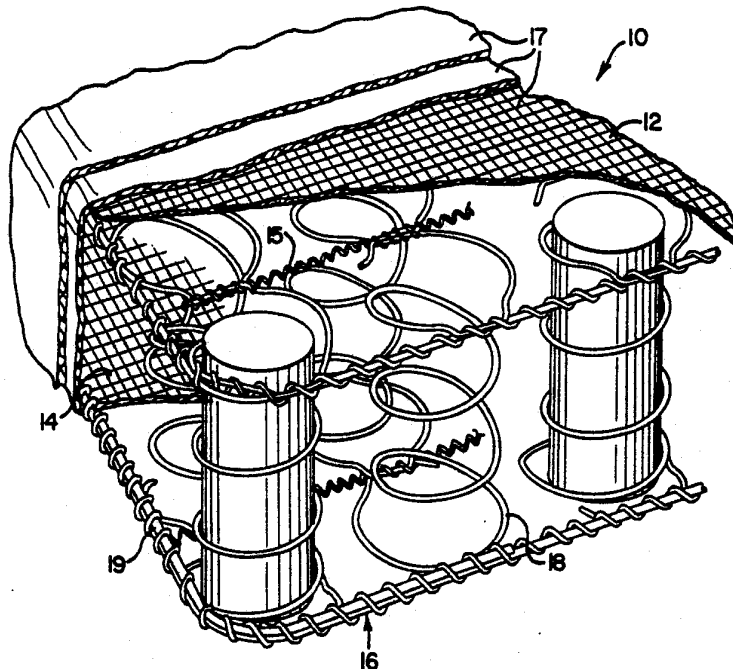




INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

<p>(51) International Patent Classification ⁵ : A47C 27/04</p>	<p>A1</p>	<p>(11) International Publication Number: WO 92/16128 (43) International Publication Date: 1 October 1992 (01.10.92)</p>
<p>(21) International Application Number: PCT/US92/02283 (22) International Filing Date: 23 March 1992 (23.03.92) (30) Priority data: 674,760 22 March 1991 (22.03.91) US (71) Applicant: THE OHIO MATTRESS COMPANY [US/ US]; Licensing and Components Group, Halle Building, 10th Floor, 1228 Euclid Avenue, Cleveland, OH 44115 (US). (72) Inventors: PISCZAK, Phillip, J. ; 8073 West River Road, Novelty, OH 44072 (US). FREEMAN, William, W. ; 8663 Kennard Road, Ludi, OH 44254 (US). WAGNER, Robert, F. ; 1038 North Jefferson, Medina, OH 44256 (US).</p>	<p>(74) Agent: BANIAK, Michael, H.; Willian Brinks Olds Hofer Gilson & Lione, NBC Tower, Suite 3600, 455 North Cit- yfront Plaza Drive, Chicago, IL 60611-5599 (US). (81) Designated States: AT, AT (European patent), AU, BB, BE (European patent), BF (OAPI patent), BG, BJ (OAPI patent), BR, CA, CF (OAPI patent), CG (OAPI patent), CH, CH (European patent), CI (OAPI patent), CM (OAPI patent), CS, DE, DE (European patent), DK, DK (European patent), ES, ES (European patent), FI, FR (European patent), GA (OAPI patent), GB, GB (Eu- ropean patent), GN (OAPI patent), GR (European pa- tent), HU, IT (European patent), JP, KP, KR, LK, LU, LU (European patent), MC (European patent), MG, ML (OAPI patent), MN, MR (OAPI patent), MW, NL, NL (European patent), NO, PL, RO, RU, SD, SE, SE (Eu- ropean patent), SN (OAPI patent), TD (OAPI patent), TG (OAPI patent). Published <i>With international search report.</i></p>	

(54) Title: INNER SPRING MATTRESS WITH CORE MEMBER AND METHOD FOR CONSTRUCTION THEREOF



(57) Abstract

A mattress (10), and a method for manufacturing a mattress (10), having an inner spring assembly (16) with a plurality of interconnected coil springs (18), and resilient core members (28) located within selected springs (18) to impart different support characteristics to the mattress (10) at the location of the core members (28).

FOR THE PURPOSES OF INFORMATION ONLY

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

AT	Austria	FI	Finland	MI	Mali
AU	Australia	FR	France	MN	Mongolia
BB	Barbados	GA	Gabon	MR	Mauritania
BE	Belgium	GB	United Kingdom	MW	Malawi
BF	Burkina Faso	GN	Guinea	NL	Netherlands
BG	Bulgaria	GR	Greece	NO	Norway
BJ	Benin	HU	Hungary	PL	Poland
BR	Brazil	IE	Ireland	RO	Romania
CA	Canada	IT	Italy	RU	Russian Federation
CF	Central African Republic	JP	Japan	SD	Sudan
CG	Congo	KP	Democratic People's Republic of Korea	SE	Sweden
CH	Switzerland	KR	Republic of Korea	SN	Senegal
CI	Côte d'Ivoire	LI	Liechtenstein	SU	Soviet Union
CM	Cameroon	LK	Sri Lanka	TD	Chad
CS	Czechoslovakia	LU	Luxembourg	TC	Togo
DE	Germany	MC	Monaco	US	United States of America
DK	Denmark	MG	Madagascar		
ES	Spain				

INNER SPRING MATTRESS WITH CORE MEMBER AND METHOD FOR CONSTRUCTION THEREOF

FIELD OF THE INVENTION

The present invention relates to the field of mattresses. More particularly, the invention relates to an inner spring mattress that can readily and economically be provided with varied and enhanced support characteristics.

BACKGROUND OF THE INVENTION

Over the years, various developments in mattresses have been directed toward making mattresses more durable, less expensive to construct, or more comfortable. Other developments have been directed toward improving the characteristics of mattresses. It is recognized, however, that preferences and needs in mattresses are very personal and individual. Because different people have different weights, heights, builds, etc., what is comfortable and correct for one individual is not necessarily comfortable or correct for another.

Thus, mattress manufacturers design and build different types of mattresses with different characteristics that are comfortable, correct, and suitable for different people. This may have required constructing mattresses with different types of inner spring assemblies, such as inner spring assemblies having different numbers of springs, or different sizes of springs, or made with springs of different materials. It can readily be appreciated that, from

- 2 -

the mattress manufacturer's viewpoint, constructing various different types of mattresses can detract from an efficient and economical manufacturing process and can result in higher production costs.

5 For example, in the past, if a mattress manufacturer wanted to produce mattresses having differing characteristics, the manufacturer might have opted to maintain an inventory of different materials, such as different sizes of springs or springs made of
10 different materials. Alternatively, in order to produce mattresses of differing characteristics, a manufacturer may have had to modify the assembly process. For example, one could make inner spring
15 assemblies with a greater or lesser number of springs or rearrange the placement of the springs, in order to make certain models of mattresses with different firmness. This multiplicity of materials and construction methods added to the cost of manufacturing a mattress. Accordingly, it would be advantageous to
20 minimize the variety of materials and construction methods needed to construct mattresses.

In addition to the above concerns, it is also recognized that it would be advantageous to provide a
25 mattress having differing characteristics at different locations on the mattress. For example, because some people often sit on the edge of a mattress while dressing, it would be preferable to make some mattresses with a perimeter area or periphery more suitable for sitting by making it firmer, while the
30 middle portion of the mattress would be less firm because it would be used solely for lying. It may also be preferred to make a central portion of some mattresses firmer to provide more support to a person's

- 3 -

lumbar region. Although it may be desired to produce mattresses having different areas with firmer support, such as for the reasons described above, in the past, modification of the construction of a mattress to make it firmer in certain regions than in others could be complicated.

Accordingly, it is an object of the present invention to provide a mattress, or similar spring cushion unit, of a construction that can be readily and economically modified during the manufacturing process, so as to provide varying properties or characteristics.

It is another object of the present invention to provide a mattress that can be manufactured to possess varying support properties with respect to specific, selectable localized regions or areas of the mattress.

It is yet another object of the invention to provide an inner spring assembly for a mattress that can provide for differing characteristics.

20 SUMMARY OF THE INVENTION

According to the present invention, there is provided a mattress, and a method for manufacturing a mattress, having an inner spring assembly with a plurality of interconnected individual spring coils and resilient core members located within selected spring coils of the inner spring assembly to impart different support characteristics to the mattress at the location of the core members.

BRIEF DESCRIPTION OF THE DRAWINGS

- 4 -

FIG. 1 is a perspective view of part of a mattress made in accordance with the teachings of the present invention, with a partial cutaway portion;

5 FIG. 2 is an enlarged perspective view of a single spring unit and core member of the embodiment shown in FIG. 1;

FIG. 3 is an elevational view of the spring unit and core member of FIG. 2; and

10 FIG. 4 is a schematic plan of an alternative arrangement springs made in accordance with the teachings of the present invention.

DETAILED DESCRIPTION OF THE EMBODIMENTS

In FIG. 1, there is a portion of a mattress 10 with a portion thereof cutaway. The mattress has a first (or top) side 12, a second (or bottom) side 14. An inner spring assembly 16 is located between one or more layers 17 of padding, foam, netting, mesh, fabric, ticking, coverings, or the like, as is well known in the art. The inner spring assembly 16 is comprised of a plurality of coil springs, e.g. spring 18. The coil springs 18 in the inner spring assembly 16 are arranged in rows and columns in a regular rectangular pattern. The inner spring assembly 16 shown here is may be comprised of identical springs, although springs of differing characteristics could be used. The springs that make up the inner spring assembly 16 are interconnected by cross-verticals 15 with the springs along the perimeter of the mattress also connected to a border wire 19 by a border wire helical 21. The coil springs 18 as well as their assembly into an innerspring unit are well known in the art, and further detail of the same shall be omitted.

- 5 -

Referring to FIG. 2, there is depicted an individual spring unit 20 that forms part of the inner spring assembly 16 of an embodiment of the present invention. The spring unit 20 includes a spring 18
5 portion 22 having first end 24 and a second end 26. The spring 18 may be made for instance of spring wire having a diameter of approximately 0.073 inches wound into a helical shape with an inner diameter of approximately 1.6 inches. Other shapes and materials
10 may be utilized for the spring.

Adapted to cooperate with a selected spring 18 is a core member 28. The core member 28 is a cylinder of resilient material, such as urethane foam, that is positioned inside the convolutions of the coil
15 of the spring 18. In this embodiment, the core member 28 is dimensioned so that its length is slightly less than the length of the spring 18 when the spring unit is fixed in place in the innerspring 16. In an exemplary embodiment, the spring 18 has a height of
20 approximately 5 3/4 inches when installed in the mattress and in an unloaded state, i.e., without a force applied to the mattress top/bottom 12/14. In the exemplary embodiment, the core member 28 has a length of approximately 5 1/4 inches. With the spring unit
25 and core member of the dimensions described, the mattress characteristics are initially defined solely by the characteristics of the spring member because the spring unit can be compressed slightly, e.g. 1/2 inch, from its length of 5 3/4 inches to a length of 5 1/4
30 inches before additional compression is opposed by both the spring unit and the core member. This has the effect that the mattress is firmer where the spring units 20 are located.

- 6 -

The diameter of the core member is preferably slightly smaller than the diameter of the intermediate convolutions of the spring 18, so that the coils of the spring can readily move relative to the core member, i.e. to avoid friction between the coils and the core member. In addition, the diameter of the core member is preferably slightly smaller than the diameter of the intermediate convolutions of the spring 18 for ease of insertion during the manufacturing process. As mentioned above, the inner diameter of the spring portion is approximately 1.6 inches. The diameter of the depicted core member 28 is approximately 1.5 inches.

In a preferred embodiment, the core member 28 is made of urethane foam having a density of 2 pounds per cubic foot and a compression of 12.0 psi at 50% deformation. Other densities or compressions may be used to impart different characteristics or properties to spring units 20. In a preferred embodiment, the core member is solid, although it may be hollow in alternative embodiments. Different materials or construction may be used for the core member, for example, the core member may be made of foam rubber or resilient plastic or an elastomeric material, or the core member may be a pneumatic or hydraulic device, or may be another spring.

The present invention can be adapted to readily impart different characteristics to different locations of the mattress. This is accomplished by selecting springs located at the position in the inner spring assembly of the mattress corresponding to the area at which enhanced firmness is desired. These selected springs can then be readily adapted simply by

- 7 -

placing a core member therein to impart greater support, or firmness. If it is preferred to make a mattress with a firm area along the perimeter, the mattress can be manufactured with core members inside
5 each individual spring unit along the perimeter of the inner spring assembly. Alternatively, core members can be positioned only in every other spring unit along the perimeter, or in any other sequence depending on the level of firmness desired. Every other spring (FIG. 1)
10 is presently considered to be the most efficient and economical, however.

In the embodiment of FIG. 4, there is depicted an inner spring assembly 42 in which core members 28 are fitted in selected springs
15 corresponding generally to the lumbar region of a person using the mattress. As in this embodiment, the firmness of selected areas can be readily varied during the manufacture of a mattress by the number, location, compression, and length of the core members. Thus, in
20 accordance with the present invention, similar or identical inner spring assemblies may be used for constructing various models of mattresses each with different degrees of firmness or with different areas of firmness. This has the advantage of providing for a
25 variety of choices of mattresses for the consumer, simplifying and reducing the costs associated with manufacturing mattresses of different construction.

In a preferred embodiment the core member is located inside the coil spring portion. This
30 facilitates locating the core member and orienting it in a direction to contribute to the firmness of the mattress. Other alternative arrangements are possible, however, such as placing the core member around the

- 8 -

spring, or along its side. These and all other modifications which are within the ordinary skill in the art to make are considered to lie within the scope of the invention as defined by the appended claims.

- 9 -

WE CLAIM:

1. An inner spring mattress formed of coil springs with an area of enhanced firmness comprising:
a plurality of resilient core members
5 selectively associated with individual springs of the inner spring assembly, said plurality of core members adapted to additively contribute to the resistance to compression of springs in the area.
2. The inner spring mattress of Claim 1 in
10 which each of said plurality of core members is located within the convolutions of its associated spring.
3. The inner spring mattress of Claim 1 in which each of said plurality of core members is located within and coaxial to an individual spring unit.
- 15 4. The inner spring mattress of Claim 1 in which said plurality of core members are made of urethane foam having a density of approximately 2 pounds per cubic foot and a compression of 12.0 psi at 50% deformation.
- 20 5. A mattress comprising:
an inner spring assembly having a top side and a bottom side, and a plurality of interconnected individual coil springs;
a plurality of resilient core members located
25 within the convolutions of selected coil springs, and
a covering material surrounding said inner spring assembly.

- 10 -

6. The mattress of Claim 5 in which each of said plurality of core members is comprised of a cylindrically-shaped piece of elastomeric material.

5 7. The mattress of Claim 5 in which said plurality of core members are selectively located in springs located around the perimeter of said inner spring assembly.

10 8. The mattress of Claim 5 in which said plurality of core members are selectively located in individual springs in the region of the mattress corresponding to a lumbar region of a person lying thereupon.

15 9. The mattress of Claim 5 in which said plurality of core members are located in alternating adjacent individual springs in a region of the mattress.

10. An inner spring assembly for a mattress comprising:

20 a plurality of coil spring, each coil spring having a top end, a bottom end and an axis, and adapted for use in a mattress so that said coil springs deflect in a direction from said top end toward said bottom end when a compressive load is applied to a top side of the mattress;

25 a resilient core members adapted to cooperate with selected coil springs, each of said core members extending from approximately said top end to said bottom end of an associated coil spring and coaxial with said spring.

- 11 -

11. The inner spring assembly of Claim 10 in which each of said core members has a length slightly less than the length of its associated coil spring, whereby compression of the inner spring assembly is resisted initially by said one coil spring and then by both said coil spring and said core member.

12. The inner spring assembly of Claim 10 in which each of said core members has a diameter slightly less than the diameter of its associated coiled spring, whereby to facilitate construction friction between said core member and said one coiled spring unit is minimized.

13. A method of constructing an inner spring mattress having an area of enhanced firmness, comprising the steps of:

- providing an inner spring assembly having a plurality of coil springs; and
- installing resilient core members within the convolutions of selected coil springs of the inner spring assembly, the selected coil springs corresponding to the desired area of enhanced firmness.

1/2

FIG 1

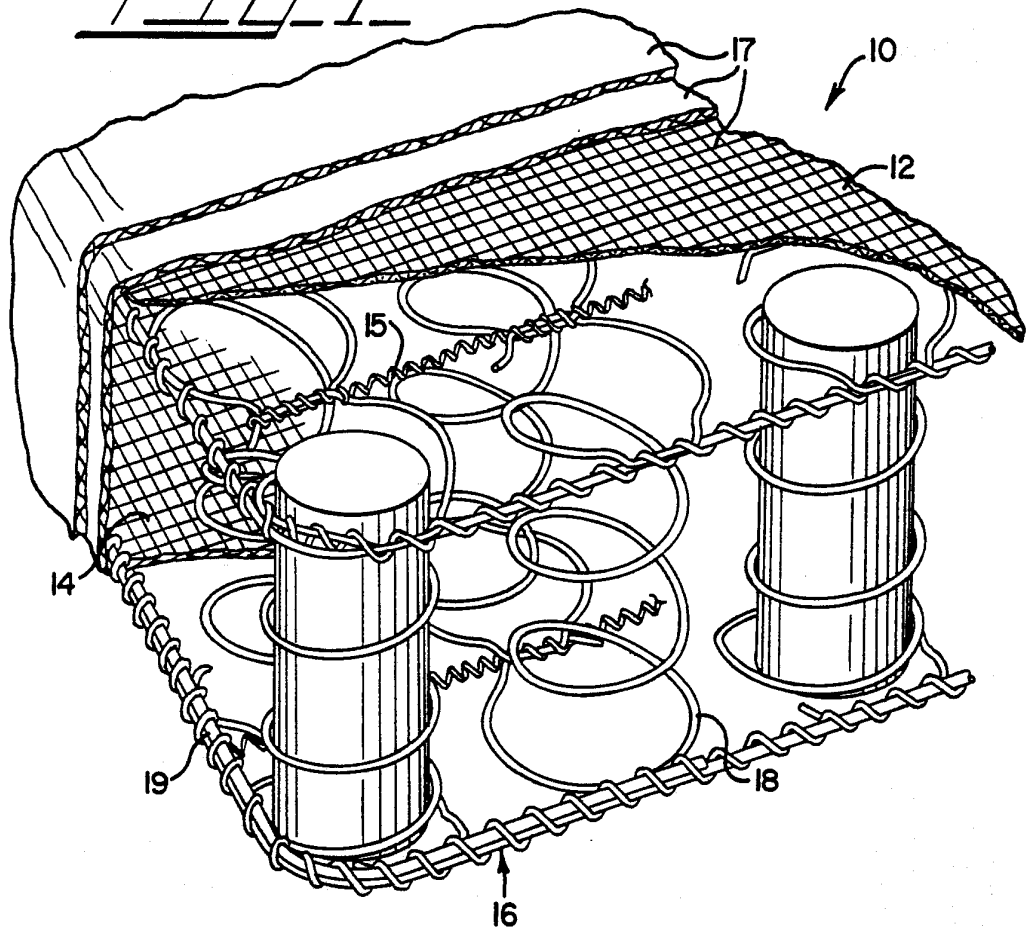


FIG 2

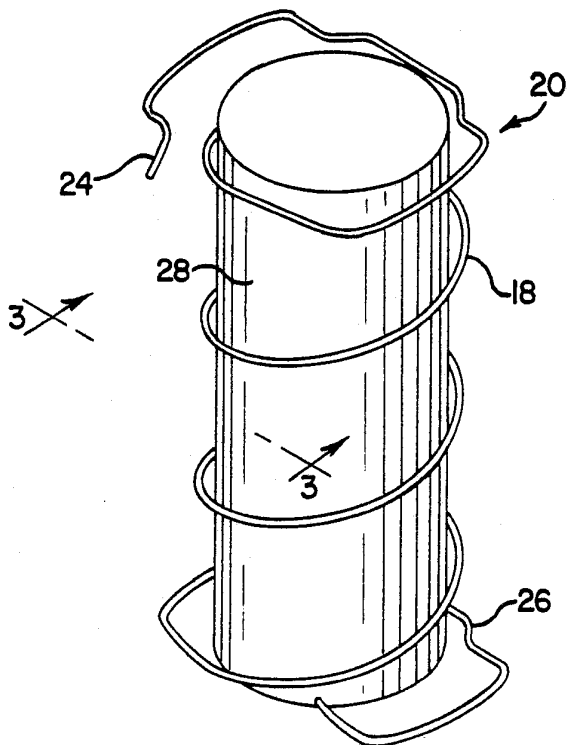
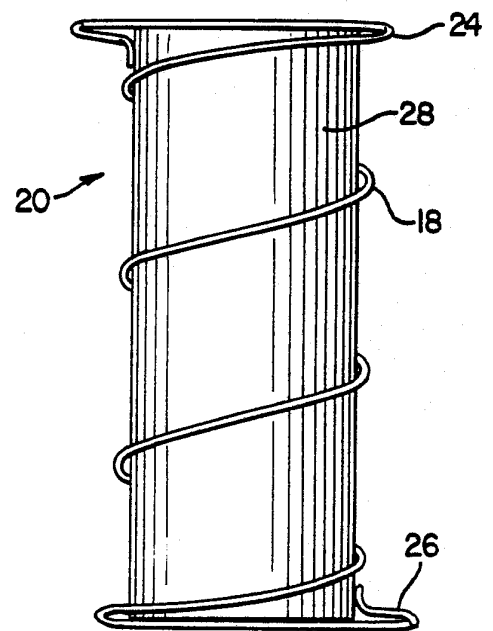


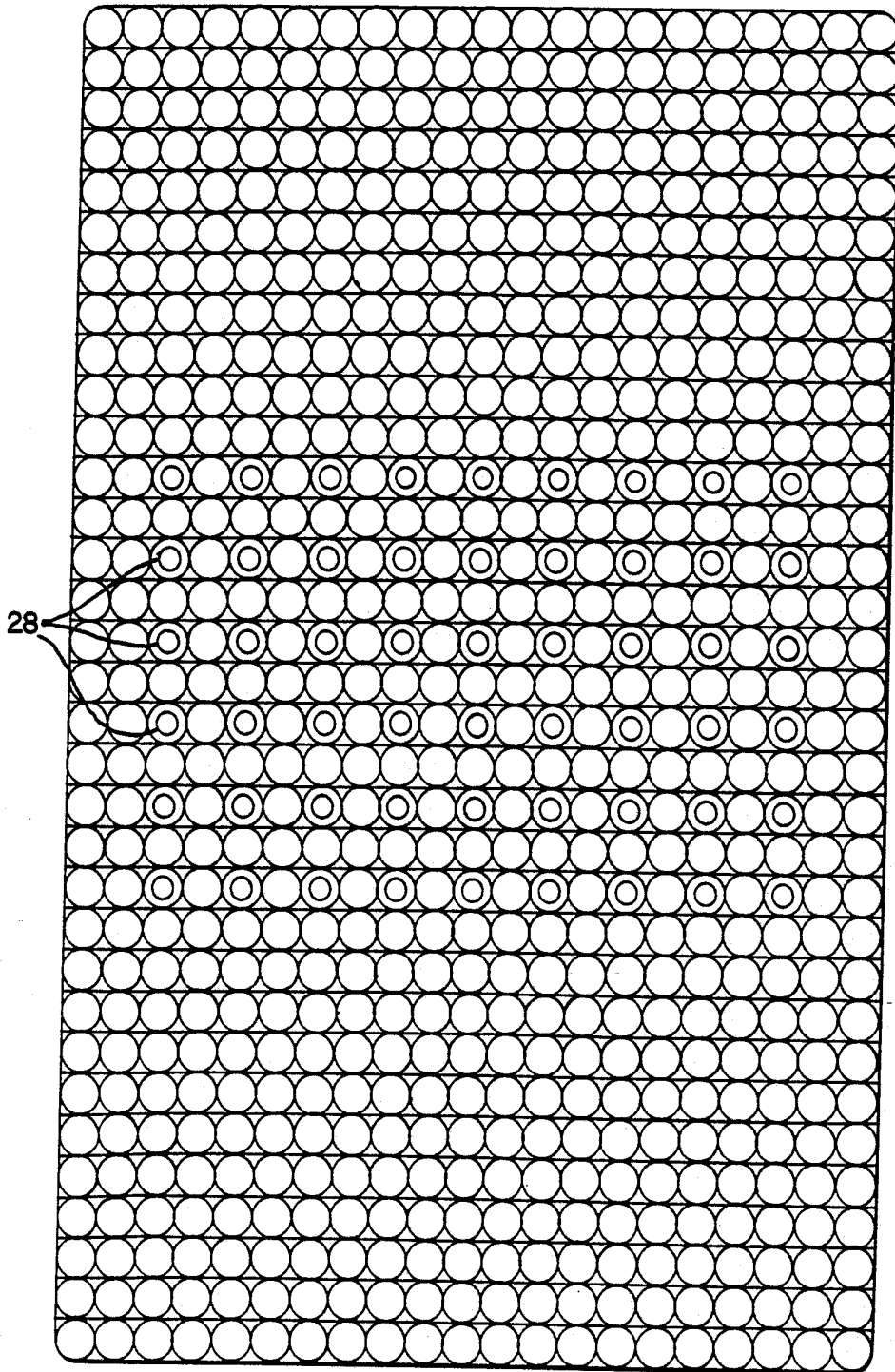
FIG 3



2/2

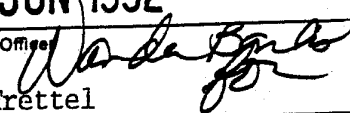
FIG. 4

42



INTERNATIONAL SEARCH REPORT

International Application No. PCT/US92/02283

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		
IPC(5) A47C 27/04		
II. FIELDS SEARCHED		
Minimum Documentation Searched ⁷		
Classification System	Classification Symbols	
U.S.	5/253, 261, 305, 475, 476, 477 267/85, 93	
Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in the 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
<u>X</u>	US, A 3,145,020 (Calla) 18 August 1964	<u>1-3,5-10,11,13</u>
<u>Y</u>	Read the entire document, see Figure 6.	4
A,P	US, A 5,020,852 (Marion) 04 June 1991	
A	US, A 3,401,411 (Morrison) 17 September 1968	
A	US, A 4,519,107 (Dillon et al) 28 May 1985	
<p>[*] Special categories of cited documents: ¹⁰</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> <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>"&" document member of the same patent family</p>		
IV. CERTIFICATION		
Date of the Actual Completion of the International Search	Date of Mailing of this International Search Report	
21 May 1992	17 JUN 1992	
International Searching Authority	Signature of Authorized Officer	
ISA/US	 Michael F. Trettel	

FURTHER INFORMATION CONTINUED FROM THE SECOND SHEET

V. OBSERVATIONS WHERE CERTAIN CLAIMS WERE FOUND UNSEARCHABLE ¹

This international search report has not been established in respect of certain claims under Article 17(2) (a) for the following reasons:

1. Claim numbers _____, because they relate to subject matter ¹² not required to be searched by this Authority, namely:

2. Claim numbers _____, because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out ¹³, specifically:

3. Claim numbers _____, because they are dependent claims not drafted in accordance with the second and third sentences of PCT Rule 6.4(a).

VI. OBSERVATIONS WHERE UNITY OF INVENTION IS LACKING ²

This International Searching Authority found multiple inventions in this international application as follows:

1. As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims of the international application.

2. As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims of the international application for which fees were paid, specifically claims:

3. No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claim numbers:

4. As all searchable claims could be searched without effort justifying an additional fee, the International Searching Authority did not invite payment of any additional fee.

Remark on Protest

The additional search fees were accompanied by applicant's protest.

No protest accompanied the payment of additional search fees.