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18. The contractile apparatus as claimed in claim 17 further comprising a second layer of ionic polymer hydrogel disposed between said conductive core and said nonionic polymer hydrogel and wherein one ionic polymer hydrogel is a cationic polymer hydrogel and another ionic polymer hydrogel is an anionic polymer hydrogel.

19. The contractile apparatus as claimed in claim 13 wherein said measuring device is a calorimetric device to monitor a concentration of said soluble ionic salt and wherein said controller controls the means for passing the

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first and second electrical current to said polymer composite based upon said concentration of said soluble ionic salt.

20. The contractile apparatus as claimed in claim 13 wherein said measuring device is a strain gauge to monitor a length of said polymer composite and wherein said controller controls the means for passing the first and second electrical current to said polymer composite based upon said length of said polymer composite.

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