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(51) International Classifications: H01L 23/36

(54) Title: HEAT SINK ARRANGEMENT

(57) Abstract: According to an exemplary embodiment of the invention, a heat sink arrangement 100 is disclosed. The heat sink arrangement 100 may comprise of a heat sink 102. The heat sink 102 may include a plurality of fins 104 and a base 106. According to an embodiment, a two arms 108 may extend from the base 106 of the heat sink 102 such that each arm 108 may have at least one groove 110. According to an embodiment, the heat sink arrangement 100 may further comprise of a clip 112 to hold a heat generating component 118 to the heat sink 102. The clip 112 may have two ends 114 and a central portion 116 and may be arranged in such a manner that one end of the clip 112 may be accommodated in one of the grooves 110 on one of the arms 108 of the heat sink 102.

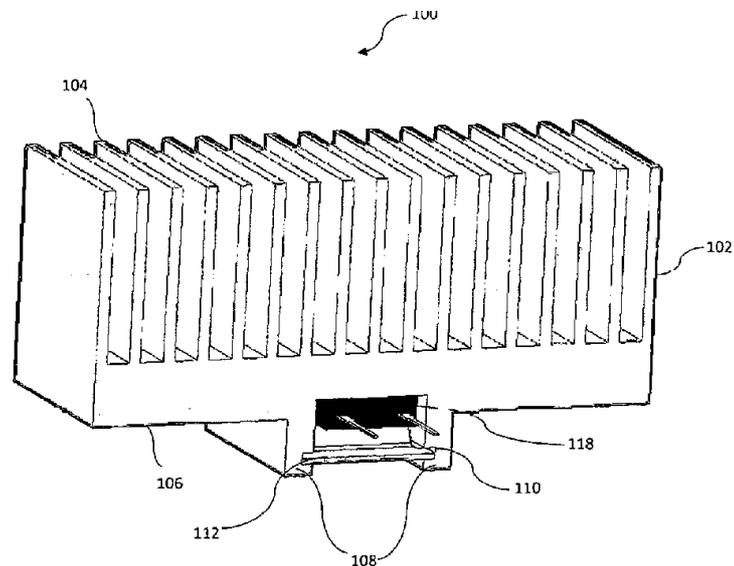
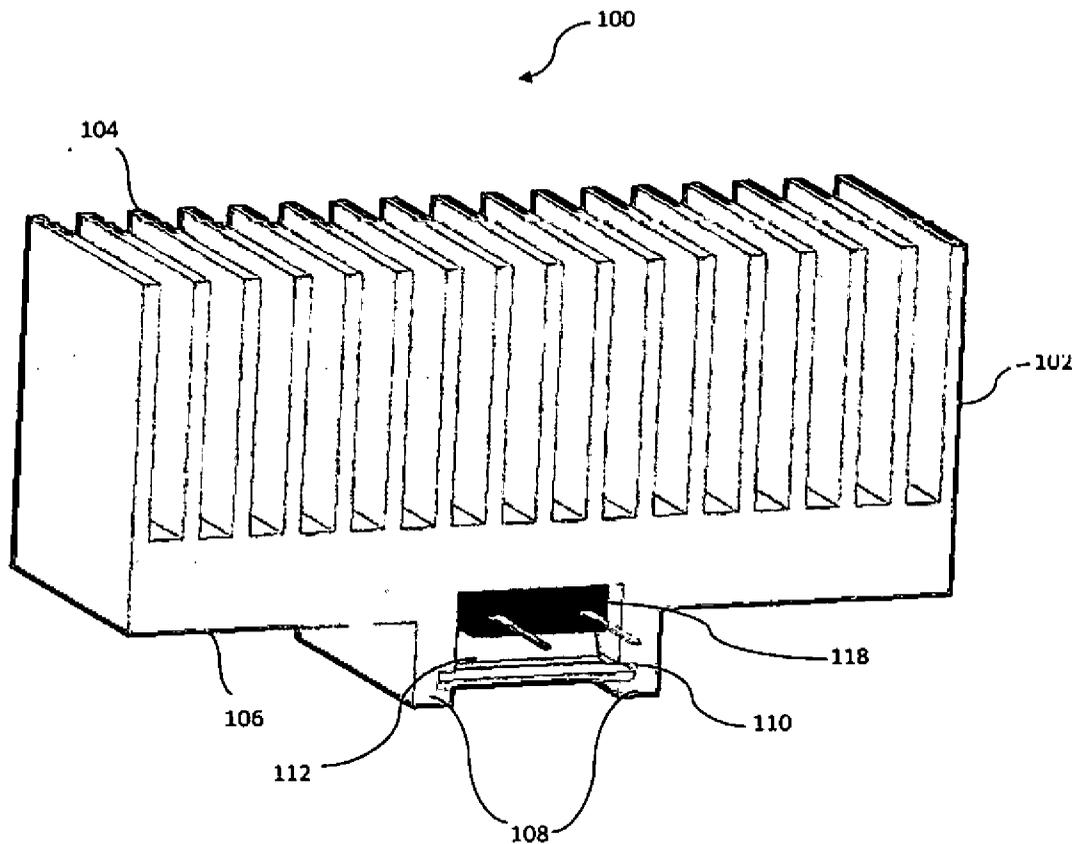


Figure 1

ABSTRACT

Heat sink arrangement

According to an exemplary embodiment of the invention, a heat sink arrangement 100 is disclosed. The heat sink arrangement 100 may include a heat sink 102. The heat sink 102 may include a plurality of fins 104 and a base 106. The heat sink 102 may further include two arms 108 extending from the base 106 of the heat sink 102 where each arm 108 may have at least one groove 110. The heat sink arrangement 100 may further include a clip 112 having two ends 114 and a central portion 116. The clip 112 and the heat sink 102 may be arranged in such a manner that each end 114 of the clip 112 may accommodate in one groove 110 on each arm 108 of the heat sink 102.



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We claim:



1. A heat sink arrangement 100 comprising:

a heat sink 102 having a plurality of fins 104 and a base 106, wherein the heat sink 102 have two arms 108 extending from the base 106, each arm 108 having at least one groove 110; and

a clip 112 having two ends 114 and a central portion 116 such that each end 114 accommodates in one groove 110 on each arm 108.

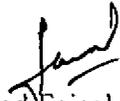
2. The heat sink arrangement 100 as claimed in claim 1, wherein the two arms 108 of the heat sink 102 may be substantially parallel to each other.

3. The heat sink arrangement 100 as claimed in claim 1, wherein the two arms 108 of the heat sink 102 are substantially perpendicular to the base 106 of the heat sink 102.

4. The heat sink arrangement 100 as claimed in claim 1, wherein the shape of the clip 112 is substantially U-shaped.

5. The heat sink arrangement 100 as claimed in claim 1, wherein the central portion 116 of the clip 112 is protruded.

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FIELD OF INVENTION



The invention generally relates to an arrangement for removing heat from a heat generating component and particularly to a heat sink arrangement.

BACKGROUND

To remove heat generated by an electrical heat generating component such as a chip or a processor, a heat sink is used. The heat sink is applied to the heat generating component to dissipate the heat from the heat generating component. The earliest method of securing a heat sink to the heat generating component includes use of several screws traveling through a printed circuit board (PCB). However, it is distinctly inconvenient to use screws to mount or remove the heat sink. Furthermore, an accessory tool is needed to assemble or disassemble the heat sink, which makes the process much more complicated and time consuming.

The conventional arrangement for securing the heat sink to the heat generating component includes an elongated clip separable from the heat sink. The clip is bent by any one of the methods such as bending by a metal rod, CNC machine, die punching etc. and is positioned to press the heat generating component to the heat sink. The precise positioning between the clip and the heat sink is important to attain proper heat transfer from the heat generating component to the heat sink. Clips which are too weak fail to firmly secure the heat sink to the heat generating component. This lowers the efficiency of heat removal. Clips which are too strong can damage the heat generating component. Therefore, it is very difficult to attain a clip which is easy to assemble and has suitable strength to accomplish the desired force on the heat

generating component. PATENT OFFICE CHENNAI 21/03/2018 10:36

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Hence, there is a need for an improved arrangement for effectively securing the heat sink to the heat generating component and achieve proper heat transfer from the heat generating component to the heat sink.

SUMMARY OF THE INVENTION

According to an exemplary embodiment of the invention, a heat sink arrangement is disclosed. The heat sink arrangement may include a heat sink. The heat sink may include a plurality of fins and a base. The heat sink may further include two arms extending from the base of the heat sink. Each arm extending from the base of the heat sink may have at least one groove. The heat sink arrangement may include a clip to hold and press a heat generating component to the heat sink. The heat sink may transfer the heat from the heat generating component to a fluid thereby cooling the heat generating component. The clip may have two ends and a central portion. The clip and the heat sink may be arranged in such a manner that each end of the clip may accommodate in one groove on each arm of the heat sink.

BRIEF DESCRIPTION OF DRAWINGS

Other objects, features, and advantages of the invention will be apparent from the following description when read with reference to the accompanying drawings. In the drawings, wherein like reference numerals denote corresponding parts throughout the several views:

Figure 1 illustrates an isometric view of a heat sink arrangement according to an exemplary

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Figure 2 illustrates a cross sectional view of a heat sink arrangement according to an exemplary embodiment of the invention.

Figure 3 illustrates a front view of a heat sink according to an exemplary embodiment of the invention.

Figure 4 illustrates a top view of a clip according to an exemplary embodiment of the invention.

Figure 5 illustrates a side view of a clip according to an exemplary embodiment of the invention.

DETAILED DESCRIPTION OF DRAWINGS

The following description with reference to the accompanying drawings is provided to assist in a comprehensive understanding of exemplary embodiments. It includes various specific details to assist in that understanding but these are to be regarded as merely exemplary. Accordingly, those of ordinary skill in the art will recognize that various changes and modifications of the embodiments described herein can be made without departing from the scope and spirit of the invention. In addition, descriptions of well-known functions and constructions are omitted for clarity and conciseness.

Figure 1 and Figure 2 illustrates an isometric view and a cross sectional view of a heat sink arrangement 100 respectively according to an exemplary embodiment of the invention. The heat sink arrangement 100 may include a heat sink 102. The heat sink 102 may transfer the

heat from a heat generating component 118 to a fluid such as air or a liquid coolant. The heat generating component 118 may be a mechanical or an electrical component such as, but not limited to chip, processor etc. By way of an example, the heat sink 102 may regulate the temperature of a computer by dissipating the heat generated by central processing unit of the computer. The heat sink 102 may have a plurality of fins 104 and a base 106. Each of the plurality of fins 104 may be a pin shaped or a flat fin. The plurality of fins 104 may be vertically arranged on the base 106 of the heat sink 102. The heat sink 102 may be made of material such as, but not limited to, copper, aluminium etc. According to an embodiment, the heat sink 102 may have two arms 108 extending from the base 106 of the heat sink 102. Each arm 108 extending from the base 106 of the heat sink 102 may include at least one groove 110. The heat sink arrangement 100 may further include a clip 112. The clip 112 may secure the heat generating component 118 to the heat sink 102.

Figure 3 illustrates a front view of the heat sink 102 according to an exemplary embodiment of the invention. The arms 108 extending from the base 106 of the heat sink 102 may be substantially perpendicular to the base 106 of the heat sink 102. The arms 108 on the heat sink 102 may be provided opposite to the fins 104 of the heat sink 102. The height of the arms 108 may be predetermined before manufacturing of the heat sink arrangement 100. The height of the arms 108 may be determined based on the height of the heat generating component 118 to be inserted between the arms of the heat sink 102 and the force to be exerted on the heat generating component 118. According to an embodiment, the arms 108 extending from the base 106 of the heat sink 102 may be substantially parallel to each other. According to another embodiment, the arms 108 of the heat sink may be tapered. It will be apparent to a person skilled in the art that the orientation of the arms 108 may be defined depending on the shape of

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may have at least one groove 110 provided on the internal face of the arms 108 such that the groove 110 on one arm 108 may be substantially opposite to the groove 110 on the other arm 108. For the heat sink 102 having multiple grooves on each arm 108 the grooves 110 may be provided at different heights on each arm 108. The multiple grooves 110 in the heat sink 102 may enable multiple sizes of heat generating components 118 to be secured in the heat sink arrangement 100. Another use of the multiple grooves 110 may be to exert varied pressure on the heat generating component 118.

Figure 4 and Figure 5 illustrates a top view and a side view of the clip 112 according to an exemplary embodiment of the invention. The clip 112 may have two ends 114 and a central portion 116. The clip 112 may have flat ends and arranged within the heat sink 102 in such a manner that each end 114 of the clip 112 may accommodate in one groove 110 on each arm 108 of the heat sink 102. The arrangement of the clip 112 in the heat sink 102 may enable the clip 112 to be inserted or removed from the heat sink 102 as per requirement. The movement of the clip 112 in the grooves 110 of the heat sink 102 may be a sliding movement. According to an embodiment, the clip 112 may be inserted or removed from the grooves 110 manually. According to another embodiment, the clip 112 may be inserted and removed using a mechanical tool. The mechanical tools for insertion and removal of clip 112 may be tools such as, but not limited to, pliers, hammer, wrench etc. According to an embodiment, the shape of the clip 112 may be substantially U-shaped. The central portion 116 of the clip may be protruded with respect to the ends 114 of the clip 112. The central portion 116 of the clip 112 may be in contact with the heat generating component 118. The heat generating component 118 may be placed between the heat sink 102 and the clip 112. The heat from the heat generating component 118 may transfer to the heat sink 102.

It is understood that the above description is intended to be illustrative, and not restrictive. It is intended to cover all alternatives, modifications and equivalents as may be included within the spirit and scope of the invention as defined in the appended claims. Many other embodiments will be apparent to those of skill in the art upon reviewing the above description. The scope of the invention should, therefore, be determined with reference to the appended claims, along with the full scope of equivalents to which such claims are entitled. In the appended claims, the terms "including" and "in which" are used as the plain-English equivalents of the respective terms "comprising" and "wherein," respectively.

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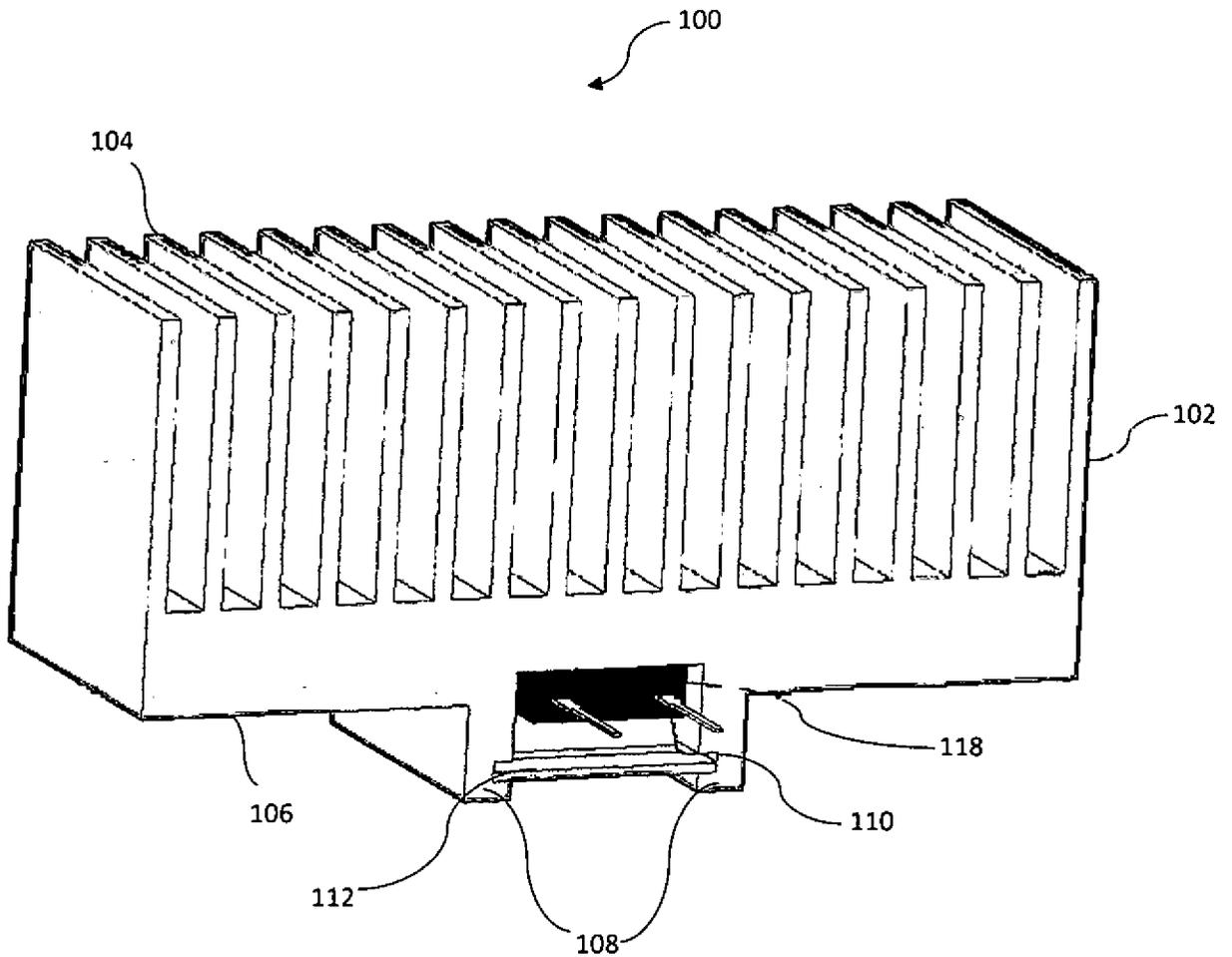
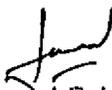


Figure 1


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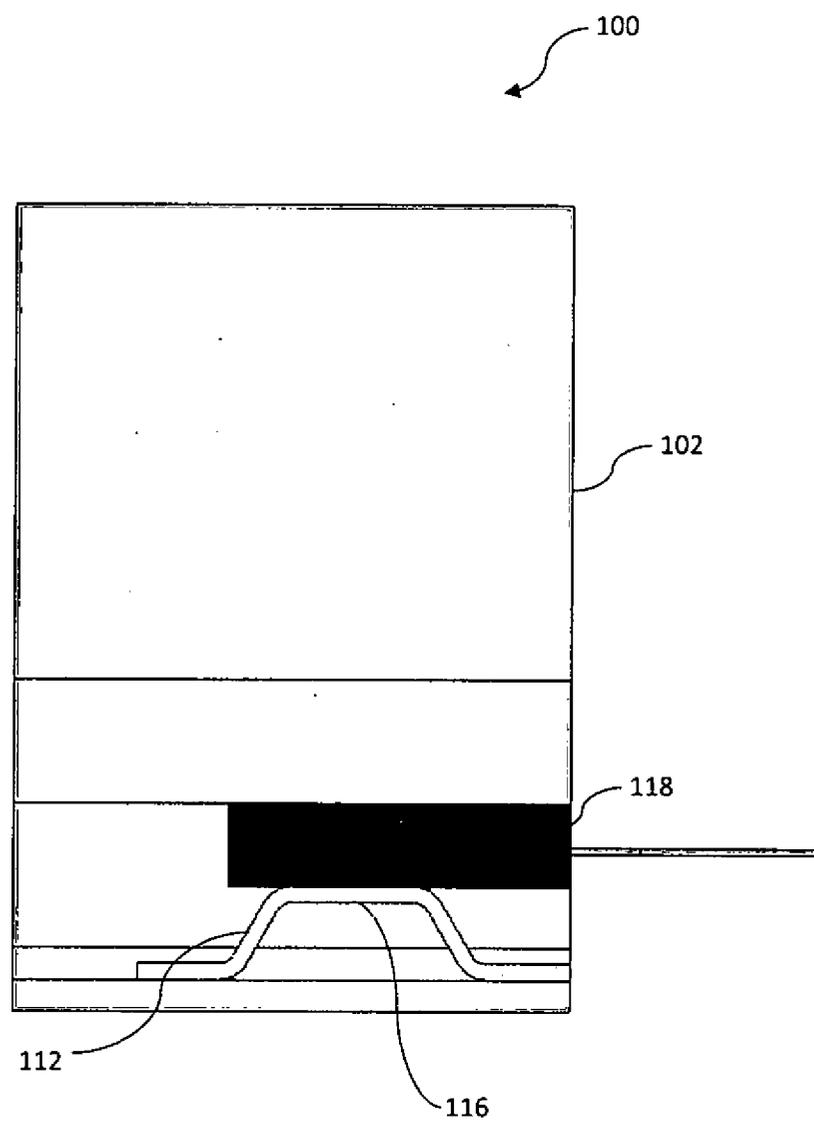


Figure 2

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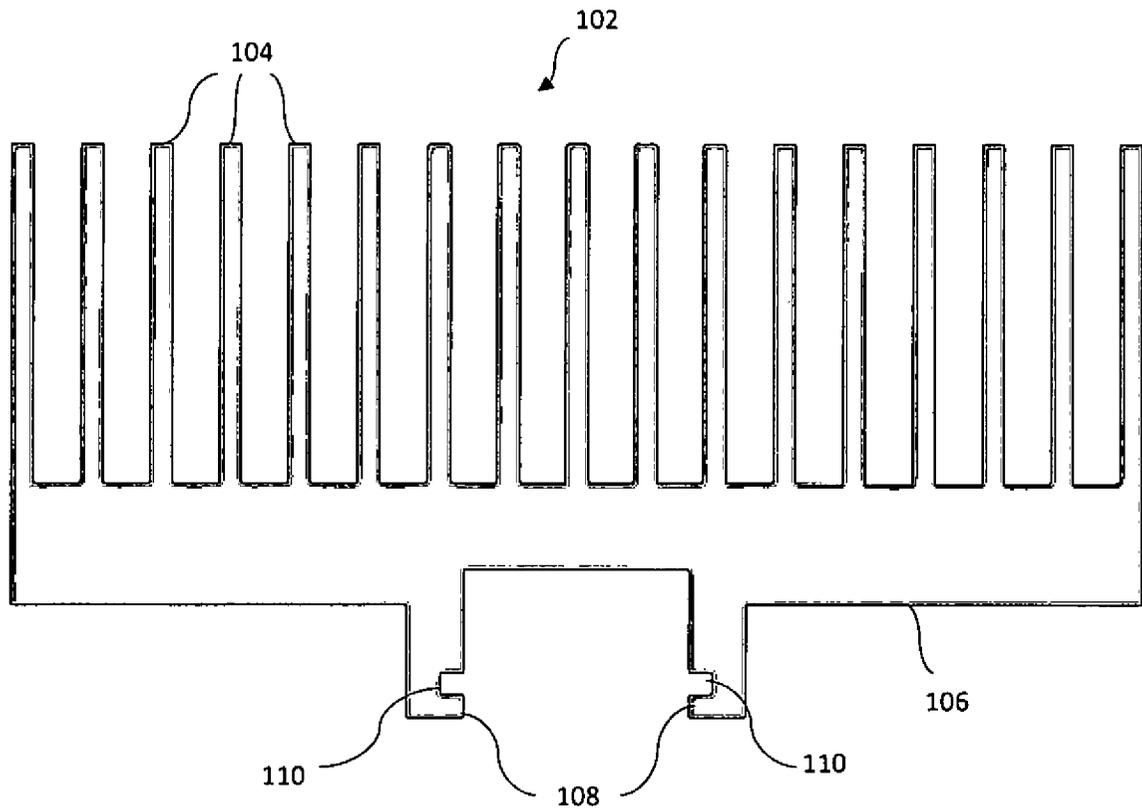


Figure 3

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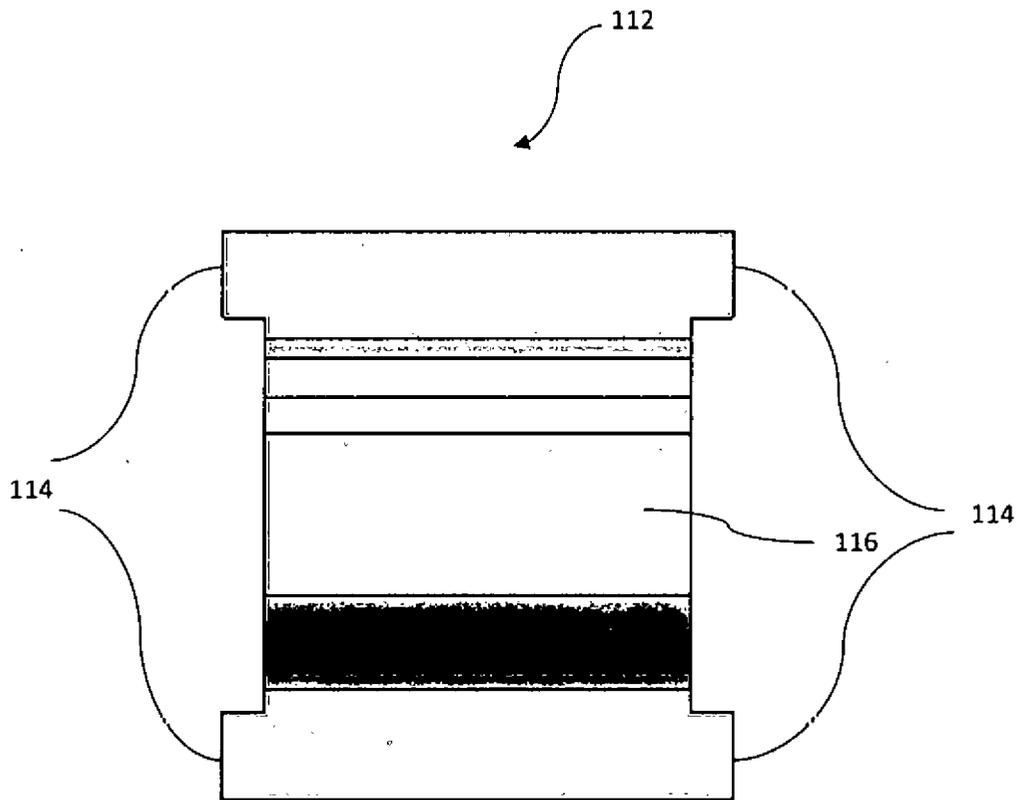
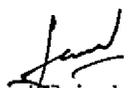


Figure 4


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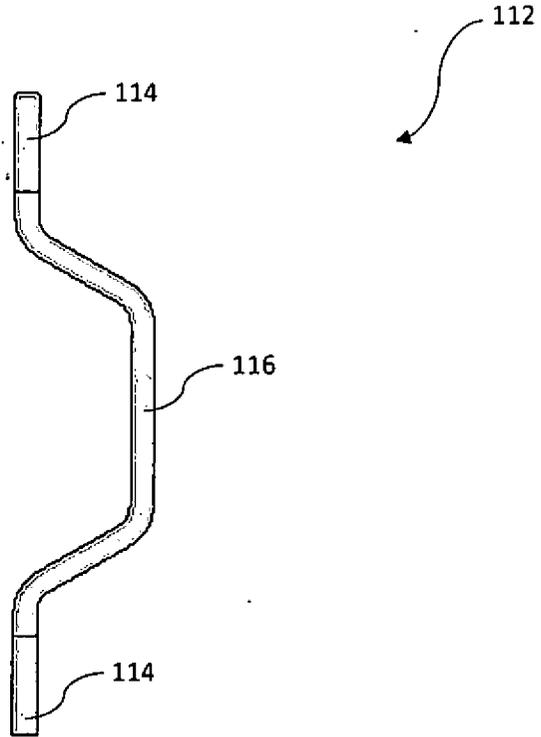
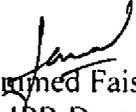


Figure 5


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