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Plotnikov et al.(10) **Pub. No.: US 2023/0230852 A1**(43) **Pub. Date: Jul. 20, 2023**(54) **COLD PLATE MADE VIA 3D PRINTING****Publication Classification**(71) Applicant: **3M INNOVATIVE PROPERTIES COMPANY**, St. Paul, MN (US)(51) **Int. Cl.**
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H01L 23/473 (2006.01)(72) Inventors: **Elizaveta Y. Plotnikov**, Woodbury, MN (US); **Sung W. Moon**, Woodbury, MN (US); **Nicholas A. Proite**, St. Paul, MN (US); **Myron K. Jordan**, Apple Valley, MN (US)(52) **U.S. Cl.**
CPC **H01L 21/4882** (2013.01); **H01L 23/473** (2013.01); **B33Y 80/00** (2014.12)(21) Appl. No.: **18/011,263**(57) **ABSTRACT**(22) PCT Filed: **Jul. 9, 2021**(86) PCT No.: **PCT/IB2021/056185**

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A cold plate having a copper base plate and a plurality of fins on the copper base plate. The fins are porous and made by 3D printing a copper-silver alloy on the copper base plate. Alternatively, the fins can be 3D printed and then adhered to the copper base plate with a brazing material. The copper base plate is placed on electronics to be cooled, such as a chip package, using a thermal interface material. An optional manifold can be placed on the copper base plate for circulating a coolant across the fins.

