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curves into a foot center coil. The foot center coil section has within it a receptacle which can accommodate a means for adjusting spring stiffness and arch height. A sensory feedback system is included to allow the wearer of the prosthetic foot to feel bending and twisting of the prosthetic foot. High spring strength and breaking strength are achieved in the preferred embodiment by the use of laminated graphite composite material impregnated with epoxy resin to construct the prosthetic foot. The prosthetic foot enables a patient to walk, run, play tennis, racquetball, and basketball and engage in other sports and vigorous activities with substantially the same mobility as an individual with a natural foot. Use of the invention in robotic applications is anticipated.

I claim:

1. A foot comprising:

(a) a single foot center coil section having a top and a bottom, said foot center coil section comprising an anterior coil spring section and a posterior coil spring section,

(b) a heel extension section extending in a first generally posterior direction from said foot center coil section,

(c) a forefoot extension section extending in a second generally anterior direction from said foot center coil section, and

(d) an arch formed at the approximate bottom of said foot center coil section by obtuse angular orientation of said forefoot extension section with respect to said heel extension section;

wherein said foot center coil section, heel extension section, and forefoot extension section constitute a unitary coil spring to form the foot;

wherein said heel extension section is adapted to absorb and store energy at heel strike during the gait cycle;

wherein said foot center coil section is adapted to transfer energy stored during heel strike to said forefoot extension section during foot roll-forward of the gait cycle;

wherein said forefoot extension section is adapted to release stored energy at toe-off during the gait cycle;

wherein said foot center coil section is adapted to serve as the functional center of the foot in absorbing, storing and releasing energy during the gait cycle;

wherein said forefoot extension section comprises a plurality of toe extensions, each of said toe extensions being separately articulable from the rest of said toe extensions;

wherein said heel extension section comprises at least one heel extension;

wherein at the location of said arch, two of said toe extensions form a gap therebetween through which said heel extension protrudes; and

wherein when a vertical load is exerted on the foot, movement of said forefoot extension section and said heel extension section with respect to said foot center coil section increases the obtuse angle formed by the orientation of said heel extension section with respect to said forefoot extension section thereby permitting said foot to experience a vertical displacement in response to said load, and said movement also causing said heel extension to move in said gap without any restriction from said toe extensions.

2. A foot comprising:

(a) a single foot center coil section having a top and a bottom, said foot center coil section comprising an anterior coil spring section and a posterior coil spring section,

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(b) a heel extension section extending in a first generally posterior direction from said foot center coil section,

(c) a forefoot extension section extending in a second generally anterior direction from said foot center coil section,

(d) an arch formed at the approximate bottom of said foot center coil section by obtuse angular orientation of said forefoot extension section with respect to said heel extension section, and

(e) an elongate shin section extending in a generally vertical direction from said foot center coil section, said shin section comprising a plurality of torsional beams for accommodating torsional movement of said shin section about a longitudinal axis through said shin section,

wherein said foot center coil section, heel extension section, and forefoot extension section constitute a unitary coil spring to form the foot;

wherein said heel extension section is adapted to absorb and store energy at heel strike during the gait cycle;

wherein said foot center coil section is adapted to transfer energy stored during heel strike to said forefoot extension section during foot roll-forward of the gait cycle;

wherein said forefoot extension section is adapted to release stored energy at toe-off during the gait cycle; and

wherein said foot center coil section is adapted to serve as the functional center of the foot in absorbing, storing and releasing energy during the gait cycle.

3. A foot as recited in claim 2 further comprising:

(f) means for absorbing and storing energy when vertical force is applied to the foot.

4. A foot as recited in claim 3 wherein (f) comprises:

a plurality of said torsional beams being shaped in an outwardly-bowed configuration from a longitudinal axis along the length of said shin section;

wherein when a vertical force is applied to the foot, said torsional beams bow outwardly to absorb and store energy, said outward bowing being accompanied by a vertical displacement of said shin section along its longitudinal axis.

5. A foot comprising:

(a) a single foot center coil section having a top and a bottom,

(b) a heel extension section extending in a first generally posterior direction from the bottom of said foot center coil section,

(c) a forefoot extension section extending in a second generally anterior direction from the bottom of said foot center coil section, said forefoot extension section comprising a plurality of toe extensions, each of said toe extensions being separately articulable from the rest of said toe extensions to enable the foot to accommodate travel over uneven terrain, and

(d) an arch formed at the approximate bottom of said foot center coil section by obtuse angular orientation of said forefoot extension section with respect to said heel extension section;

wherein said foot center coil section, heel extension section, and forefoot extension section constitute a coil spring to form the foot;

wherein said heel extension section serves as a means for absorbing and storing energy at heel strike during the gait cycle;