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Active Knit Compression Stockings

IP Status: Issued US Patent; **Issued Patent No.** 11,280,031

Shape memory alloy wires provide active compression

Active knit compression garments dynamically apply compression to various areas of the body for medical, athletic and aerospace applications. The technology uses knitted garments that integrate shape memory alloy (SMA) wires trained through an annealing process to remember a straight or slightly curved form. When heated, the SMA wires return to those trained forms to cause the knit to contract, providing active compression. The knitted garments can wrap around the body in the form of leg sleeves, arm sleeves or body wraps. The garments give the wearer dynamic control by providing variable levels of functional compression, which is determined by the properties of the SMA, knit stitch type, size and structure and temperature of the SMA knit.

Provides dynamic control over pressure exerted

Current compression garments include large, inflatable garments tethered to inflation sources or passive, elastic stockings that are not only difficult to put on/take off but do not apply controllable or dynamic pressures on the body. This new active knit compression technology combines the mobility and low-profile features of the passive knit compression stockings with the dynamic and controllable features of the inflatable garments. Using shape memory alloy materials trained to return to specific forms when heated, this technology is lightweight, low profile and provides dynamic control over the amount of pressure exerted.

Phase of Development

- Prototype developed.

Benefits

- Low profile and controllable compression garment
- Dynamically applies therapeutic compression
- Does not inhibit wearer mobility

Features

- SMA wires, when heated, return to trained forms to create contraction in a knit structure, providing active compression
- Shape memory alloy (SMA) wires trained to remember a form (straight or slightly curved)
- Stockings, leg sleeves, arm sleeves or body wraps

Applications

Technology ID
20170407

Category
Engineering & Physical Sciences/Materials
Life Sciences/Medical Devices

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- Therapeutic compression treatment (e.g., lymphedema, orthostatic intolerance, deep vein thrombosis (DVT), varicose veins)
- Sports medicine compression garments (e.g., injuries, improved cardiovascular circulation, treatment of ulcers, increasing speed, agility, and comfort)
- Aerospace orthostatic intolerance garments (OIG)
- Post-surgery recovery garments
- Diabetic foot care
- Fitness clothing

Researchers

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Publications

Active knit compression stockings for the treatment of orthostatic hypotension
ISWC 2017 - Proceedings of the 2017 ACM International Symposium on Wearable Computers, Vol. Part F130534, pp. 186-191

Interested in Licensing?

The University relies on industry partners to further develop and ultimately commercialize this technology. The license is for the sale, manufacture or use of products claimed by the patents. Please contact us to share your business needs and licensing and technical interests in this technology.