

(54) **LOCALIZED BODILY COOLING/HEATING APPARATUS AND METHOD**

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(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 17 days.

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(51) **Int. Cl.**⁷ **A61F 7/00**

(52) **U.S. Cl.** **607/104; 607/108; 607/112**

(58) **Field of Search** 607/104, 107, 607/108-112, 114; 105/46; 219/211, 528

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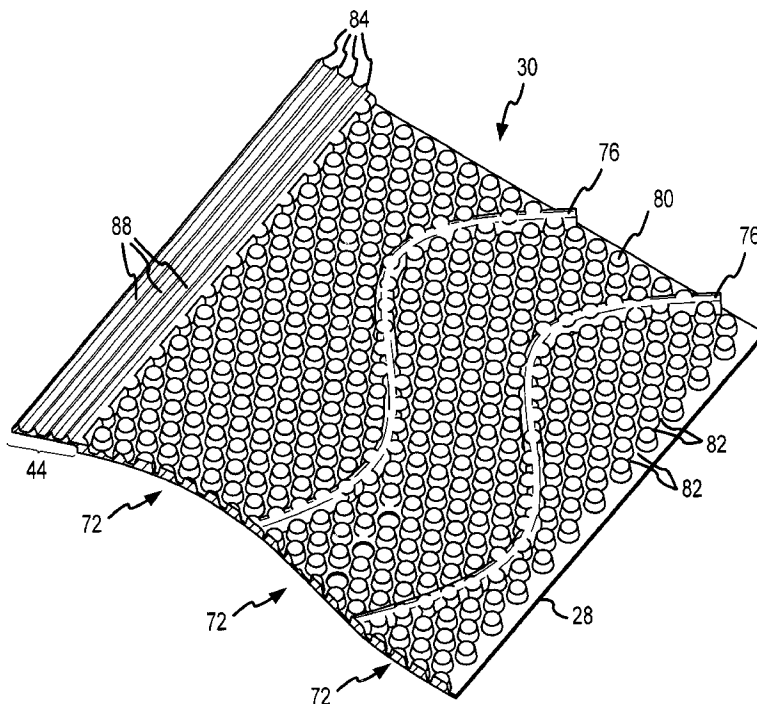
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(57) **ABSTRACT**

The present invention provides for rapid heat transfer with a tissue region of interest (24) by the direct contact of a circulated thermal exchange fluid with the tissue region of interest (24). The tissue region of interest is covered with an appropriately configured flexible membrane (28). A spacing structure maintains a spaced relation between an interior side (30) of the flexible membrane (28) and the tissue region of interest (24) to define a fluid circulation space (34) for fluid flow therebetween. Thermal exchange fluid is drawn into the fluid circulation space (34) through an inlet (60) in the flexible membrane and out of the fluid circulation space (34) through an outlet (64) in the flexible membrane (28) under negative or nearly negative gauge pressure. The fluid directly contacts the tissue region of interest (24), resulting in cooling/heating of the tissue region of interest (24).

47 Claims, 11 Drawing Sheets



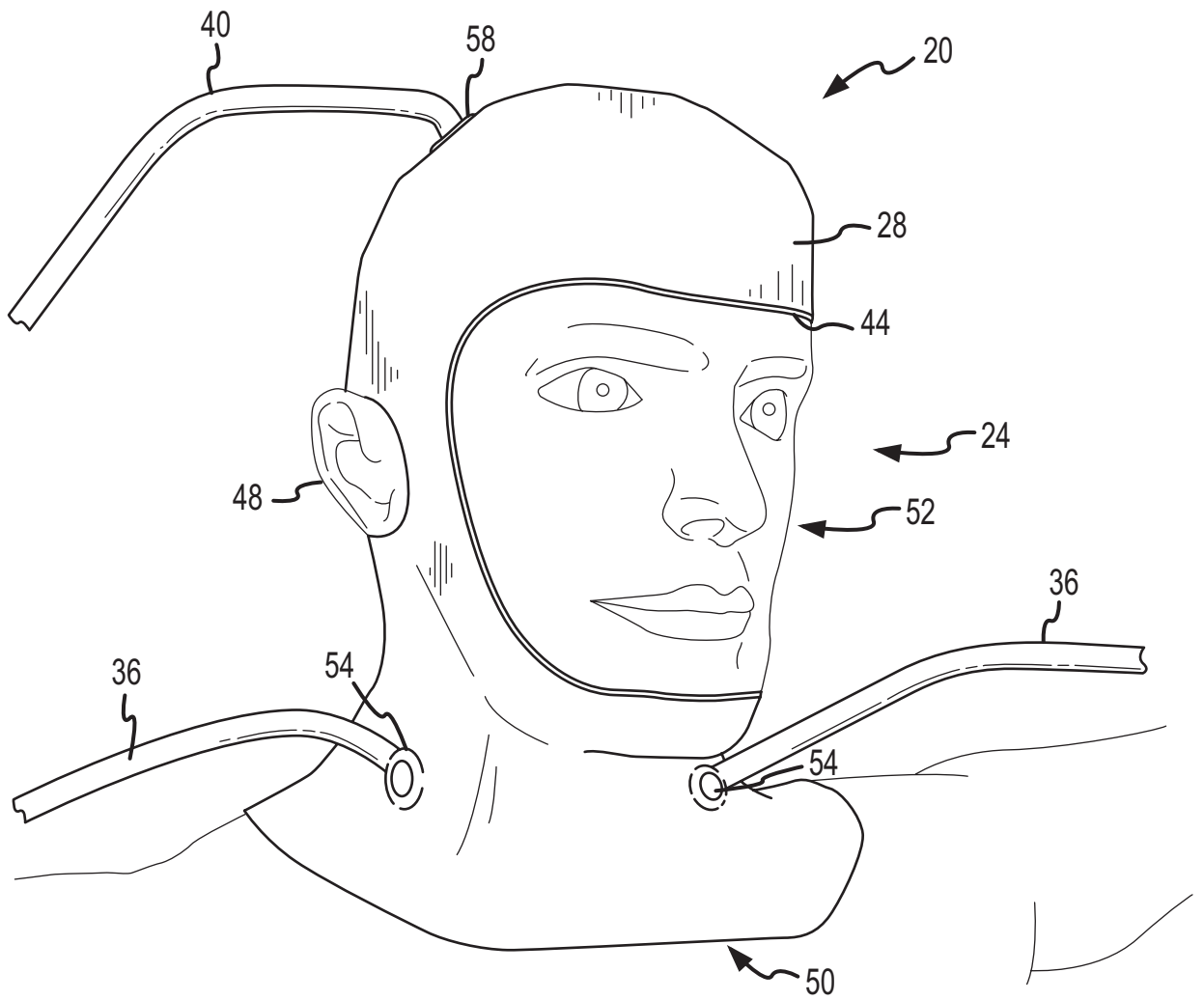


FIG.1

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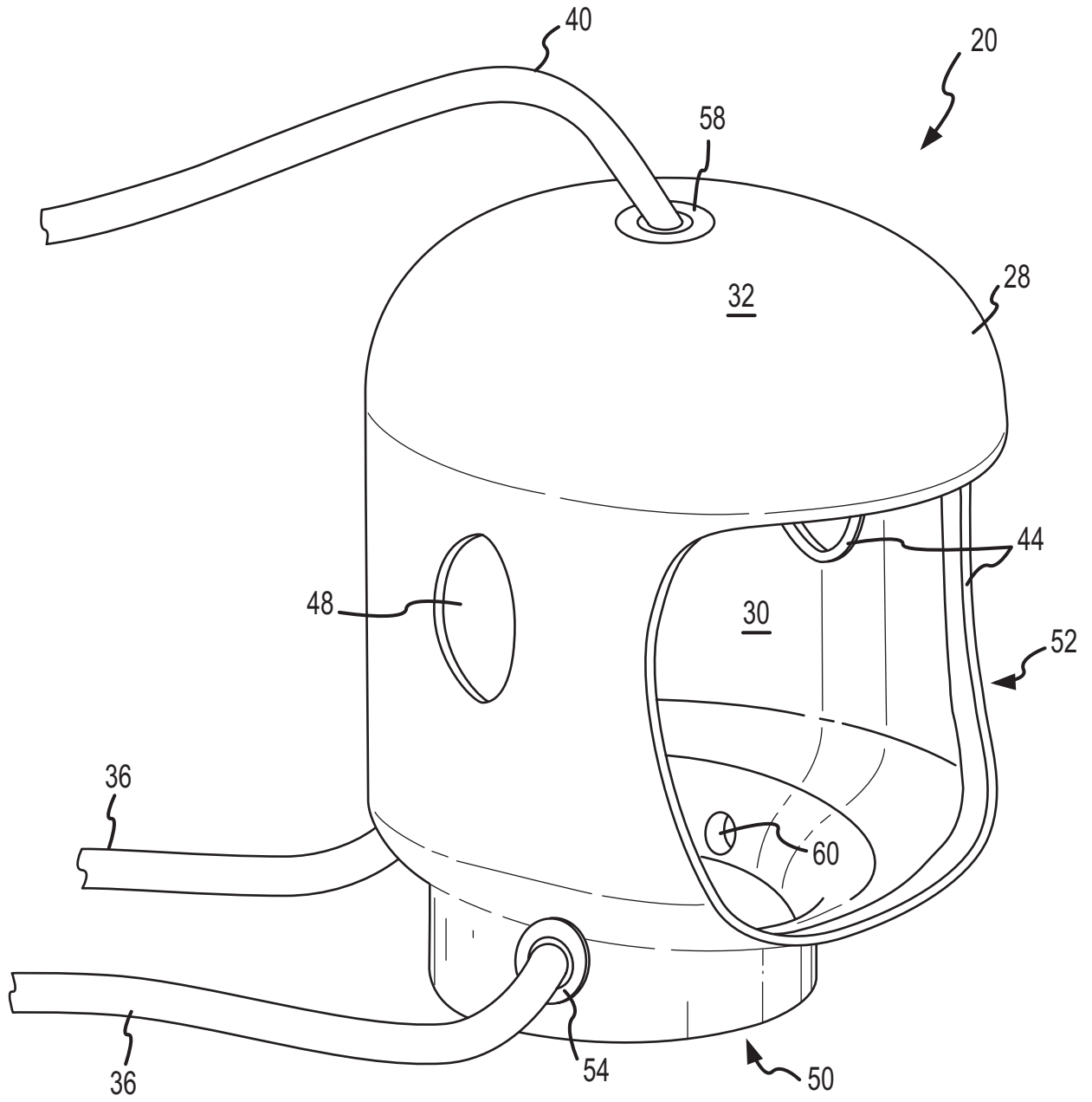


FIG.2

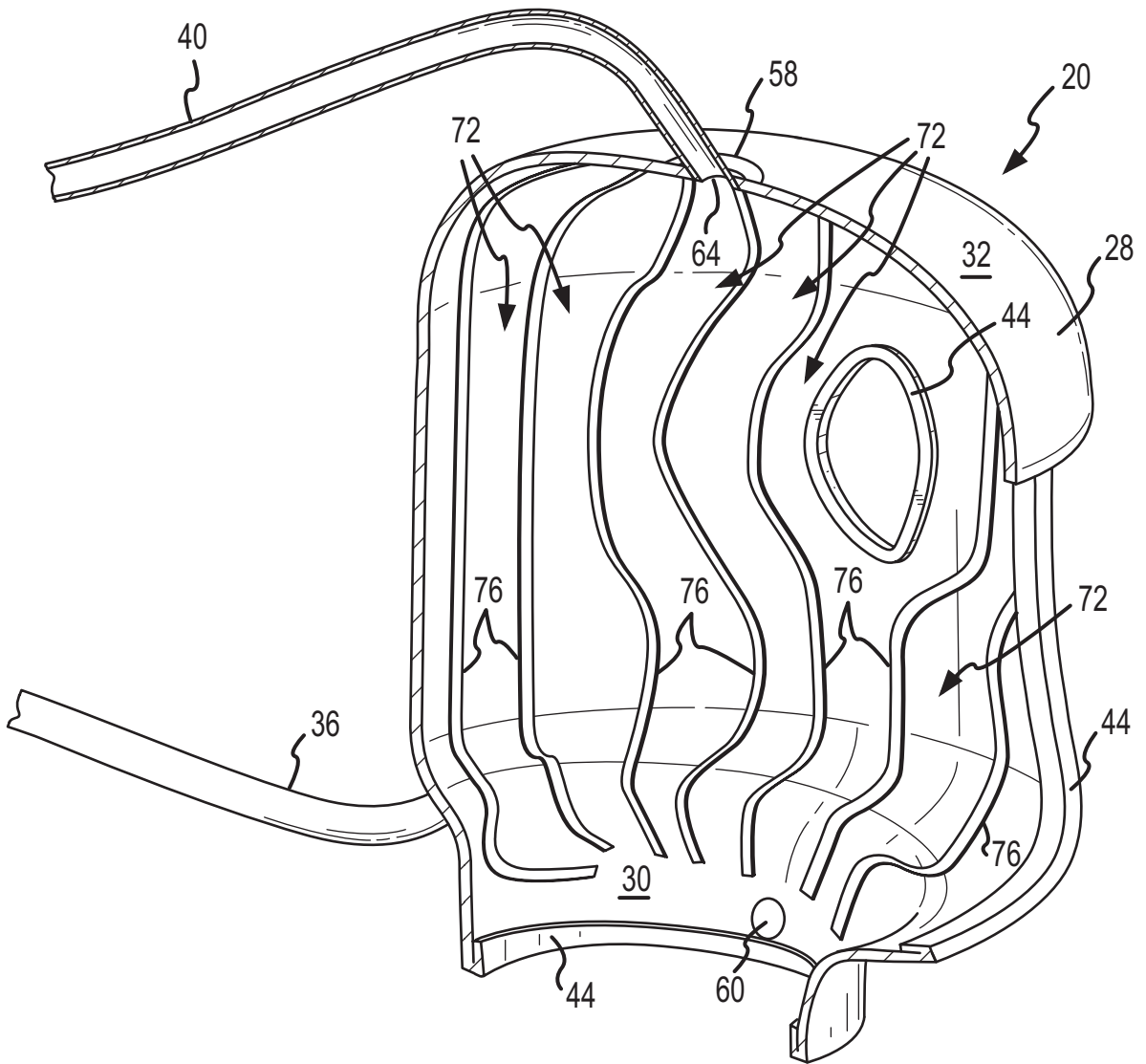


FIG.3

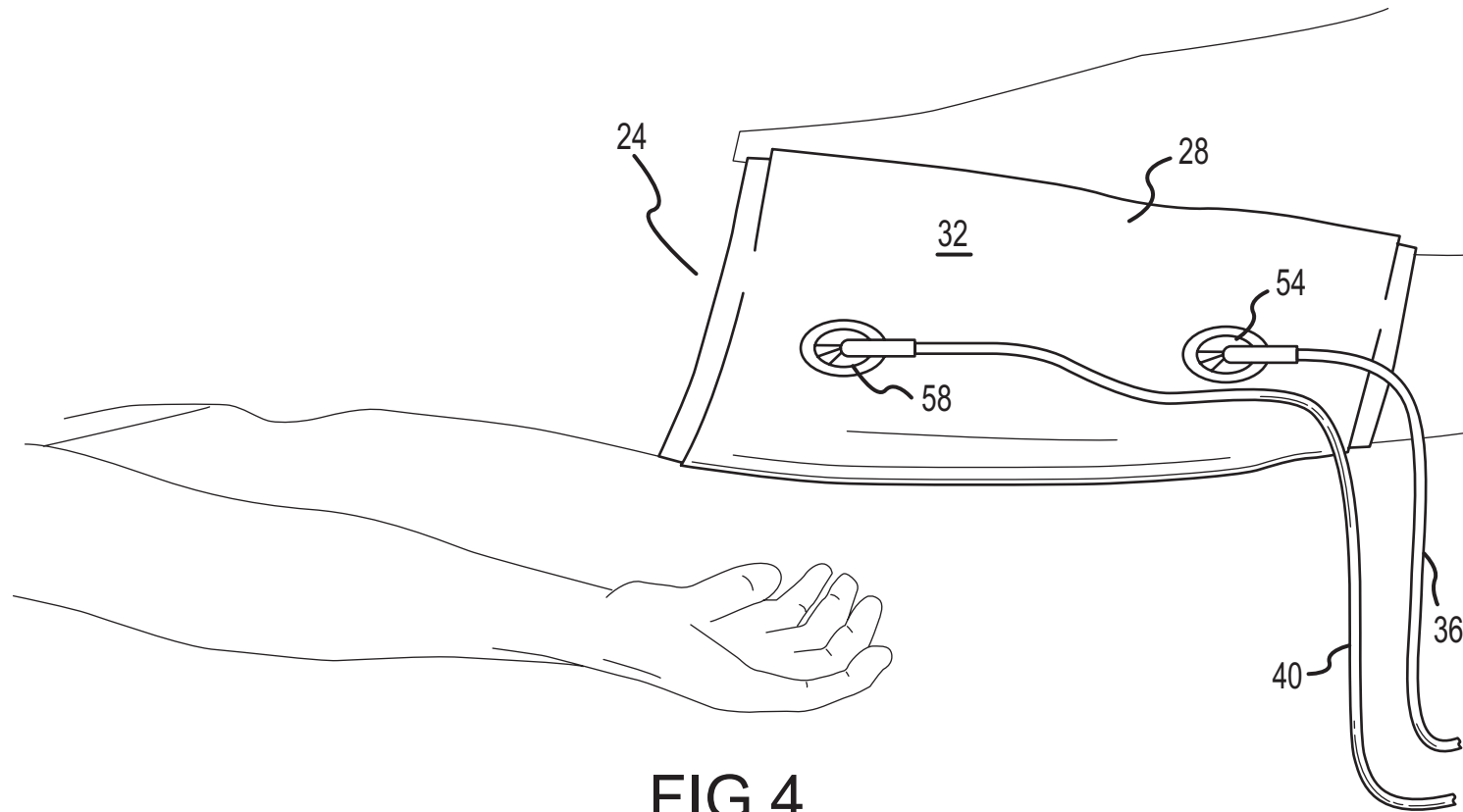


FIG. 4

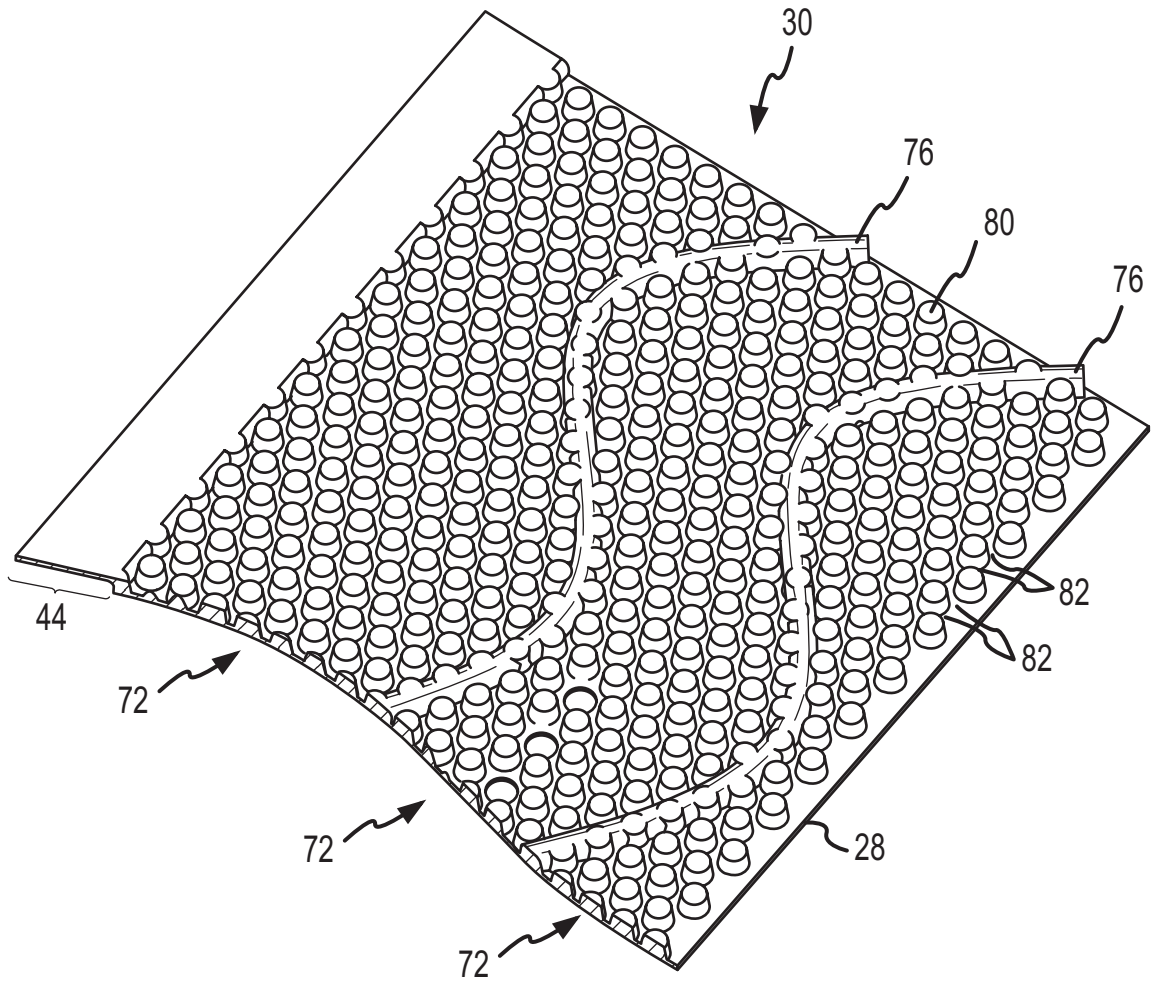


FIG.5

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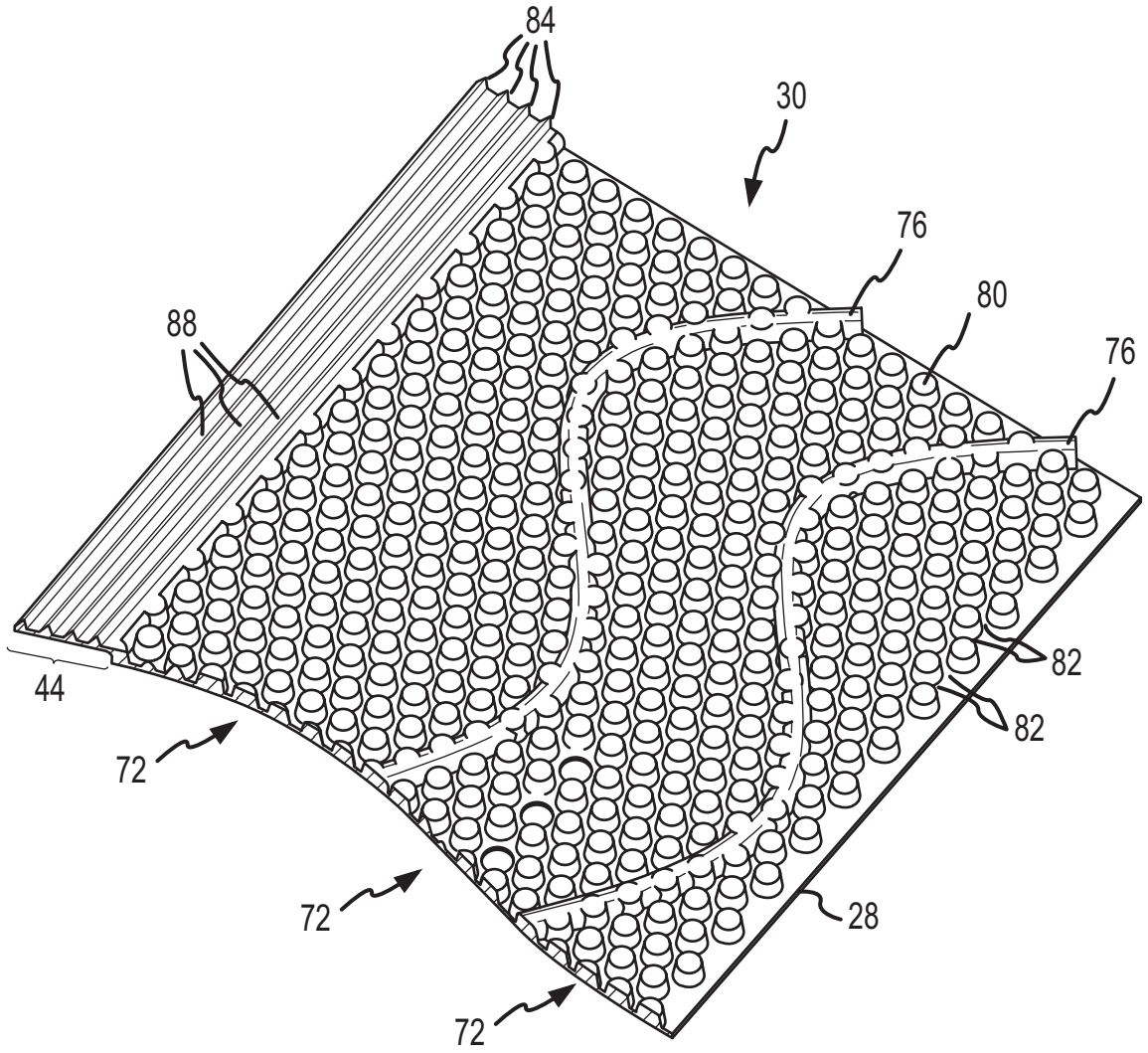


FIG.6

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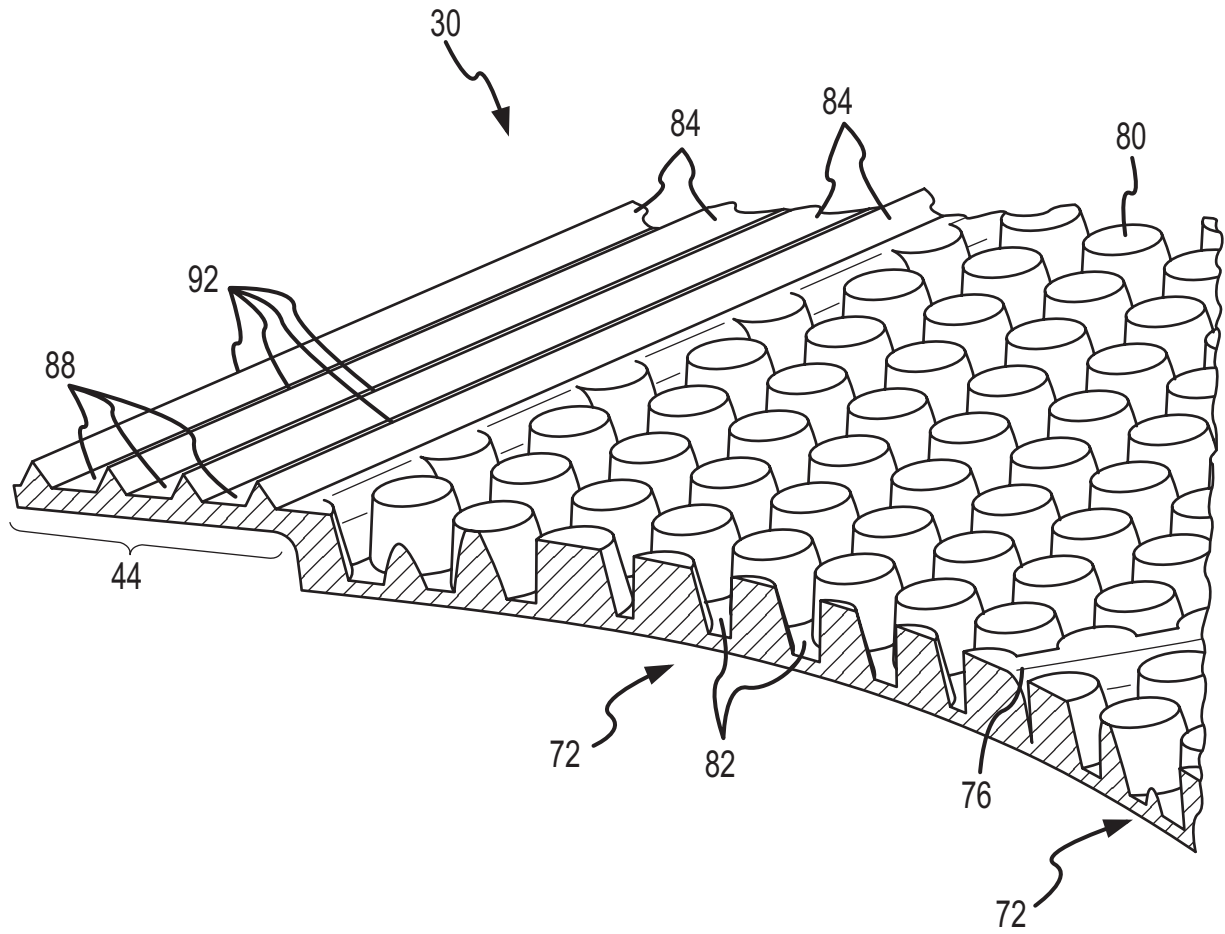


FIG.7

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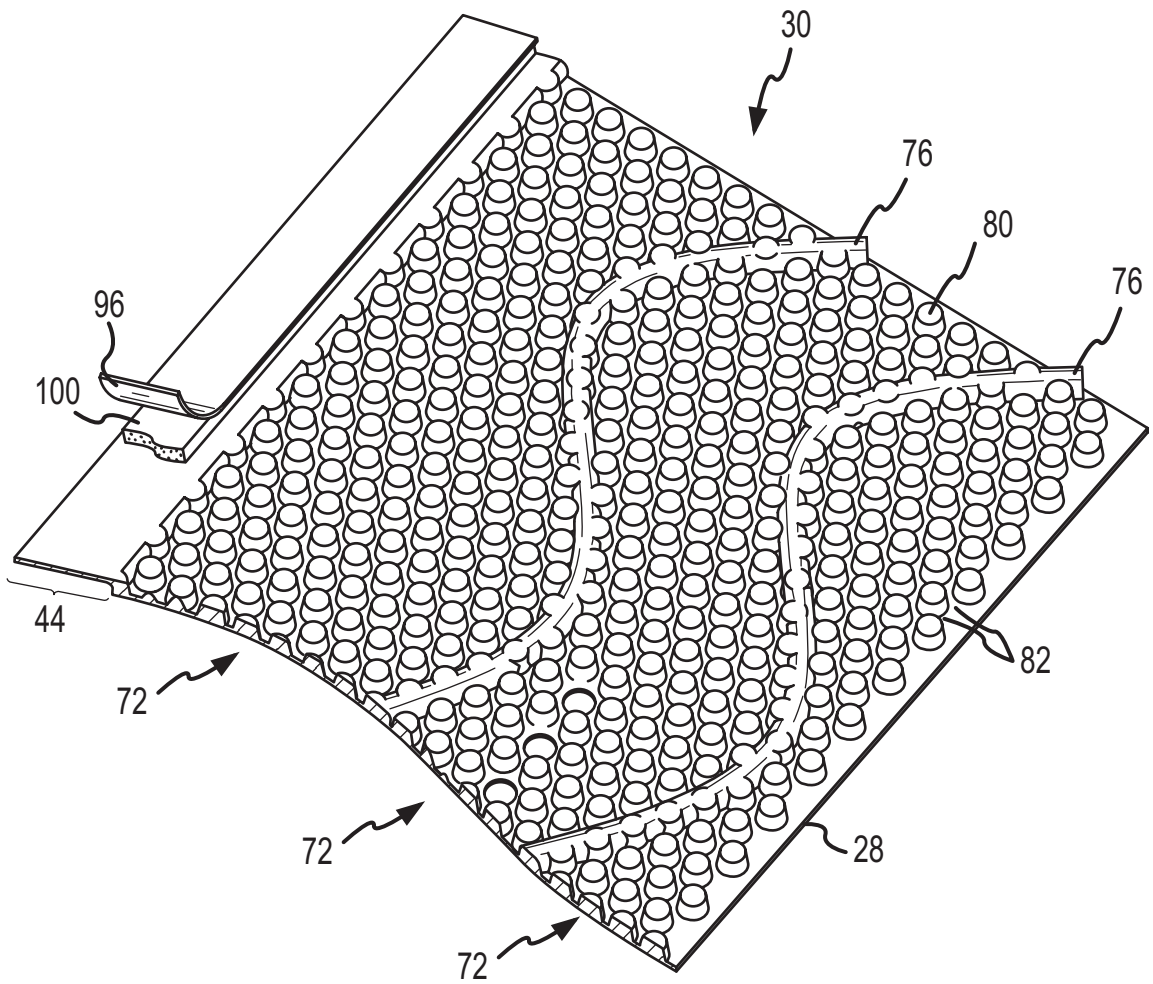


FIG.8

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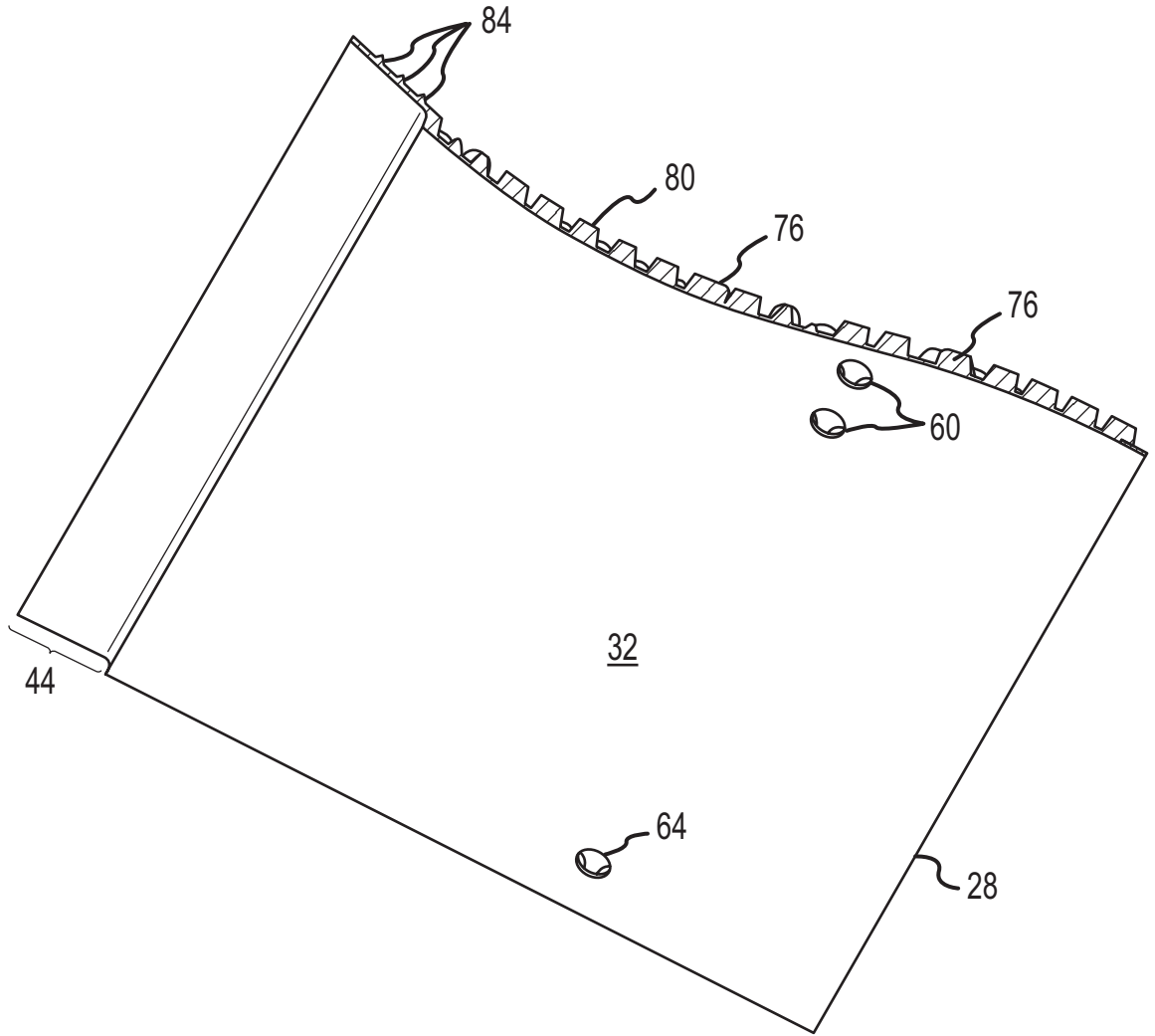


FIG.9

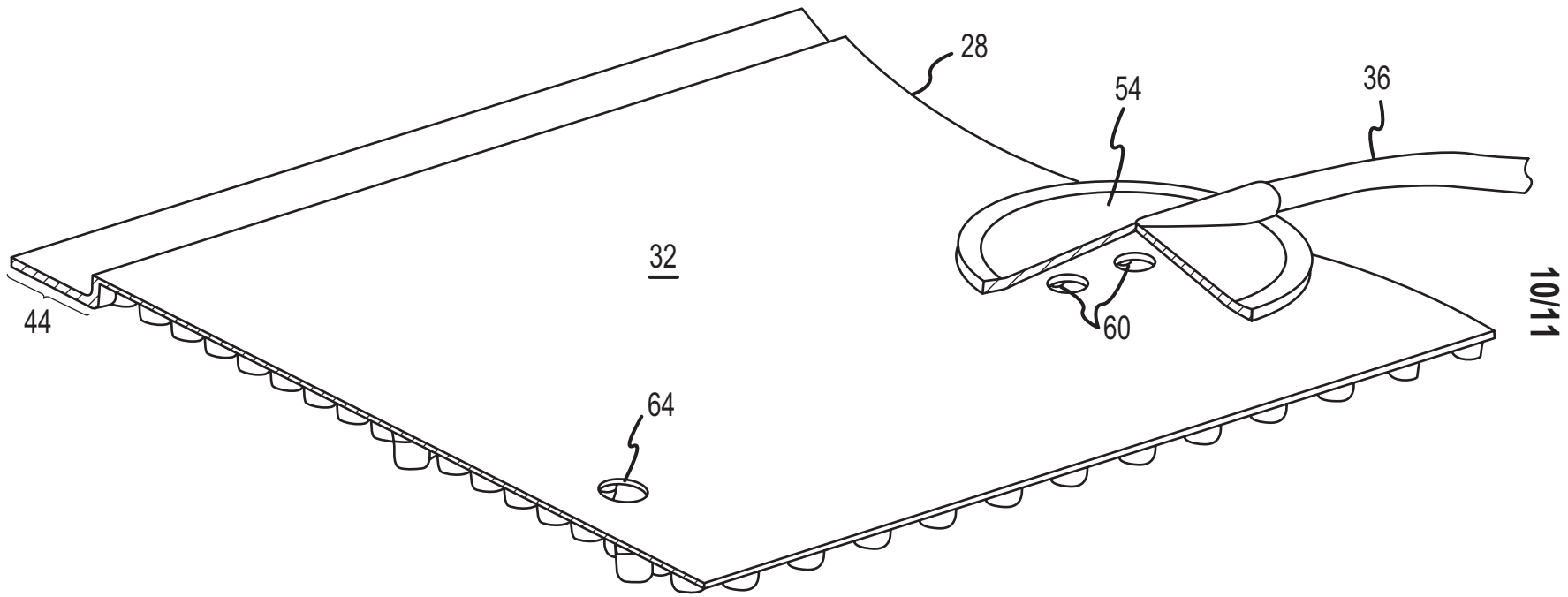
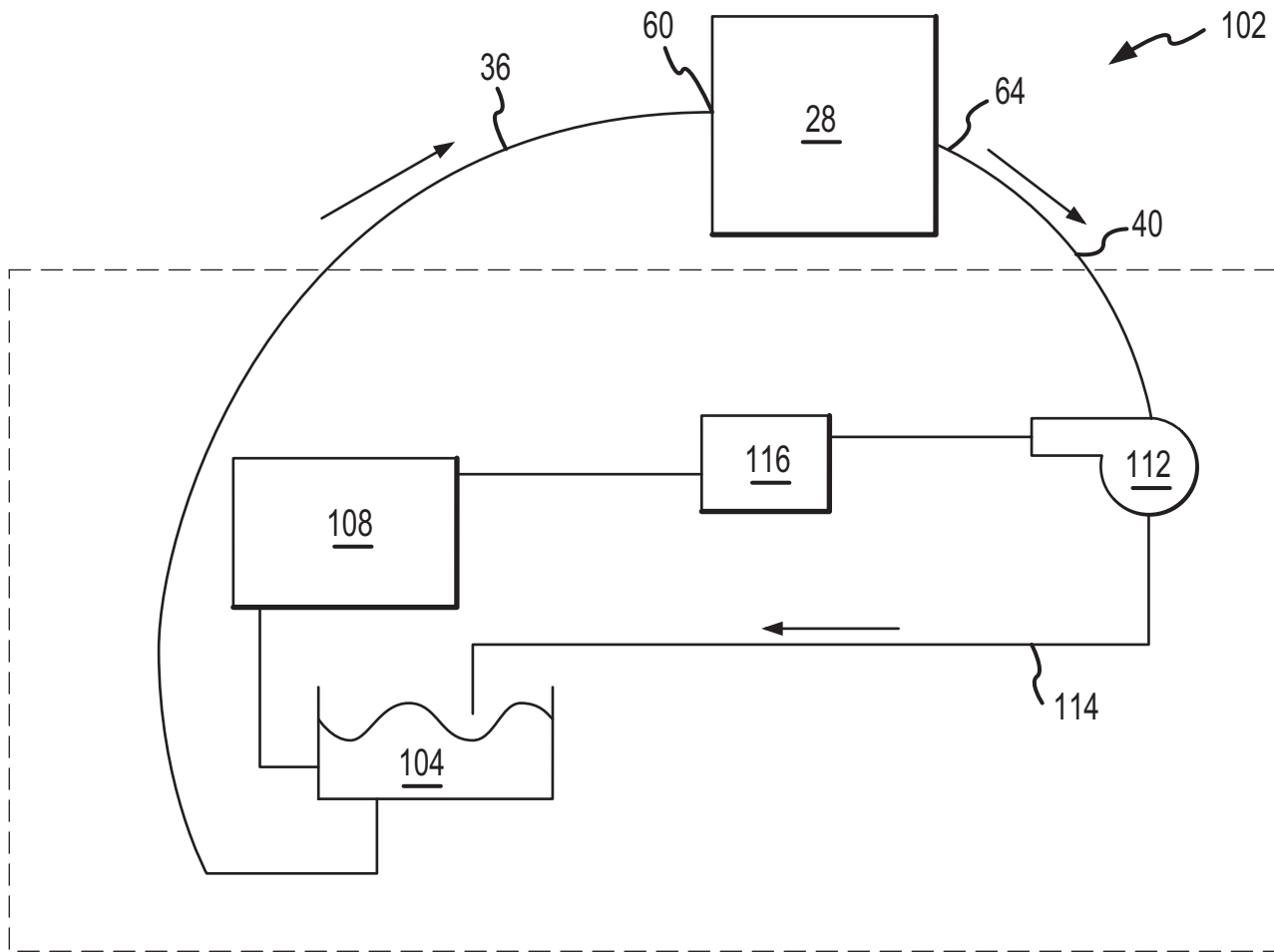


FIG.10



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FIG.11