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(54) Title: MECHANICALLY PROGRAMMABLE CLOSED FLUID ACTUATION SYSTEM

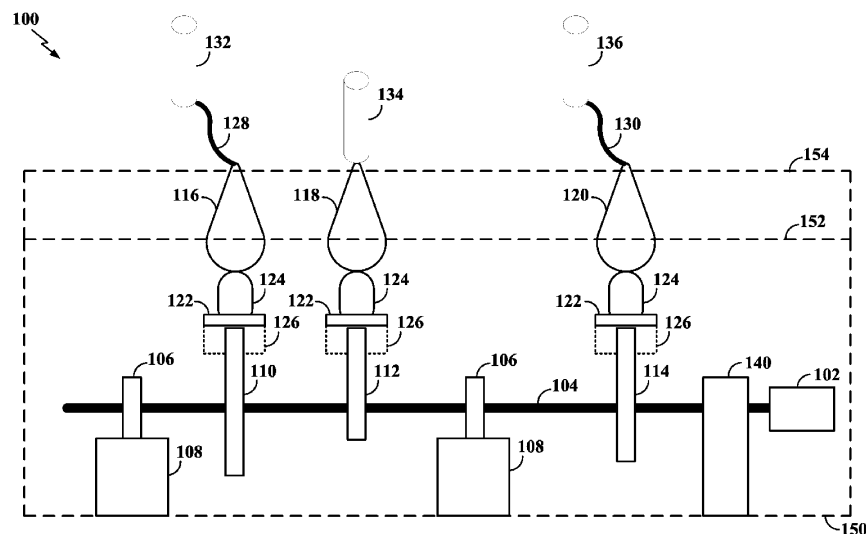


FIG. 1

(57) Abstract: Aspects of the disclosure relate to methods, apparatus, and systems for actuating a soft robot. An actuation system includes a camshaft, a motor configured to drive the camshaft to rotate around a rotational axis, and an air bladder configured to expel fluid from the air bladder during compression and draw fluid into the air bladder during decompression. The system further includes a cam coupled to the camshaft that is configured to rotate around the rotational axis when the camshaft is driven and compress or decompress the air bladder based on a physical profile of the cam as the cam rotates around the rotational axis. The system also includes a soft robot coupled to the air bladder, wherein the soft robot is actuated to move based on the fluid inserted into the soft robot during compression or the fluid removed from the soft robot during decompression.

[Continued on next page]

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