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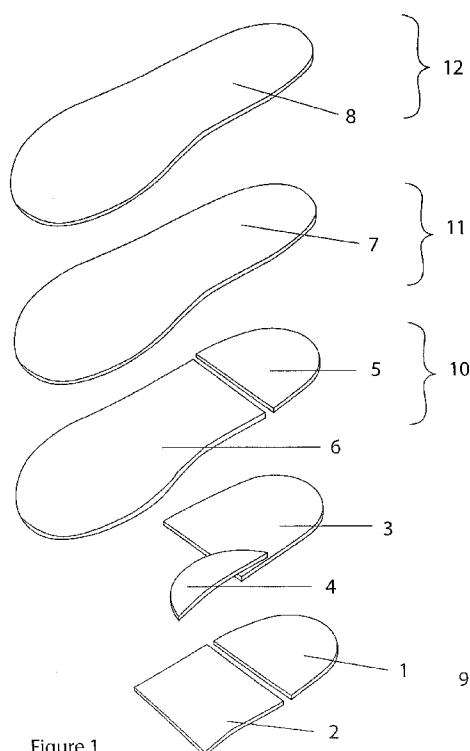
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(54) **Title:** PRESSURE OFFLOADING INSOLE WITH ADJUSTABLE ARCH SUPPORT



(57) **Abstract:** The present invention relates to the engineering of insole; more specifically insole with two dominant properties of offloading pressure in one particular area, and providing automatically adjustable arch support. The present invention is configured to provide sufficient support and overall pressure distribution for foot regardless of whether the wearer's foot is over-pronated, under-pronated, or neutral.

PRESSURE OFFLOADING INSOLE WITH ADJUSTABLE ARCH SUPPORT

Technical Field

The present invention relates to the engineering of insole; more specifically insole with two dominant properties of offloading pressure in one particular area, and providing automatically adjustable arch support. The present invention is configured to provide sufficient support and overall pressure distribution for foot regardless of whether the wearer's foot is over-pronated, under-pronated, or neutral.

Background Of The Invention

Foot is an essential part of the body that allows us to complete essential activities in our lives such as walking, running, travelling, etc. Considering its significance, selecting the right insole for one's foot to ensure comfort, absence of physical affliction, and proper support and reinforcement of the arches and other regions of the foot is compulsory.

There are currently a number of footwear insoles being offered in the market; thus far, majority of these inventions or products critically fail to provide adequate support for the foot especially to the arches of foot. Because each person's arches are of particular height, shape, and form, almost all insoles available are either of incorrect or non-adjustable height, shape, and/or form, resulting in the following problems:

1. When arch support is formed too high for the arch of the wearer's foot, it tends to prod excessively into the arch of the foot of the wearer for each and every step walked, causing pain and discomfort when walking or running.
2. When arch support is formed too low for the arch of the wearer's foot, it is not capable of properly providing sufficient support for the arch of the foot, the wearer then would walk on a rather flat insole, suffering from foot strains.

In addition to automatically adjustable arch support, the present invention allows pressure to distribute evenly across all areas of foot through different layers or well-engineered structure of pressure distributing materials. Thus, the insole is configured to support each and every part of the foot.

Hence, the present invention is formulated to address these issues. The present invention comprises flexible, resilient, and spongy materials in arch region and various other force absorption and distribution materials composing in different areas of said insole.

Upon being compressed by the weight of the wearer, the force exerted upon the foot will be distributed across the foot, lessening any pain occurring after a long walk; while the flexible, resilient, and spongy materials acting as an arch support will adjust itself according to the shape of each individual's foot. As a result, the arch of the wearer is properly and sufficiently supported without any pains or discomfort.

Summary Of The Invention

Under this section, the concept of the present invention is introduced, aiming to highlight the main features of the present invention and its assembly method. Further detail will be elaborated under detailed description of the invention section. This is for the purpose of raising an example to give a better understanding of the invention, and not intending to define or limit the scope of the invention.

The insole comprises various layers of force absorption and distribution materials as well as arch support material.

Arch support comprises flexible, resilient, and spongy materials in between layers of force absorption and distribution materials to ensure proper support of the arch of the foot and overall comfort while wearing. Arch support will be located in the arch area of the wearer's foot in between different layers of force absorption and distribution materials.

While, shock absorption and distribution materials are of different thickness, shapes, and sizes. They are placed at different areas of the foot based on its main functions and purposes.

Brief Descriptions Of The Drawings

For the purpose of illustrating and describing the present invention, it is best to review detailed description of the drawings and the drawings hand in hand for comprehensive understanding. In spite of the description and details of the present invention, it is not meant to confine or limit scope, materials, or methods of the present invention by any means.

Figure. 1 shows components of insole with automatically adjustable arch support

Figure. 2 shows side-view of insole with automatically adjustable arch support

Detailed Description Of The Invention

Detailed description of the drawing is will be described under this section for a comprehensive understanding of the invention and the drawings. Numerations in correspondence with the drawings are referred to in the detailed description of the invention to clearly indicate certain parts and depicting a clearer concept only, and not for confining or limiting the scope of the invention in any way.

Figure. 1 shows components of pressure offloading insole with automatically adjustable arch support. The present invention comprises force distribution material at heel region (1), flexible, resilient, and spongy material in the mid-foot region (2), wedge (3), flexible, resilient, and spongy arch support (4), force absorption material at heel region (5), force absorption material at forefoot to mid-foot region (6), force distribution material (7), and sock lining (8).

Force distribution material at heel region (1) and flexible, resilient, and spongy material in the mid-foot region (2) are located at the base layer of the insole (9). A wedge (3) is placed on top of the base layer of the insole using glue or any device capable of attaching them together. Flexible, resilient, and spongy arch support (4) is placed on top of the wedge (3) using glue or any device capable of attaching them together. Force absorption material at heel region (5) and force absorption material at forefoot to mid-foot region (6) are located in the mid-layer of the insole (10). Force distribution material (7) is located under the top layer of the insole (11). Lastly, sock lining (8) is placed on the top of the insole (12).

Force distribution material at heel region (1) assists with supporting and distributing any pressure exerted on the heel region while walking lessening pain occurring from walking.

Flexible, resilient, and spongy material in the mid-foot region (2) assists with filling, shaping and supporting mid-foot area of the wearer. The material makes it possible to adjust to feet of different shapes and forms.

A wedge (3) function is also made of shock distributing material. Its main function is to distribute the weight exerted on the heel region towards mid-foot region to alleviate pressure from one particular spot.

Flexible, resilient, and spongy arch support (4) is generally made of high-density foam. It works as a mold for each wearer's feet. It is located on the arch area of the insole, adjusting itself to different foot shapes and forms. With the help of flexible, resilient, and spongy material in the mid-foot region (2) in the base layer (9), they work together to push up, fill, and ensure maximum support at the arch and the mid-foot area of the wearer.

Force absorption material at heel region (5) works to absorb any shock exerted on the heel region before the force gets distributed in other areas of the foot.

Force absorption material at forefoot to mid-foot region (6) works to absorb any shock exerted on the forefoot to mid-foot region. The material used is of different hardness than force absorption material at heel region (5). Generally it tends to be of lesser hardness, making it softer. The forepart of the insole will then provide a softer sensation when walking and sufficient support as the ball of foot is highly susceptible to pain affliction from shock exertion.

Force distribution material (7) is located under the top layer of the insole (11). It works to absorb any immediate shock exerted on the foot before distributing it over to other force offloading materials configured within the insole. Because of the nature of the material, it will also provide footprint effect where each individual's wearer will have their tailored insole after wearing it for some time as this material memorizes the under-foot shape of the wearer.

Finally sock lining (8) is placed on the top of the insole (12). It comprises leather, PU, fabric or other material capable of making the finished look of the insole decent and presentable.

All of these components are attached together using glue, lamination or any means capable of attaching them together in the said arrangement.

Figure. 2 shows side-view of pressure offloading insole with automatically adjustable arch support

Side view of pressure offloading insole with automatically adjustable arch support comprises force distribution material at heel region (1), flexible, resilient, and spongy material in the mid-foot region (2), wedge (3), flexible, resilient, and spongy arch support (4), force absorption material at heel region (5), force absorption material at forefoot to mid-foot region (6), force distribution material (7), and sock lining (8).

Commencing from the top, sock lining (8) is attached on top of force distribution material (7) by any means capable of attaching them together. Force distribution material (7) is located on top of two force absorption materials: force absorption material at heel region (5), force absorption material at forefoot to mid-foot region (6). Force distribution material (7), force absorption material at heel region (5), force absorption material at forefoot to mid-foot region (6) are attached to one another by means of glue, lamination, or other devices capable of attaching them together. Force absorption material at heel region (5), force absorption material at forefoot to mid-foot region (6) are also connected via glue, lamination or any means capable of attaching them together. Flexible, resilient, and spongy arch support (4) is attached under force absorption material at forefoot to mid-foot region (6) in the mid-foot region where the arch of the foot is. The wedge (3) is then placed underneath force absorption material at heel region (5) and its other edge will overlap under flexible, resilient, and spongy arch support (4). Force distribution material at heel region (1) is attached under the wedge in the heel region. Flexible, resilient, and

spongy material in the mid-foot region (2) is attached under some part of the wedge (3), next to force distribution material at heel region (1) and part of it under flexible, resilient, and spongy arch support (4).

All of the attachment required to assembly these component together can be done by using glue,
5 lamination, or any means capable of holding and assembling these components together.

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Claims

1) A insole comprising:

an insole comprises different layers of pressure offloading and automatically adjustable arch support;

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2) The insole of claim 1, wherein force distribution material at heel region is incorporated therein.

3) The insole of claim 1, wherein flexible, resilient, and spongy material in the mid-foot region is incorporated therein.

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4) The insole of claim 1, wherein a wedge is incorporated therein.

5) The insole of claim 1, wherein a flexible, resilient, and spongy arch support is incorporated therein.

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6) The insole of claim 1, wherein force absorption material at heel region is incorporated therein.

7) The insole of claim 1, wherein force absorption material at forefoot to mid-foot region is incorporated therein.

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8) The insole of claim 1, wherein force distribution material is incorporated therein.

9) The insole of claim 1, wherein sock lining is incorporated therein.

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10) The insole of claim 1, wherein all components are attached together via the use of glue, lamination, or other devices capable of attaching them together.

11) The insole of claim 1, wherein sock lining is attached on top of all layers.

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12) A method of assembling the insole comprising:

Attaching sock lining on top of force distribution material by any means capable of attaching them together;

Attaching force distribution material on top of two force absorption materials: force absorption material at heel region and force absorption material at forefoot to mid-foot region;

Attaching force distribution material, force absorption material at heel region, force absorption material at forefoot to mid-foot region to one another using glue, lamination, or other devices

5 capable of attaching them together.

Attaching force absorption material at heel region, force absorption material at forefoot to mid-foot region via glue, lamination or any means capable of attaching them together.

Attaching flexible, resilient, and spongy arch support under force absorption material at forefoot to mid-foot region in the mid-foot region where the arch of the foot is.

10 Attaching the wedge underneath force absorption material at heel region and its other edge will overlap under flexible, resilient, and spongy arch support.

Attaching force distribution material at heel region under the wedge in the heel region;

Attaching flexible, resilient, and spongy material in the mid-foot region under the wedge extending under flexible, resilient, and spongy arch support, adjacent to force distribution

15 material at heel region.

13) A insole comprising:

An insole comprises different layers of pressure offloading and automatically adjustable arch support;

20 Wherein force distribution material at heel region is incorporated therein;

Wherein flexible, resilient, and spongy material in the mid-foot region is incorporated therein;

Wherein a wedge is incorporated therein;

Wherein a flexible, resilient, and spongy arch support is incorporated therein;

Wherein force absorption material at heel region is incorporated therein;

25 Wherein force absorption material at forefoot to mid-foot region is incorporated therein;

Wherein force distribution material is incorporated therein;

Wherein sock lining is incorporated therein;

Wherein all components are attached together via the use of glue, lamination, or other devices capable of attaching them together;

30 Wherein sock lining is attached on top of all layers;

14) The insole of claim 13, force distribution material at heel region assists with supporting and distributing any pressure exerted on the heel region while walking lessening pain occurring from walking.

15) The insole of claim 13, flexible, resilient, and spongy material in the mid-foot region assists with filling, shaping and supporting mid-foot area of the wearer. The material makes it possible to adjust to feet of different shapes and forms.

5 16) The insole of claim 13, a wedge is also made of shock distributing material. Its main function is to distribute the weight exerted on the heel region towards mid-foot region to alleviate pressure from one particular spot.

10 17) The insole of claim 13, flexible, resilient, and spongy arch support is generally made of high-density foam. It works as a mold for each wearer's feet. It is located on the arch area of the insole, adjusting itself to different foot shapes and forms. With the help of flexible, resilient, and spongy material in the mid-foot region in the base layer, they work together to push up, fill, and ensure maximum support at the arch and the mid-foot area of the wearer.

15 18) The insole of claim 13, force absorption material at heel region works to absorb any shock exerted on the heel region before the force gets distributed in other areas of the foot.

20 19) The insole of claim 13, force absorption material at forefoot to mid-foot region works to absorb any shock exerted on the forefoot to mid-foot region. The material used is of different hardness than force absorption material at heel region. Generally it tends to be of lesser hardness, making it softer. The forepart of the insole will then provide a softer sensation when walking and sufficient support as the ball of foot is highly susceptible to pain affliction from shock exertion.

25 20) The insole of claim 13, force distribution material is located under the top layer of the insole. It works to absorb any immediate shock exerted on the foot before distributing it over to other force offloading materials configured within the insole. Because of the nature of the material, it will also provide footprint effect where each individual's wearer will have their tailored insole after wearing it for some time as this material memorizes the under-foot shape of the wearer.

30 21) The insole of claim 13, sock lining is placed on the top of the insole. It comprises leather, PU, fabric or other material capable of making the finished look of the insole decent and presentable.

22) The insole further comprises:

said force distribution material at heel region comprises EVA or any sort of similar materials with the same or similar property;

- 5 said flexible, resilient, and spongy material in the mid-foot region comprises low density foam or any sort of similar materials with the same or similar property;

said wedge comprises sloped EVA or any sort of similar materials with the same or similar property;

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said a flexible, resilient, and spongy arch support comprises high density memory foam or any sort of similar materials with the same or similar property;

- 15 said force absorption material at heel region comprises mid density to high density EVA or any sort of similar materials with the same or similar property;

said force absorption material at forefoot to mid-foot region comprises mid density to low density EVA or any sort of similar materials with the same or similar property;

- 20 said force distribution material comprises EVA or any sort of similar materials with the same or similar property;

said sock lining comprises leather, PU, fabric or any sort of similar materials with the same or similar property;

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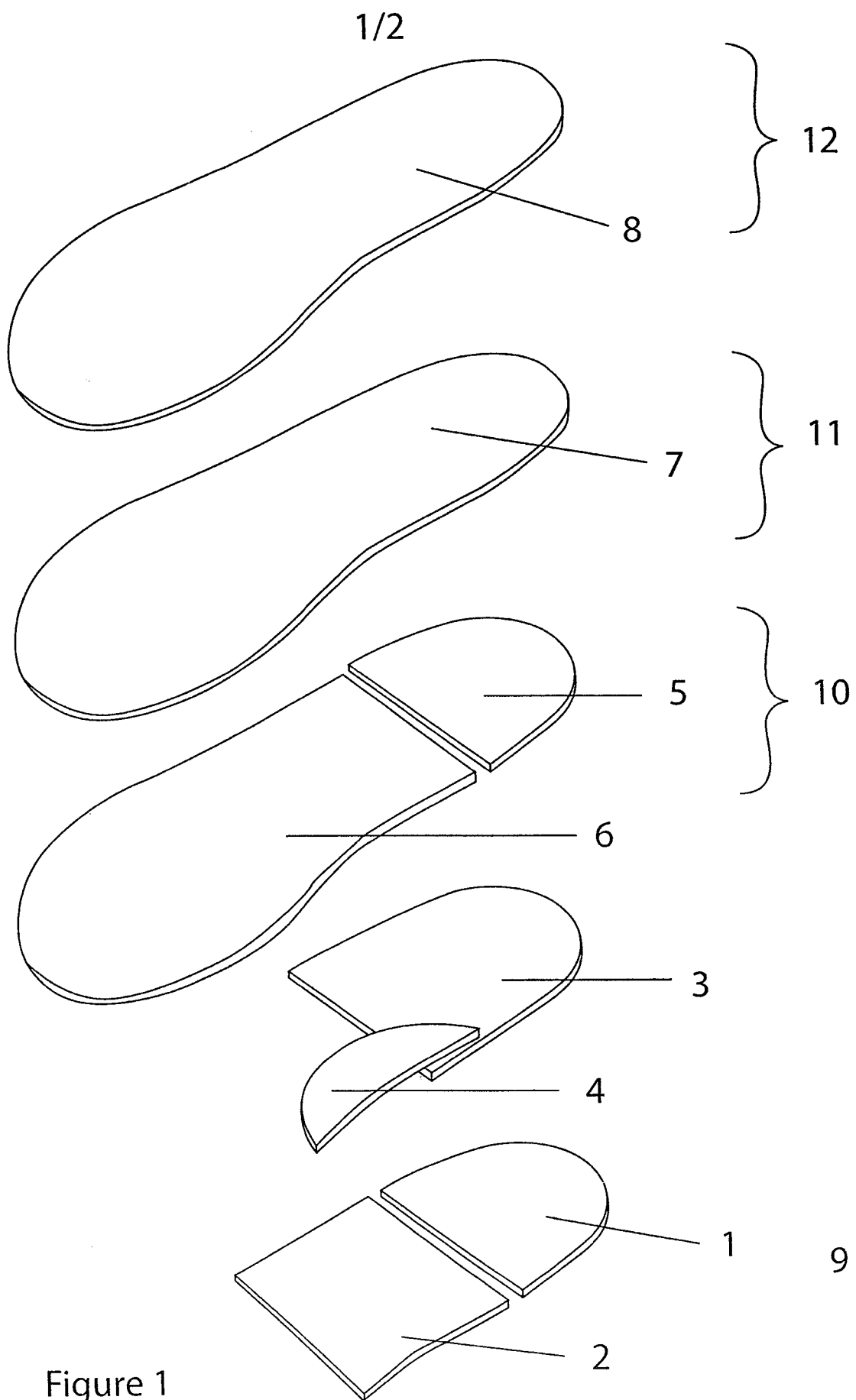


Figure 1

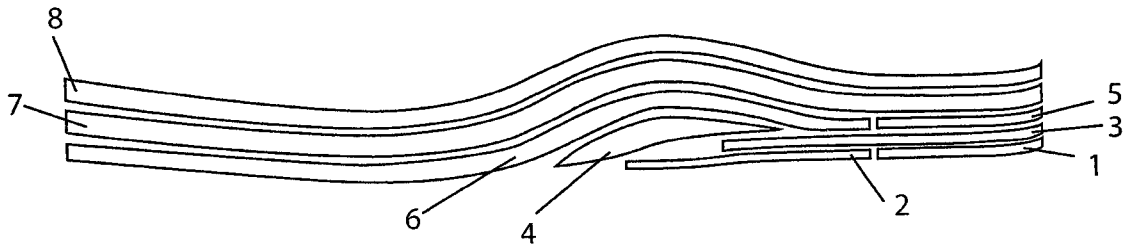


Figure 2

INTERNATIONAL SEARCH REPORT

International application No.

PCT/TH2015/000074

A. CLASSIFICATION OF SUBJECT MATTER

Int.Cl. A43B17/00 (2006.01) i, A43B17/14 (2006.01) i

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

Int.Cl. A43B17/00, A43B17/14

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Published examined utility model applications of Japan 1922-1996
 Published unexamined utility model applications of Japan 1971-2016
 Registered utility model specifications of Japan 1996-2016
 Published registered utility model applications of Japan 1994-2016

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	JP 2000-116407 A (MATSUOKA, Hironori)	1, 3, 5-6
Y	2000.04.25, paragraphs [0008]-[0014], Figs.1-3 (Family: none)	2, 4, 7-22
Y	US 2007/0107261 A1 (CHESKIN, Melvyn P.) 2007.05.17, paragraphs [0016]-[0026], Figs.1-9 & JP 2009-514599 A & WO 2007/056101 A1 & EP 1942761 A & KR 10-2008-0066981 A & CA 2628057 A1 & CN 101299942 A	2, 4, 7-22
Y	JP 2001-204504 A (TAIHEIYOU SEIKA CORP.) 2001.07.31, paragraph [0017], Fig.5 (Family: none)	20, 22



Further documents are listed in the continuation of Box C.



See patent family annex.

* Special categories of cited documents:

“A” document defining the general state of the art which is not considered to be of particular relevance

“E” earlier application or patent but published on or after the international filing date

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“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 when the document is taken alone

“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

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