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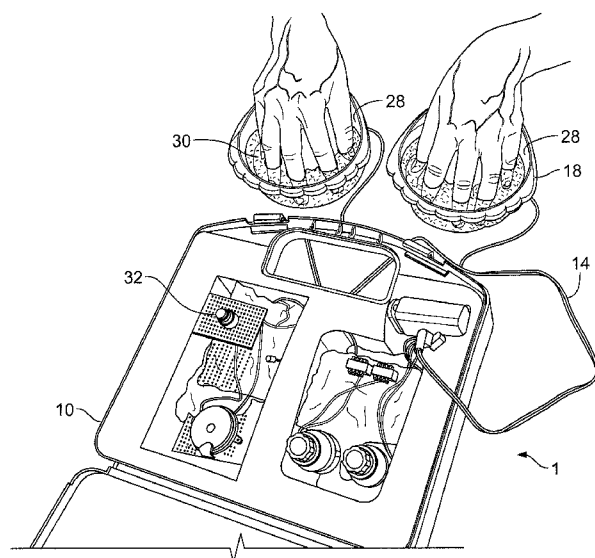


FIG. 5

(57) Abstract: An electrical venous stimulation apparatus comprising an electrical signal generator, the signal generator configured to generate a specified electrical output signal. The apparatus also includes a plurality of electrodes in electrical communication with the signal generator and configured to be placed in electrical communication with a subject. The electrical output signal sent to the subject includes an output voltage, electrical current, and waveform that changes with time in a preprogrammed repeating cycle. The output voltage, electrical current, and waveform are configured to elicit a physiological response that stimulates a plurality of peripheral nerves in the subject, activates a venous muscle pump mechanism in one or more limbs of the subject, and non-invasively alter the physiology of target vein(s), wherein the target vein(s) is caused to distend from under the surface of the subject's skin.