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We, SCHLARAFFIA-WERKE HUSER GmbH & CO. KG.  
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being the Applicant in respect of the Application No.83266/91 state the following:-

The person nominated for the grant of the patent;

has, for the following reasons, gained entitlement from the actual Inventors:

The Inventors devised the invention in the course of normal employment with the Nominated Person who are entitled to the granted patent under the provisions of Sub-section 15(1)(c) of the Patents Act 1990 .

The person nominated for the grant of the patent is;

the applicant of the applications listed in the declaration under Article 8 of the PCT.

The basic applications referred to in the declaration under Article 8 of the PCT are the first applications made in a Convention country in respect of the invention.

Dated this 4th day of February 1993

SCHLARAFFIA-WERKE HUSER GmbH & CO. KG.  
By their Patent Attorneys  
COLLISON & CO.

  
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(54) Title  
**BOX-SPRING CORE**

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(57) Claim

1. A box-spring core comprising: a first group of first chains extending spacedly adjacent and parallel to one another and each having an elongated flexible sheath formed with a plurality of longitudinally spaced, transversely extending, and throughgoing slits that are each transversely aligned with the slits of adjacent sheaths, a transverse seam adjacent each slit, the seams internally subdividing the respective sheaths into a respective succession of longitudinally spaced pockets, and respective springs in the respective pockets each compressible in a transverse direction parallel to the slits, the springs having opposite ends lying generally in respective parallel planes; and a second group of second chains extending adjacent and parallel to one another and transversely of the first chains and each having an elongated flexible sheath formed with a plurality of longitudinally spaced, transversely extending, and throughgoing slits fitted with respective slits of the first group such that the second-chain sheath lies generally between the planes, a transverse seam adjacent each second-chain slit, the second-chain seams internally subdividing the second-chain sheath into a succession of pockets, and respective springs in the respective second-chain pockets and each compressible in a transverse direction parallel to the respective slits, the second-chain springs having opposite ends lying generally in the respective parallel planes.

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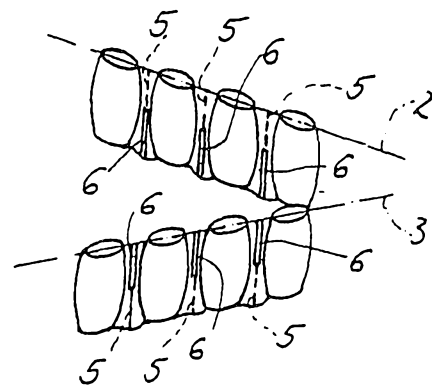
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| <b>(54) Title:</b> BOX-SPRING CORE   |  |  |
| <b>(54) Bezeichnung:</b> TASCHENFEDERKERN  |  |  |
| <b>(57) Abstract</b><br><p>To produce a box-spring core with a plurality of parallel chains of boxed springs in which the neighbouring chains are jointed without any foreign material, it is proposed that the chains (2, 3) have insertion slots (6) in the region of the connecting seams (5) over half the height of the chains and open on the same edge, a first number of chains (2) with slots (6) in the same direction is arranged mutually parallel at a distance from one another, a second number of chains (3) mutually parallel and at a distance from one another is arranged at right angles to the first number of chains (2) but running in the opposite direction to the slots (6) in the first number and the first and second numbers of chains (2, 3) are arranged with interengaging slots (6) in lines and columns, whereby the distances formed between parallel rows are filled by components of the second number of chains (3) inserted in the gaps in the components of the first number of chains (2) so that the components of each subsequent line or column are arranged in mutually staggered array.</p>  |  |  |
| <b>(57) Zusammenfassung</b><br><p>Um einen Taschenfederkern mit einer Vielzahl von parallelen Ketten eingetaschter Federn zu schaffen, bei dem die Verbindung der benachbarten Ketten ohne Fremdmaterial erfolgt, wird vorgeschlagen, daß die Ketten (2, 3) im Bereich der Verbindungsnahte (5) über die halbe Kettenhöhe reichende, jeweils zur gleichen Randkante offene Einsteckschlitz (6) aufweisen, jeweils eine erste Anzahl von Ketten (2) mit gleichgerichteten Schlitz (6) mit Abstand voneinander zueinander parallel gerichtet angeordnet sind, eine zweite Anzahl von Ketten (3) rechtwinklig zu der ersten Anzahl von Ketten (2) gerichtet parallel zu- und mit Abstand voneinander verlaufend angeordnet sind, deren Schlitz (6) zueinander gleichgerichtet, zu den Schlitz (6) der ersten Anzahl aber entgegengerichtet verlaufen, und die erste und zweite Anzahl von Ketten (2, 3) mit ineinandergreifenden Schlitz (6) in Zeilen und Spalten angeordnet sind, wobei die zwischen parallelen Reihen gebildeten Abstände durch in die Lücken der Elemente der ersten Anzahl von Ketten (2) eingesetzte Elemente der zweiten Anzahl von Ketten (3) ausgefüllt sind, so daß die Elemente jeder folgenden Zeile oder Spalte versetzt zueinander angeordnet sind.</p> |  |  |



Box-spring core

**6 4 5 8 3 3**

- 5 Subject of the invention is a box-spring core with multiple parallel chains of boxed springs whereby each chain has a continuous row of springs tightly wrapped in a cloth-type sheath and interconnected by same whereby the boxes thus formed of a chain have connecting seams running across for delimitation of the springs, these  
10 the adjoining chains are mechanically interconnected.

Such box-spring cores are e.g. known from EP 0 154 076 where it is proposed that parallel chains are interconnected by adhesive. From the state of the art box-spring cores are also known where mechanical connection is achieved by continuous  
15 connecting threads.

The use of adhesive is disadvantageous to the extent that additional material i.e. adhesive has to be used, that coating equipment must be provided and that waiting time for hardening of the adhesive must be taken into account. The connecting  
20 systems known to date require a considerable level of equipment whereby furthermore the arrangement of connecting threads is disadvantageous both during manufacture and further processing of the box-spring core.

Starting from this state of the art the purpose of the invention is to create a box-spring core of this type where adjoining chains are connected without foreign  
25 material.

To achieve this purpose the invention proposes that the chains have slots in the connecting seams and that these slots extend over a part of the chain height, particularly extend over half the chain height, open onto the same edge, that each  
30 time a first number of chains with unidirectional slots are arranged in spaced-out parallel formation, that a second number of spaced-out parallel chains are arranged at right angles to the first number and that the slots of the second number of chains are also unidirectional, but open onto the edge opposite to that of the  
35 slots of the first number of chains, and that the first and second numbers of chains are arranged with interlocking slots in rows and columns whereby the spaces formed between parallel rows are filled up by elements of the second number of chains inserted into the gaps of the elements of the first number of chains so that



the elements of each following row or column are arranged in a mutually offset array.

- The design as per the invention only requires the provision of slots in the connecting seams. Chains so designed can then be arranged in rows and columns at right angles to each other and without additional material provide immediate connection of the box-spring core by means of interlocking slotted areas. There is therefore no need for glued, welded, seamed, clipped or other connections. The design as per the invention produces a spring core whereby the chains are arranged in rows and columns with relatively tight packing of the springs and the interconnection of the chains for creating the box-spring core happens exclusively by overlapping slotted areas. This results in a precise exterior dimensional stability of the spring core where longitudinal or lateral telescoping of the springs is excluded because the slots in the seam ensure positional rigidity. Additionally, boxed springs are packed tightly together which gives great stability to the spring core. Moreover, a high degree of hardness of the box-spring core is obtained which with the previous state of the art could only be achieved by greater wire thickness of the spring elements.
- A preferred further development is one whereby a double connecting seam is provided between the boxed springs of a chain and the slots positioned between these pairs of seams.

This ensures that in the arrangement of the slots the connecting seam is in no way opened up which could lead to exposure of the boxed springs in this area.

It may also be advantageous to have a bridge of the sheath material of the boxed springs between each pair of connecting seams.

- Another useful further development of such a box-spring core in the scope of this invention whereby the chains have slots in the connecting seams opening onto the same edge, a first number of chains with unidirectional slots are arranged with spaces between and running parallel, a second number of spaced-out, parallel chains is arranged at right angles to the first number of chains, the slots of this second number also being unidirectional, but opening onto the edge opposite to that of the slots of the first number, and the first and second number of chains are arranged with interlocking slots in rows and columns, whereby the spaces formed between parallel rows are filled up by elements of the second number of chains inserted into the gaps of the elements of the first number of chains so that the



elements of each following row or column are arranged in a mutually offset array, is one whereby the interlocking slots of the first and second chains are so aligned each time that the two planes formed as it were by the end faces of the boxed springs run parallel and spaced out from each other and the end faces of all springs lie in these planes.

As to the length of the slots it makes no difference whether they extend only over half the chain height or have a different dimension as long as joining the chains together ensures the creation of a box-spring core with two parallel contact surfaces whereby the end faces of the boxed springs lie in these contact surfaces. It is e.g. possible to make the slots considerably longer than over half the chain height in which case with both chains having the same long slots the joining of the chains is facilitated by flexure at the slots. However, it is also possible to create a chain with relatively short slots which do not even reach to the middle of the chain height and the other chain with considerably longer slots extending beyond the middle, as long as this meets the condition that the end product forms two parallel level contact surfaces. Also more theoretically it is thinkable to have one chain with slots extending practically over the full height of the boxed spring and to entirely or almost entirely omit the slots from the other chain as long as the two chains can be interconnected while meeting the above requirement.

For the advantages derived from this design reference is made to the above presentations. It must also be noted that the design as per Claim 4 and likewise the design as per the further Claims 5 to 8 must also be considered in combination with Claims 1 to 3. Subject of the invention is further a box-spring core with multiple parallel chains of boxed springs whereby each chain has a continuous row of springs tightly wrapped in a cloth-type sheath and interconnected by same whereby the pockets of a chain thus formed have connecting seams running across for delimitation of the springs, these seams being parallel to the longitudinal seams of the springs whereby furthermore the adjoining chains are mechanically interconnected.

To achieve the purpose defined in the introduction it is possible for chains having slots opening onto the same edge in the connecting seams and where a first number of slotted chains is arranged in spaced-out parallel formation and a second number of spaced-out parallel chains is arranged at right angles to the first number of chains and where the slots of the second number of chains all open onto the edge opposite to that of the slots in the first number of chains and the first and second number of chains are arranged with interlocking slots in rows and columns



whereby the spaces formed between parallel rows are filled up by elements of the second number of chains inserted into the gaps of the elements of the first number of chains so that the elements of each following row or column are arranged in a mutually offset array, to provide a parallel solution whereby the slots of each chain individually or in groups open alternately onto one edge or the other.

It is thereby proposed particularly that the interlocking slots of the first and second chains are so aligned each time that the end faces of all the boxed springs lie in the parallel contact planes of the box-spring core.

A further preference is that the first and second chains are joined together by interlocking slots in the manner of a weaving pattern.

It is thereby advantageous for reasons of stability that the slots extend each time beyond half the chain height of the chain.

The above design achieves that the chains can be joined in the manner of a weaving pattern so that the finished box-spring core represents an even better intermediate product in terms of cohesion which can be maintained with less care until it has been processed into a mattress in its final form. Because of the offset arrangement of the slots and the consequent possibility of weaving the individual chains together the risk of the box-spring core coming apart through careless handling before final processing is excluded.

The other advantages already described in Claims 1 to 3 are also retained, just as the characteristics of sub-claims 2 and 3 must also be combined in sub-combination with Claims 4 to 8.

As a further solution for achieving the purpose set out in the introduction the invention proposes as a parallel solution that each time a first number of chains with unidirectional slots in the connecting seams is placed in parallel and spaced-out formation, a second number of parallel and spaced-out chains is arranged at right angles to the first number of chains and the first and second number of chains are arranged in rows and columns whereby the spaces formed between parallel rows are filled up by elements of the second number of chains inserted into the gaps of the elements of the first number of chains so that the elements of each following row or column are arranged in a mutually offset array and that the slots are shaped as open elongated slots only in the area between the two planes formed by the end faces of the boxed springs and that each chain of the second



number of chains passes through the mutually aligned elongated slots of the chain assembly formed by the first number of chains, whereby at the point of passage through each elongated slot an area of a connecting seam of the chain of the second number is arranged.

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This arrangement makes it possible e.g. to pass through a number of parallel chains of the first type whose elongated slots are coaxially aligned, through each coaxial number of elongated slots, a chain of the second type and to so arrange that the second number of chains are each time positioned in an elongated slot in the region of their connecting seam. This achieves a firm mechanical interconnection of the chains and produces an equally firm box-spring core. To facilitate passing the chains through the elongated slots the chains can be compressed so that they can be more easily pushed through the open elongated slots whereby after the springing back of the springs arranged in the chains they are mechanically locked in place in the desired position. The preferred type of spring is a barrel spring.

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A preferred further development is one whereby the elongated slots terminate at a distance from the plane of the spring end faces. It is also preferable that the elongated slots are placed centrally between the planes. It is furthermore advantageous if the edges of the elongated slots are closed off by seams.

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To further improve the mechanical interlocking of the chains of the first and second types it is preferable that the second number of chains have slots open towards one or both edges in the connecting seams of the sheath whereby when the chains of the first and second number are arranged for interconnection the elongated slots open at the edge of each slot pair of the interlocking chains are aligned for engagement.

30

It is thereby advantageous if the length of the slots opening onto the edge is about equal to the length of the sheath area remaining between the end of the matching elongated slot closed at the edge and the plane formed by spring end faces.

35

Furthermore it is preferable that the length of the elongated slots that are closed at the edge is at least slightly greater than the maximum diameter of the springs of the second number of chains passing through them.

The arrangement proposed by the invention achieves that the chains are as it were interlocked and securely positioned in relation to each other. Thus a finished box-





spring core can be formed which with regard to cohesion represents an excellent intermediate product that can be maintained with little care until it has been processed into a mattress in its final form. The connecting means proposed by the invention assure the cohesion of the box-spring core until its final processing.

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Embodiments of the invention are represented in the drawings and described in more detail below.

Illustrations:

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Fig. 1 View of box-spring core as per the invention

Fig. 2 Side-view of the same

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Fig. 3 Enlarged detail drawing

Fig. 4 Detail drawing in isometric presentation

Fig. 5 View of a box-spring core

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Fig. 6 Enlarged detail drawing

Fig. 7 Side-view of preferred variant

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Fig. 8 Detail drawing of box-spring core as per the invention seen from above

Fig. 9 The same in cross-section

30 The box-spring core 1 as shown in Fig. 1 -4 consists of multiple parallel chains 2, 3 of boxed springs, whereby each chain 2, 3 has a continuous row of springs 4 tightly wrapped in a cloth-type sheath and interconnected by same. The boxes thus formed of a chain 2, 3 have connecting seams 5 running across for delimitation of the springs. These connecting seams 5 run parallel to the longitudinal axes of the springs 4.

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The adjoining chains 2, 3 are mechanically interconnected. For this purpose the chains 2, 3 have slots 6 in the connecting seams 5 these slots being unidirectional and opening onto the same edge for each chain and extending over half the chain height. Each time a first number of chains 2 is arranged in a spaced-out parallel formation with unidirectional slots 6, while a second number of chains 3 likewise in

spaced-out and mutually parallel formation is arranged at right angles to the first number of chains 2. The slots of chains 3 are also unidirectional, but open onto the edge opposite to that of the slots 6 of the first number. The first and second number of chains 2, 3 are arranged with interlocking slots 6 in rows and columns as can be seen particularly in Fig. 1. Thereby the spaces formed between the parallel rows 2, 3 are filled up by elements of the second number of chains 3 inserted into the gaps of the elements of the first number of chains 2. In this way the elements of each following row or column are arranged in a mutually offset array. To avoid that the provision of slots leads to the exposure of the springs 4 near the slots so that they are no longer completely enclosed by the box the connecting seam 5 can be designed as a double seam whereby the slot 6 is arranged between these connecting seam pairs. In so far as this is required for dimensioning reasons it is possible to have a bridge of the sheath material of the boxed springs 4 between each pair of connecting seams 5 of a chain 2 or 3.

The invention makes available an extremely simple system for the manufacture of box-spring cores which dispenses with all auxiliary connecting means.

As the embodiments as per Figures 5-7 show the box-spring core 1 consists of multiple parallel chains 2, 3 of boxed springs, preferably barrel springs, whereby each chain 2,3 has a continuous row of springs tightly wrapped in a cloth-type sheath and interconnected by same. The boxes thus formed of a chain 2, 3 have connecting seams running across 5 for delimitation of the springs 4. These connecting seams run parallel to the longitudinal axes of the springs. The adjoining chains 2, 3 are mechanically interconnected. For this as can be seen in the embodiment as per Fig. 6 the chains 2, 3 have slots 6 opening each time onto the same edge in the connecting seams 5. Each time a first number of chains 2 with unidirectional slots 6 is arranged in parallel, spaced-out formation, while a second number of spaced-out parallel chains 3 is arranged at right angles to the first number of chains 2. The slots 6 of the second number of chains are also unidirectional, but open onto the edge opposite to that of the slots 6 of the first number. The first and second number of chains 2, 3 are arranged with interlocking slots 6 in rows and columns as can be seen particularly in Fig. 5. Thereby the spaces formed between parallel rows 2, 3 are filled by elements of the second number of chains 3 inserted into the gaps of the elements of the first number of chains 2. In this way the elements of each following row or column are arranged in a mutually offset array. To avoid that the provision of slots leads to the exposure of the springs 4 near the slots so that they are no longer completely surrounded by the box, the connecting seam 5 can be designed as a double seam (see Fig. 7)



whereby the slot 6 is arranged between these connecting seam pairs. In so far as this is required for dimensioning reasons it is possible to have a bridge of the sheath material of the boxed springs 4 between each pair of these connecting seams. This makes available an extremely simple system for the manufacture of box-spring cores which dispenses with all auxiliary connecting means.

As can be seen particularly from Fig. 6 the slots which operate in pairs can be of different height. With the slot pair of the chains 2, 3 shown on the right in Fig. 6 the upper slot extends to the middle of the relevant chain height while the opposed slot 6 of the bottom chain 3 extends over more than half the chain height. Even with this design interlocking is possible and gives improved hinging action near the slot 6 of the bottom chain.

With the middle interlocking slot pair 6 both slots 6 are so long that they extend far over the middle of the height of chain 2, 3. Here also interlocking and hinging is perfectly possible, but of course there is some deterioration in the cohesion of the cloth web.

In the embodiment on the left in Fig. 6 slot 6 of the bottom chain 3 is so short that it ends far from the middle of the chain height while slot 6 of the top chain 2 which pairs with slot 6 of the bottom chains extends considerably past the middle of the chain so that in any case after interlocking of the slots 6 it is certain that the end faces of all the boxed springs will form the two contact planes of the box-spring core. Slots can also be of a different shape.

In the embodiment in Fig. 7 the slots 6 have been so arranged that the slots 6 alternately open onto one or the other edge of chain 2. The other chain 3 which works together with this chain is not shown, but is designed similarly. This makes it possible to join the chains 2, 3 in the manner of a weaving pattern so that each time a slot 6 overlaps the chain below and the chain previously lying underneath is connected by insertion from above into the next slot. Here too the slot length and arrangement are such that in any case two mutually level contact surfaces of the box-spring core are formed. A preferred arrangement is one whereby the slots 6 extend past half the chain height. However, different slot lengths and shapes are possible and in some circumstances even advantageous.

As the embodiments in Figures 8 and 9 show the box-spring core 1 consists of multiple parallel chains 2, 3 whereby each chain has a continuous row of springs tightly wrapped in a cloth-type sheath and interconnected by same. The boxes thus



formed of a chain 2, 3 have connecting seams 5 running across for delimitation of the springs 4. These connecting seams run parallel to the longitudinal axes of the springs. The adjoining chains 2, 3 are interconnected mechanically. For this a first number of chains 3 has unidirectional slots in the connecting seams 5 whereby
   
 5 several chains are arranged in parallel spaced-out formation. A second number of parallel spaced-out chains 2 is arranged at right angles to the first number of chains 3 whereby the first and the second number of chains 3, 2 are arranged in rows and columns and the spaces formed between parallel rows are filled up by elements of the second number of chains 2 inserted into the gaps of the elements
   
 10 of the first number of chains 3 so that the elements of each following row or column are arranged in a mutually offset array. In accordance with the invention the slots are formed as open elongated slots 6 only in the area lying between the planes formed by the end faces of the boxed springs 4. Furthermore each chain of the second number of chains 2 is each time arranged so that it passes through the
   
 15 mutually aligned elongated slots 6 of the chain assembly formed from the first number of chains 3 whereby at each interlocking of slots there is an area of a connecting seam 5 in the chain 2 of the second number. As can be seen particularly from Figure 9 the elongated slots can end at a distance from the planes formed by the spring end faces. Moreover the elongated slots 6 are formed
   
 20 preferably in the middle between the planes. Furthermore the edges of the elongated slots 6 are closed off by seams (connecting seams 5). Additionally it is proposed that the second number of chains 2 have slots in the connecting seams 5 of the sheath opening onto one or both edges so that in interlocking arrangement of the chains of the first and second number (3, 2) the slots open at the edge and
   
 25 the elongated slots 6 closed at the edge of each matching slot pair of the interlocking chains 3, 2 are aligned accordingly. For the rest the design proposes that the elongated slots 6 closed at the edge are of a length which is at least slightly greater than the maximum diameter of the springs 4 of this second number of chains 2 passing through them. When the springs 4 are compressed the passing
   
 30 through the elongated slots 6 is very easy without tearing the material whereby when the chains of the second number 2 are properly arranged as per the sample shown in Fig. 1 the springs can be released so that they spring back and adopt the position as per Fig. 8.



## THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:

- 5 1. A box-spring core comprising: a first group of first chains extending spacedly adjacent and parallel to one another and each having an elongated flexible sheath formed with a plurality of longitudinally spaced, transversely extending, and throughgoing slits that are each transversely aligned with the slits of adjacent sheaths, a transverse seam adjacent each slit, the seams
- 10 internally subdividing the respective sheaths into a respective succession of longitudinally spaced pockets, and respective springs in the respective pockets each compressible in a transverse direction parallel to the slits, the springs having opposite ends lying generally in respective parallel planes; and a second group of second chains extending adjacent and parallel to one
- 15 another and transversely of the first chains and each having an elongated flexible sheath formed with a plurality of longitudinally spaced, transversely extending, and throughgoing slits fitted with respective slits of the first group such that the second-chain sheath lies generally between the planes, a transverse seam adjacent each second-chain slit, the second-chain seams
- 20 internally subdividing the second-chain sheath into a succession of pockets, and respective springs in the respective second-chain pockets and each compressible in a transverse direction parallel to the respective slits, the second-chain springs having opposite ends lying generally in the respective parallel planes.
- 25 2. The box-spring core defined in claim 1, wherein each sheath has longitudinally extending opposite edges generally on the planes, the slits opening at the planes.
- 30 3. The box-spring core defined in claim 2 wherein each sheath has a predetermined height measured perpendicularly between the planes, each slit having a predetermined length measured perpendicularly between the planes, the combined lengths of a pair of interfitting slits being generally equal to the predetermined height.
- 35 4. The box-spring core defined in claim 3 wherein each slit length is equal generally to half the predetermined height.



5. The box-spring core defined in claim 2 wherein the first-chain slits all open at the edges on one of the planes and the second-chain slits all open at the edges on the other of the planes.

6. The box-spring core defined in claim 2 wherein alternating slits of each sheath open transversely oppositely, whereby the sheaths must be woven together to form the core.

7. The box-spring core defined in claim 1 wherein each seam is a transverse row of stitches.

8. The box-spring core defined in claim 7 wherein each seam is a pair of rows of stitches longitudinally flanking the respective slit.

9. The box-spring core defined in claim 1 wherein the first-chain slits are formed as transversely elongated holes and the second-chain slits are oppositely outwardly open short slits, the second chains extending through the elongated holes of the first chains.

10. The box-spring core defined in claim 9, wherein each elongated hole is of a size sufficient that the second-chain springs can fit through them when compressed.

11. The box-spring core defined in claim 1 wherein the springs are coil springs.

12. The box-spring core defined in claim 11 wherein the coil springs are barrel springs.

13. The box-spring core defined in claim 1 wherein the sheaths are of cloth.



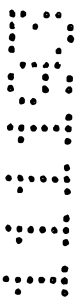
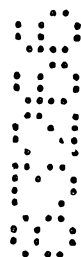
14. A box-spring core substantially as hereinbefore described with reference to the accompanying drawings.

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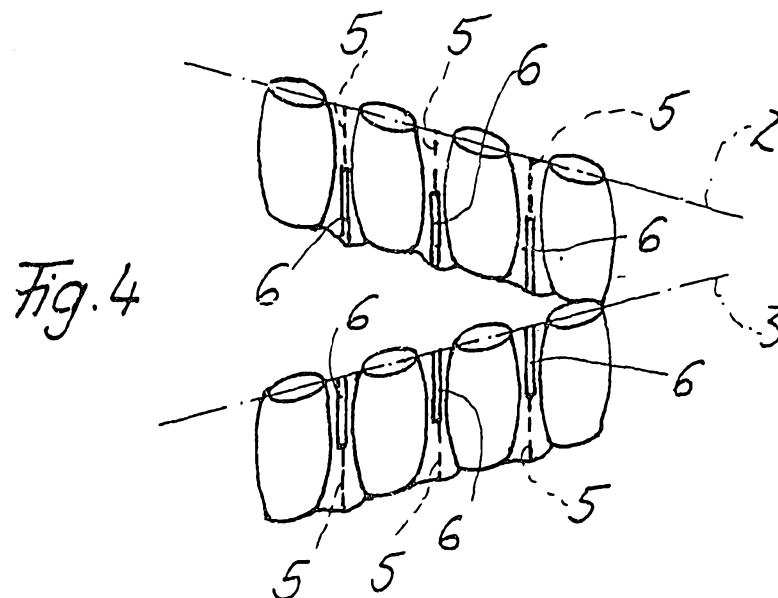
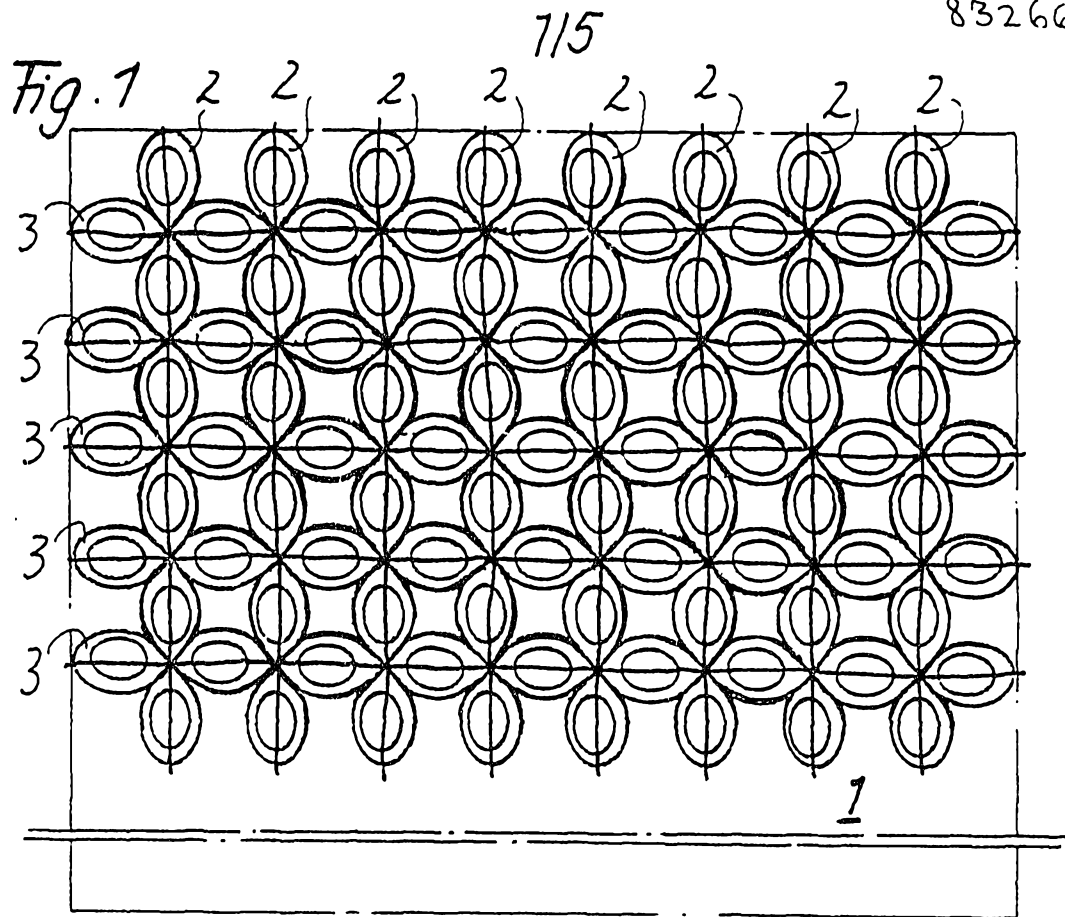
Dated this 11th day of November 1993

SCHLARAFFIA-WERKE  
HUSER GmbH

10 By their Patent Attorneys  
COLLISON & CO



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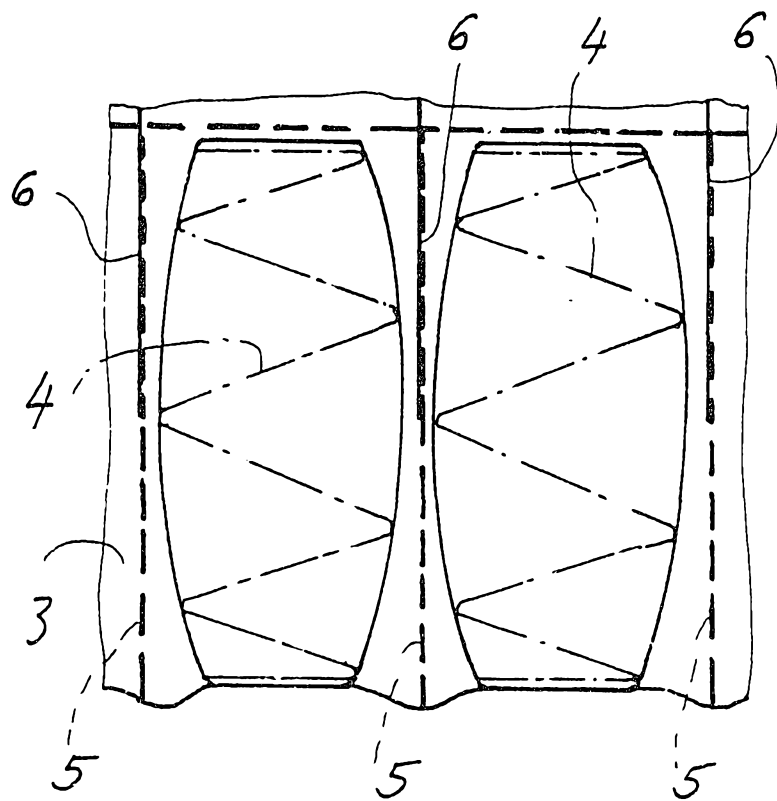
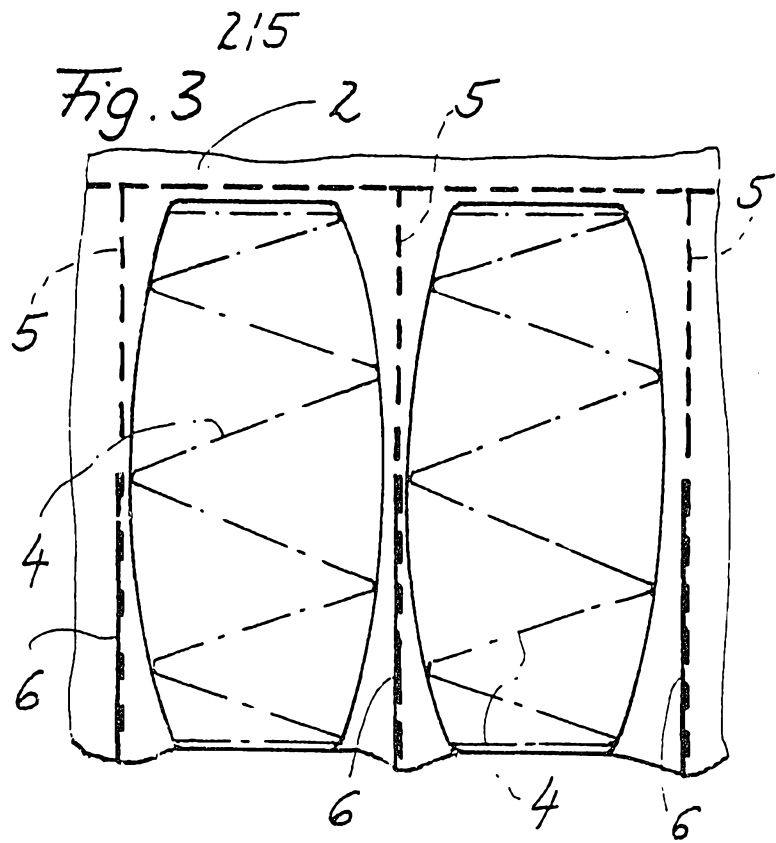
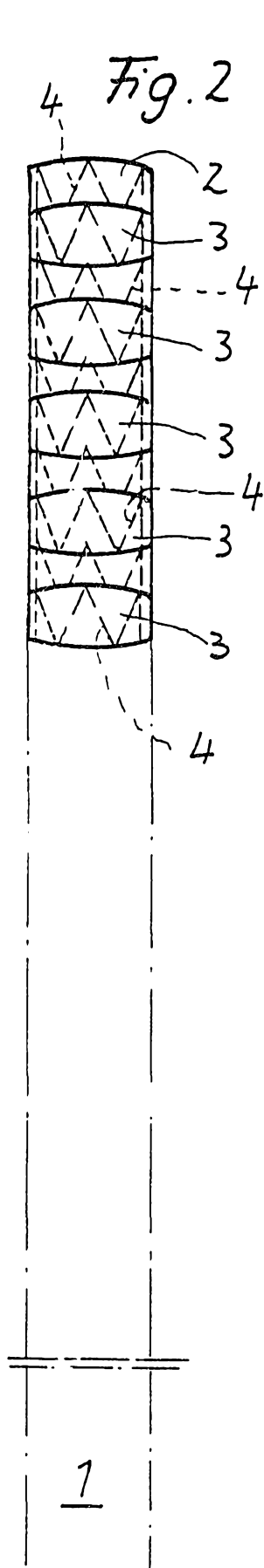


Fig. 5

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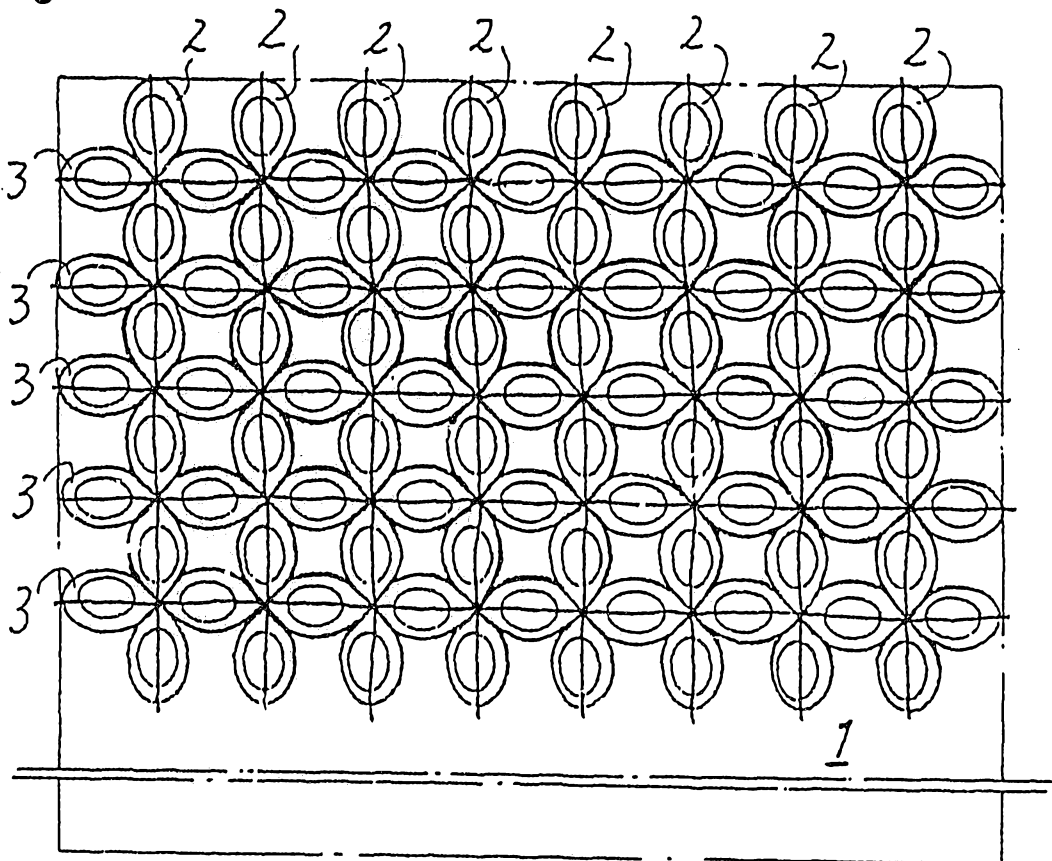
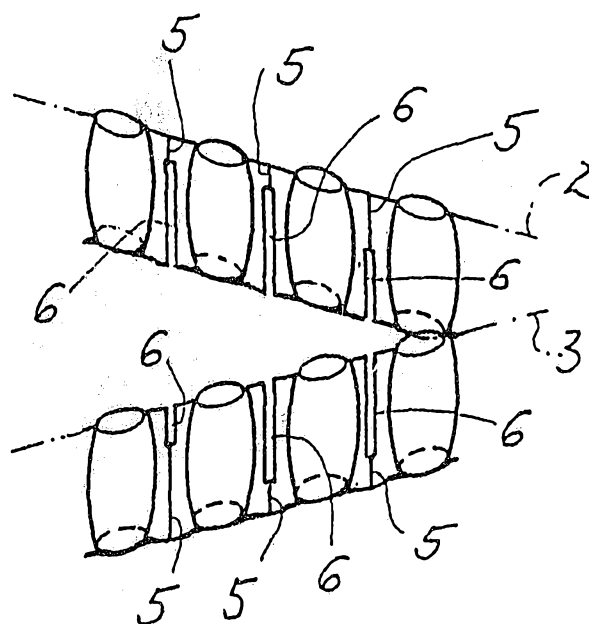
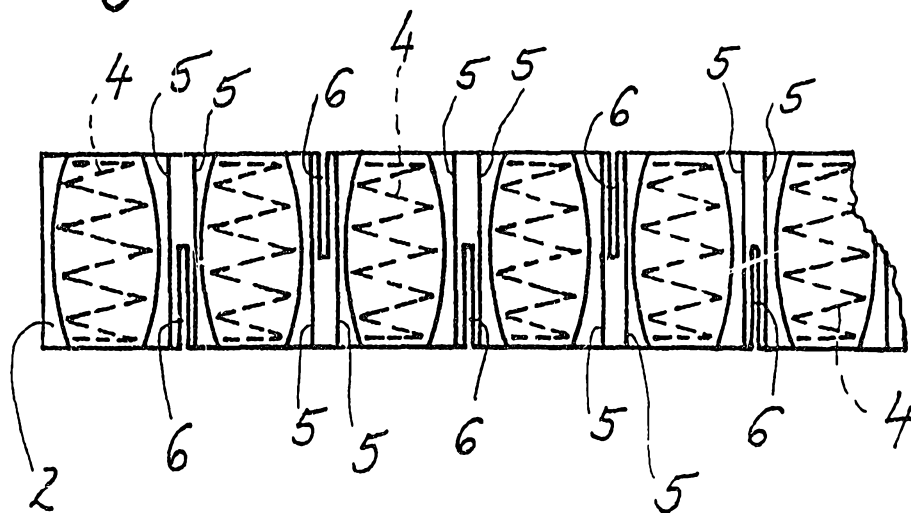


Fig. 6



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Fig. 7



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Fig. 8

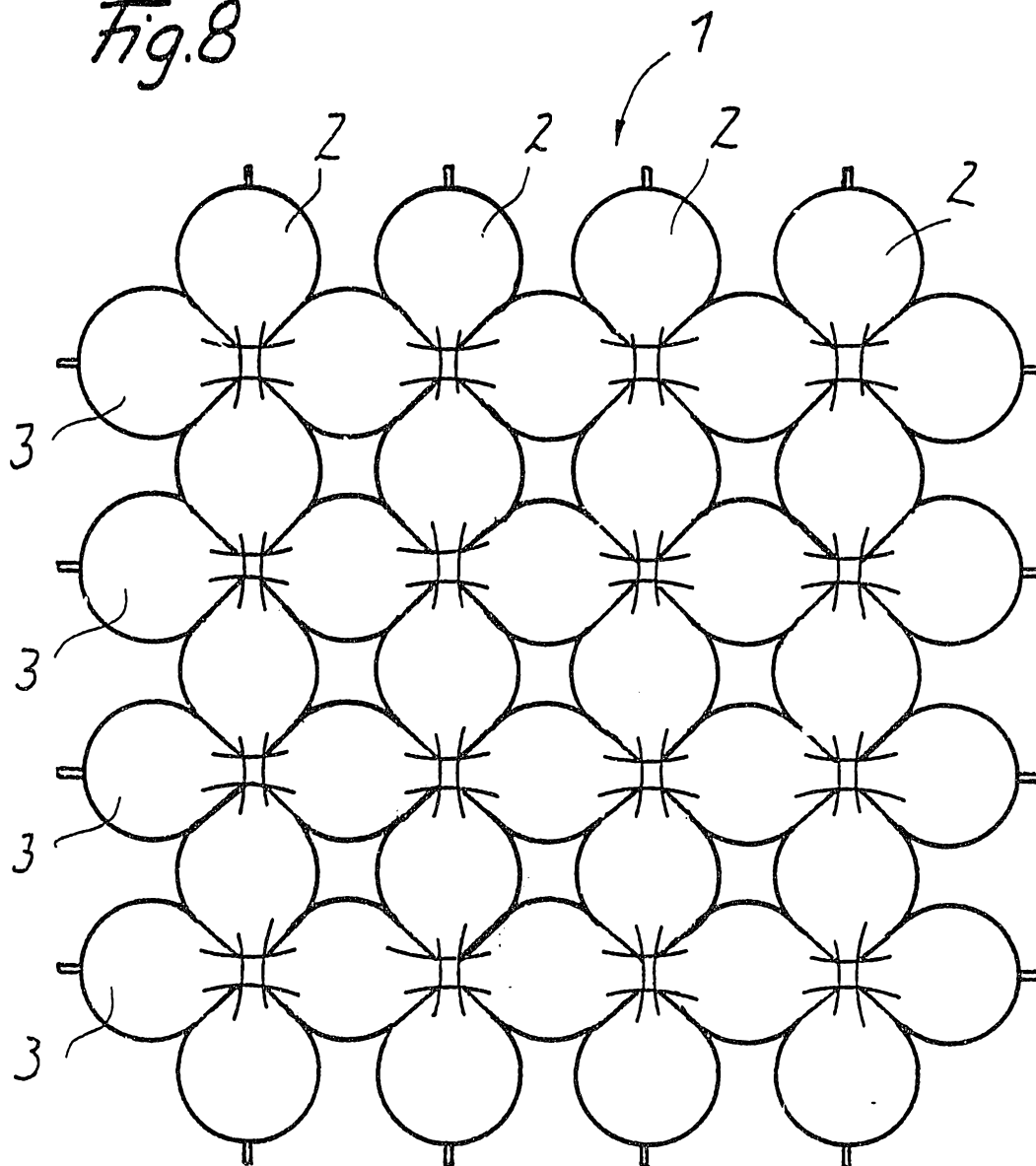
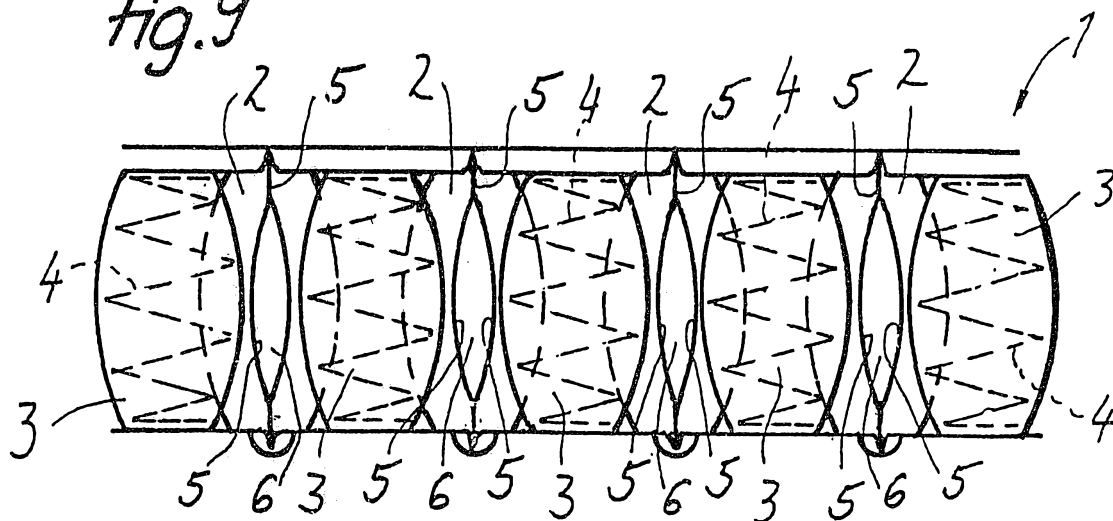


Fig. 9



# INTERNATIONAL SEARCH REPORT

International Application No PCT/DE 91/00665

|   |  |   |
|---|--|---|
| <b>I. CLASSIFICATION OF SUBJECT MATTER</b> (If several classification symbols apply, indicate all) <sup>6</sup>   |  |   |
| According to International Patent Classification (IPC) or to both National Classification and IPC   |  |   |
| Int. Cl. <sup>5</sup> A 47 C 27/06 ; A 47 C 23/04   |  |   |
| <b>II. FIELDS SEARCHED</b>  |  |   |
| Minimum Documentation Searched <sup>7</sup>   |  |   |
| Classification System   | Classification Symbols   |   |
| Int. Cl. <sup>5</sup>   | A 47 C   |   |
| Documentation Searched other than Minimum Documentation<br>to the Extent that such Documents are Included in the Fields Searched <sup>8</sup>   |  |   |
|   |  |   |
| <b>III. DOCUMENTS CONSIDERED TO BE RELEVANT <sup>9</sup></b>  |  |   |
| Category <sup>*</sup>   | Citation of Document, <sup>11</sup> with indication, where appropriate, of the relevant passages <sup>12</sup>             | Relevant to Claim No. <sup>13</sup>                 |
| A   | EP, A, 0154076 (SIMMONS U.S.A. CORPORATION) 11 September 1985, (cited in the application) see abstract; figures<br><br>--- | 1,4,5,9   |
| A   | US, A, 4523344 (STUMPF ET AL.) 18 June 1985 see abstract; figures<br><br>---   | 1,4,5,9   |
| A   | DE, C 119083 (FRICK) 6 April 1900<br><br>---   |   |
| <div style="display: flex; justify-content: space-between;"> <div style="width: 48%;"> <p><sup>*</sup> Special categories of cited documents: <sup>10</sup></p> <p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier document but published on or after the international filing date</p> <p>"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)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p> </div> <div style="width: 48%;"> <p>"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</p> <p>"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step</p> <p>"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.</p> <p>"&amp;" document member of the same patent family</p> </div> </div> |  |   |
| <b>IV. CERTIFICATION</b>  |  |   |
| Date of the Actual Completion of the International Search   |  | Date of Mailing of this International Search Report |
| 23 October 1991 (23.10.91)  |  | 5 November 1991 (05.11.91)                          |
| International Searching Authority   |  | Signature of Authorized Officer                     |
| EUROPEAN PATENT OFFICE  |  |   |