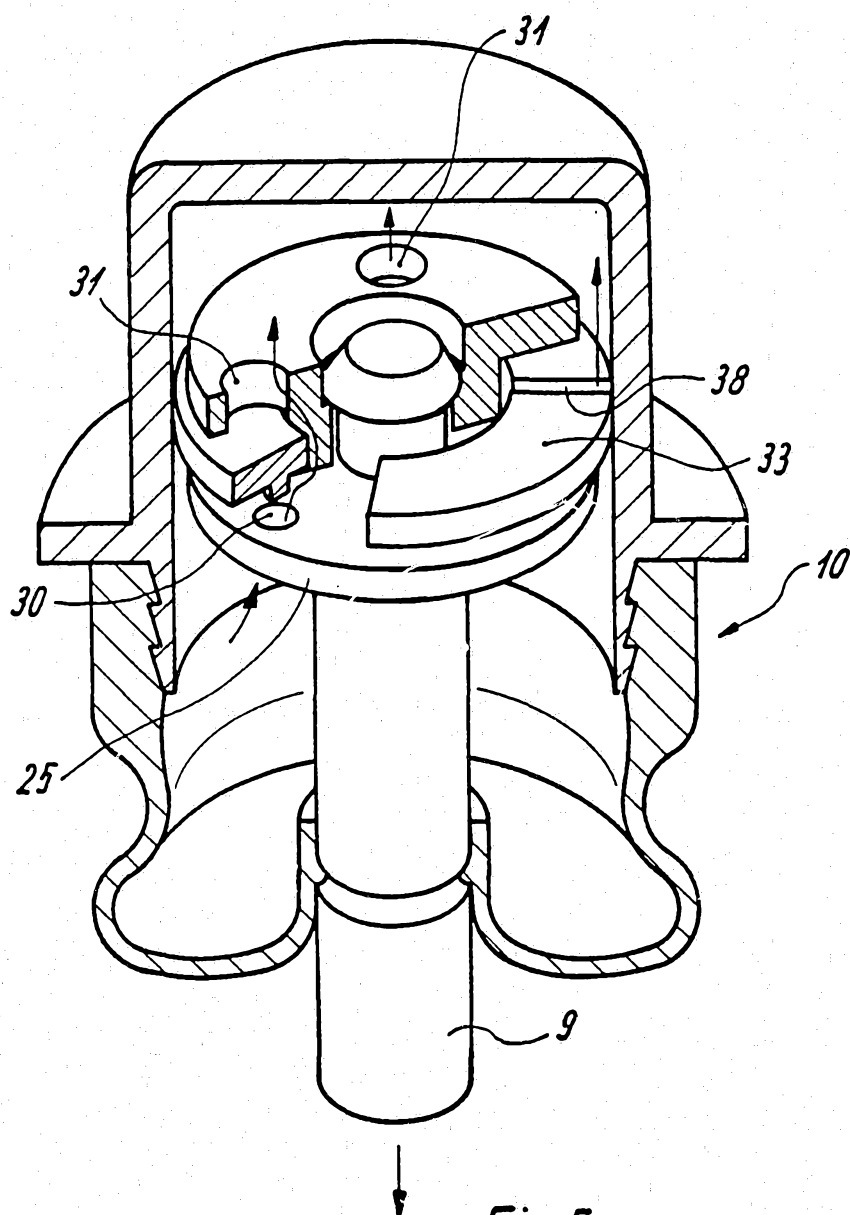
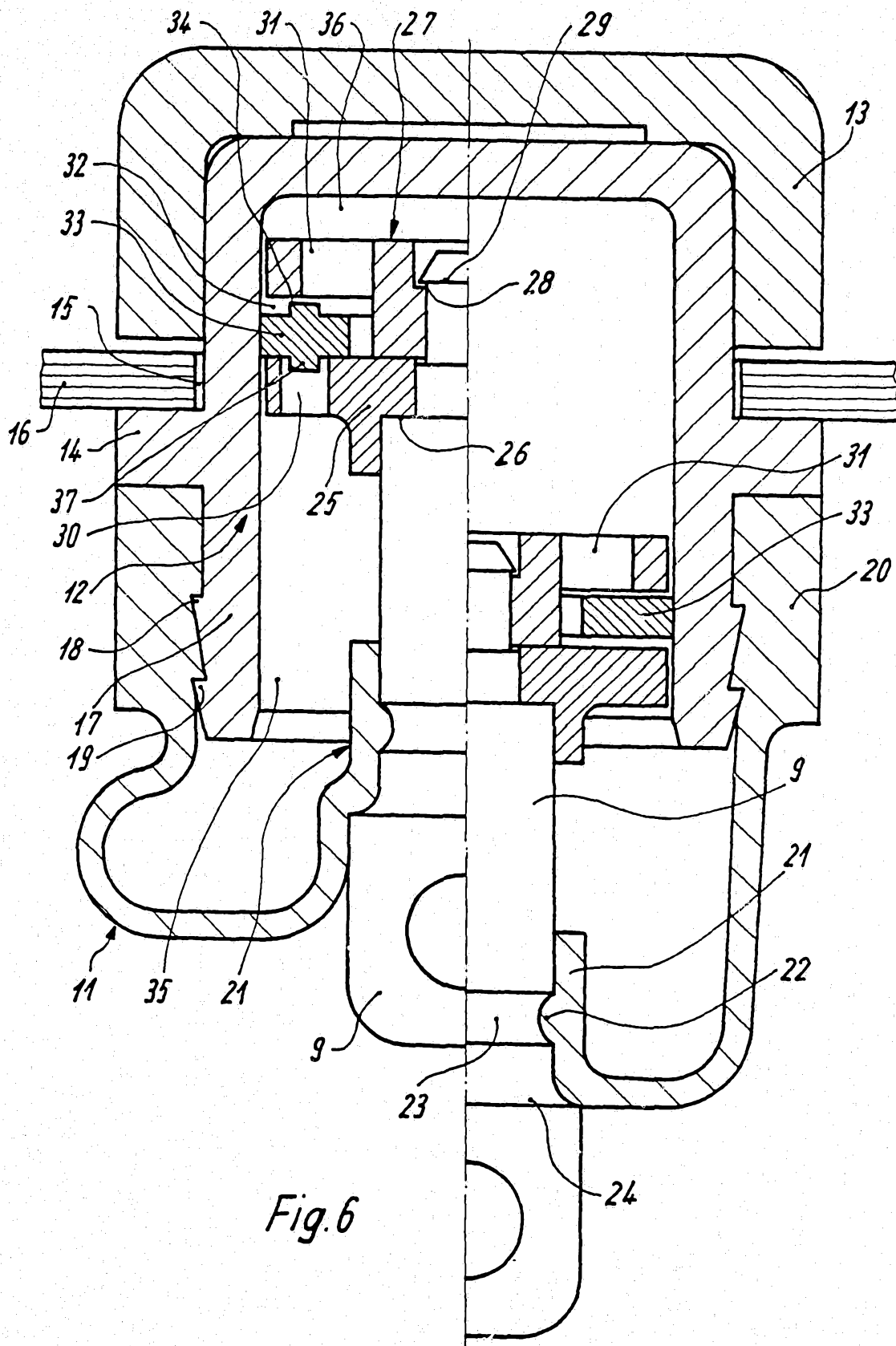
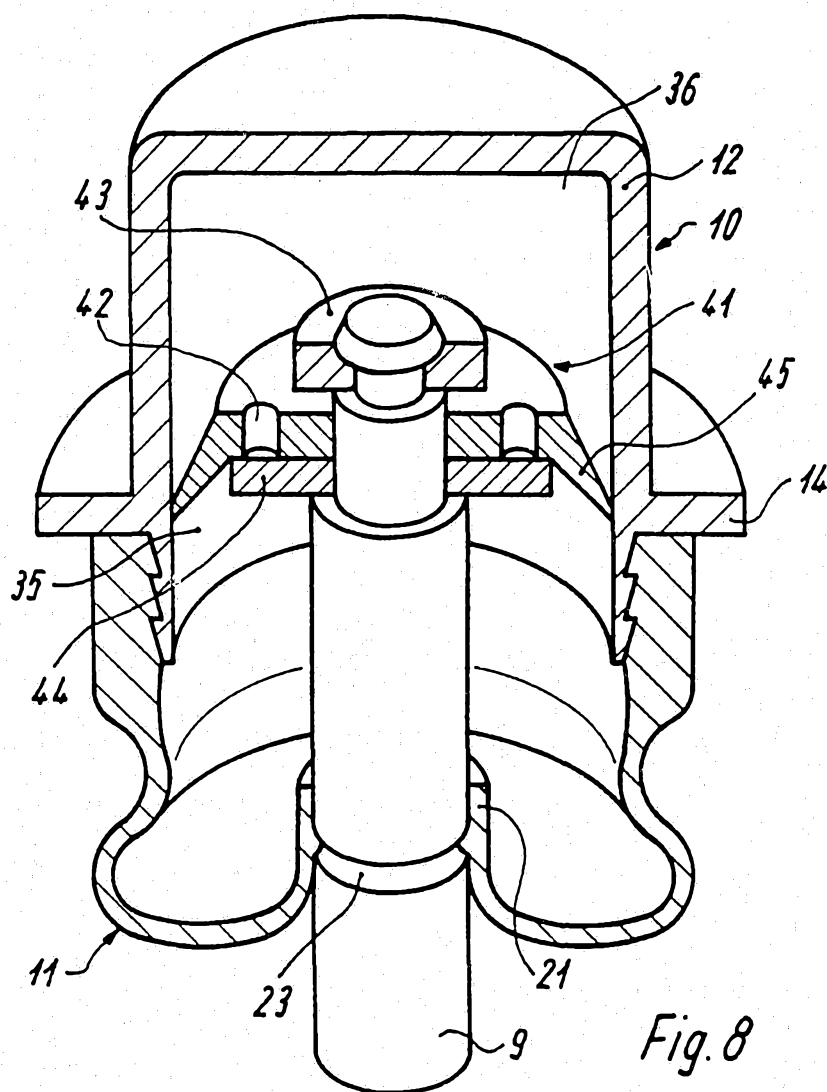
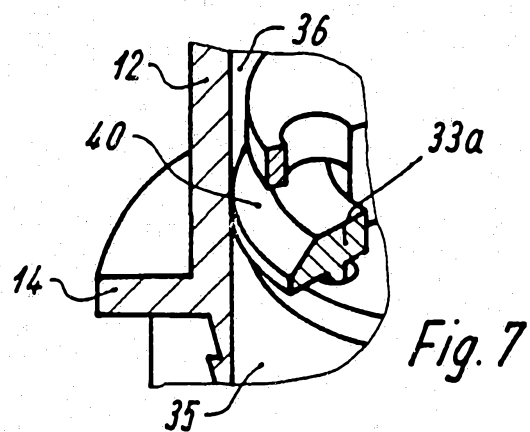


Fig. 4



*Fig. 5*





INTERNATIONAL SEARCH REPORT

International Application No PCT/DE 88/00729

I. CLASSIFICATION OF SUBJECT MATTER (If several classification symbols apply, indicate all) *		
According to International Patent Classification (IPC) or to both National Classification and IPC		
Int. Cl. ⁴ E 05 F 3/20		
II. FIELDS SEARCHED		
Minimum Documentation Searched ⁷		
Classification System ¹	Classification Symbols	
Int. Cl. ⁴	E 05 F; F 16 F	
Documentation Searched other than Minimum Documentation: to the Extent that such Documents are Included in the Fields Searched *		
III. DOCUMENTS CONSIDERED TO BE RELEVANT *		
Category *	Citation of Document, ¹¹ with Indication, where appropriate, of the relevant passages ¹²	Relevant to Claim No. ¹³
Y	US, A, 2437192 (GLANZ) 2 March 1948 see figures 1-4; column 1, line 49 - column 2, line 6; column 2, line 53 - column 4, line 29 --	1,2
Y	FR, A, 1280076 (P.C.C.) 29 December 1961 see figures 1,2; page 1, column 2, line 15 - page 2, column 1, line 48 --	1,2
A	--	3-7
A	FR, A, 2576994 (RHEINISCHE ARMATUREN- UND MASCHINENFABRIK ALBERT SEMPELL) 8 August 1986, see figure; abstract --	9
A	Patent Abstracts of Japan, volume 11, Nr. 205 (M-603) (2652) 3 July 1987, & JP, A, 6224048 (BRIDGESTONE CORP.) 2 February 1987 see the whole document -- ./.	10
* Special categories of cited documents: ¹⁰ "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier document but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art. "&" document member of the same patent family		
IV. CERTIFICATION		
Date of the Actual Completion of the International Search	Date of Mailing of this International Search Report	
17 January 1989 (17.01.89)	2 February 1989 (02.02.89)	
International Searching Authority	Signature of Authorized Officer	
European Patent Office		

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	US, A, 2953810 (HALL) 27 September 1960 see figures 2-4; column 3, lines 32-55 --	10,14
A	DE, B, 1155030 (HEINZ SCHÜRMANN & CO.) 26 September 1963, see figure 1; column 3, line 41 - column 4, line 20 -----	13,14

**ANNEX TO THE INTERNATIONAL SEARCH REPORT
ON INTERNATIONAL PATENT APPLICATION NO.**

DE 8800729
SA 25458

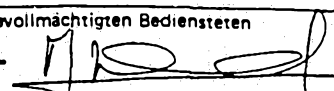
This annex lists the patent family members relating to the patent documents cited in the above-mentioned international search report. The members are as contained in the European Patent Office EDP file on 26/01/89. The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US-A- 2437192			
FR-A- 1280076			
FR-A- 2576994	08-08-86	GB-A- 2172081	10-09-86
		DE-A- 3601712	11-09-86
		JP-A- 61270532	29-11-86
US-A- 2953810			
DE-B- 1155030			

INTERNATIONALER RECHERCHENBERICHT

Internationales Aktenzeichen

PCT/DE 88/00729

I. KLASSEFIZKATION DES ANMELDUNGS-GE-GENSTANDS (bei mehreren Klassifikationssymbolen sind alle anzugeben) ⁶		
Nach der Internationalen Patentklassifikation (IPC) oder nach der nationalen Klassifikation und der IPC		
Int. Cl. ⁴ E 05 F 3/20		
II. RECHERCHIERTE SACHGEBIETE		
Recherchierter Mindestprüfstoff ⁷		
Klassifikationssystem	Klassifikationssymbole	
Int. Cl. ⁴	E 05 F; F 16 F	
Recherchierte nicht zum Mindestprüfstoff gehorende Veröffentlichungen, soweit diese unter die recherchierten Sachgebiete fallen ⁸		
III. EINSCHLÄGIGE VERÖFFENTLICHUNGEN⁹		
Art [*]	Kennzeichnung der Veröffentlichung ¹¹ , soweit erforderlich unter Angabe der maßgeblichen Teile ¹²	Betr. Anspruch Nr. ¹³
Y	US, A, 2437192 (GLANZ) 2. März 1948 siehe Abbildungen 1-4; Spalte 1, Zeile 49 - Spalte 2, Zeile 6; Spalte 2, Zeile 53 - Spalte 4, Zeile 29 --	1,2
Y	FR, A, 1280076 (P.C.C.) 29. Dezember 1961 siehe Abbildungen 1,2; Seite 1, Spalte 2, Zeile 15 - Seite 2, Spalte 1, Zeile 48 --	1,2
A	--	3-7
A	FR, A, 2576994 (RHEINISCHE ARMATUREN- UND MASCHINENFABRIK ALBERT SEMPELL) 8. August 1986 siehe Abbildung; Zusammenfassung --	9
A	Patent Abstracts of Japan, Band 11, Nr. 205 (M-603)(2652) 3. Juli 1987, & JP, A, 6224048 (BRIDGESTONE CORP.) . / .	10
¹⁰ Besondere Kategorien von angegebenen Veröffentlichungen: "A" Veröffentlichung, die den allgemeinen Stand der Technik definiert, aber nicht als besonders bedeutsam anzusehen ist "E" älteres Dokument, das jedoch erst am oder nach dem internationalen Anmeldedatum veröffentlicht worden ist "L" Veröffentlichung, die geeignet ist, einen Prioritätsanspruch zweifelhaft erscheinen zu lassen, oder durch die das Veröffentlichungsdatum einer anderen im Recherchenbericht genannten Veröffentlichung belegt werden soll oder die aus einem anderen besonderen Grund angegeben ist (wie ausgeführt) "O" Veröffentlichung, die sich auf eine mündliche Offenbarung, eine Benutzung, eine Ausstellung oder andere Maßnahmen bezieht "P" Veröffentlichung, die vor dem internationalen Anmeldedatum, aber nach dem beanspruchten Prioritätsdatum veröffentlicht worden ist "T" Spätere Veröffentlichung, die nach dem internationalen Anmeldedatum oder dem Prioritätsdatum veröffentlicht worden ist und mit der Anmeldung nicht kollidiert, sondern nur zum Verständnis des der Erfindung zugrundeliegenden Prinzips oder der ihr zugrundeliegenden Theorie angegeben ist "X" Veröffentlichung von besonderer Bedeutung; die beanspruchte Erfindung kann nicht als neu oder auf erfinderischer Tätigkeit beruhend betrachtet werden "Y" Veröffentlichung von besonderer Bedeutung; die beanspruchte Erfindung kann nicht als auf erfinderischer Tätigkeit beruhend betrachtet werden, wenn die Veröffentlichung mit einer oder mehreren anderen Veröffentlichungen dieser Kategorie in Verbindung gebracht wird und diese Verbindung für einen Fachmann naheliegend ist "&" Veröffentlichung, die Mitglied derselben Patentfamilie ist		
IV. BESCHEINIGUNG		
Datum des Abschlusses der internationalen Recherche		Absenddatum des internationalen Recherchenberichts
17. Januar 1989		- 2. 02 89
Internationale Recherchenbehörde		Unterschrift des bevollmächtigten Bediensteten
Europäisches Patentamt		M. VAN MOL 

III. EINSCHLÄGIGE VERÖFFENTLICHUNGEN (Fortsetzung von Blatt 2)		
Art *	Kennzeichnung der Veröffentlichung, soweit erforderlich unter Angabe der maßgeblichen Teile	Betr. Anspruch Nr.
	2. Februar 1987 siehe das ganze Dokument --	
A	US, A, 2953810 (HALL) 27. September 1960 siehe Abbildungen 2-4; Spalte 3, Zeilen 32-55 --	10,14
A	DE, B, 1155030 (HEINZ SCHÜRMANN & CO.) 26. September 1963 siehe Abbildung 1; Spalte 3, Zeile 41 - Spalte 4, Zeile 20 -----	13,14

ANHANG ZUM INTERNATIONALEN RECHERCHENBERICHT ÜBER DIE INTERNATIONALE PATENTANMELDUNG NR.

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SA 25458

In diesem Anhang sind die Mitglieder der Patentfamilien der im obengenannten internationalen Recherchenbericht angeführten Patentedokumente angegeben.
Die Angaben über die Familienmitglieder entsprechen dem Stand der Datei des Europäischen Patentamts am 26/01/89
Diese Angaben dienen nur zur Unterrichtung und erfolgen ohne Gewähr.

Im Recherchenbericht angeführtes Patentedokument	Datum der Veröffentlichung	Mitglied(er) der Patentfamilie	Datum der Veröffentlichung
US-A- 2437192		Keine	
FR-A- 1280076		Keine	
FR-A- 2576994	08-08-86	GB-A- 2172081	10-09-86
		DE-A- 3601712	11-09-86
		JP-A- 61270532	29-11-86
US-A- 2953810		Keine	
DE-B- 1155030		Keine	