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W. M. DRENNON
ARTIFICIAL LIMB JOINT

2,556,525

Filed Oct. 8, 1949

FIG. 1.

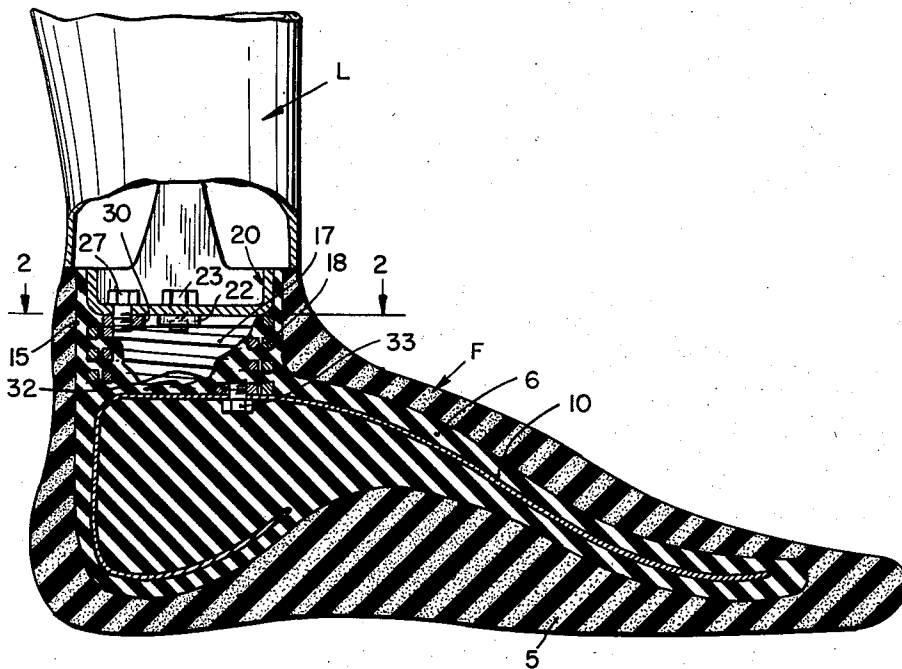


FIG. 2.

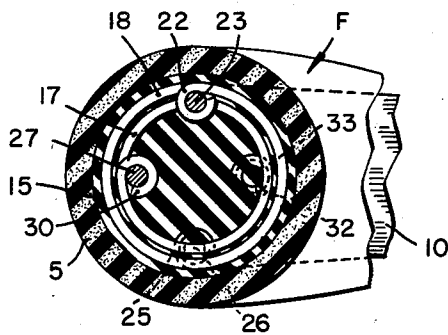


FIG. 4.

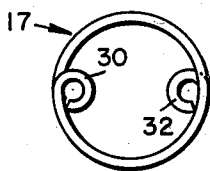
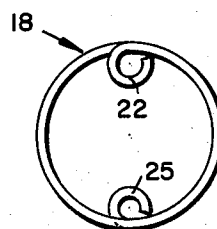


FIG. 3.



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ARTIFICIAL LIMB JOINT

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1 Claim. (Cl. 3—6)

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This invention has to do with artificial limbs and has as an object the provision of an improved joint therefor. While my improved joint is particularly well suited as an ankle joint, it should be understood, of course, that I do not intend to confine its use as an ankle joint, since it is capable of providing a joint between any two relatively movable parts of an artificial limb or the like.

It is a further object of the invention to provide a joint which has flexibility approaching that of a human joint such as an ankle joint.

Another object is the provision of a joint of this character which is capable of affording maximum comfort and which is extremely durable.

A further characteristic and advantage of my invention is its simplicity and economy of manufacture.

Other objects will appear hereinafter.

Without intending thereby to limit the broader scope of my invention as defined by the appended claim, I shall now describe an embodiment thereof which I, at present, prefer, for which purpose I shall refer to the accompanying drawings, wherein:

Fig. 1 is a view partly in section and partly in side elevation of a foot and leg joined together by my improved ankle joint;

Fig. 2 is a section taken on line 2—2 of Fig. 1;

Fig. 3 is a top plan view of the outer spring element; and

Fig. 4 is a top plan view of the inner spring element.

In the drawings, I show a foot portion F and a leg portion L.

The foot portion is composed of an outer layer 5 of soft material, such as sponge rubber, and a core 6 of a relatively stiff material, such as vulcanized rubber, although it is my preference that the core possess some degree of flexibility.

Within the core I embed a spring steel anchor plate 10 which serves as a lower anchor or foundation for the ankle joint now to be described. The foot portion is provided with an upwardly opening socket 15 within which I mount a pair of nested, concentric spiral springs 17, 18, and atop the spring elements I provide a cup-shaped metallic anchor plate or member 20 which extends into and is secured to the leg L. As best seen in Figs. 2-4, the upper end of the outer spring 18 is provided with a loop 22 which is secured to anchor member 20 as by a bolt 23, while the lower end of the outer spring terminates in a loop 25 secured to the anchor plate 10 as by bolt 26.

The upper end of the inner spring 17 terminates in a loop 30 secured to the anchor member 20 by bolt 27, while the lower end of the inner spring terminates in a hook 32 secured to the anchor plate by bolt 33.

It will be observed that the top and bottom loops of the outer spring are anchored at di-

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ametrically opposite points, while the top and bottom loops of the inner spring are also anchored at diametrically opposite points. That is, the respective ends of the outer spring are anchored at points spaced 180° from each other, while the respective ends of the inner spring are also anchored at points spaced 180° from each other, and spaced 90° from the respective anchor points of the outer spring. Thus, no matter in which direction the foot is tilted relative to the leg, the stress is communicated directly to one of the anchor points, while vertical loads are taken by the springs in compression.

While, for illustrative purposes only, a portion of the rubber is shown in Fig. 1, I prefer to embed the springs 17, 18 in that portion of the rubber core 6 which fills socket 15. Thus, the rubber to some extent shares the vertical loads with the springs and it also protects the springs from exposure and corrosion.

The sole means of anchoring the foot to the leg is through the attachment of the springs to the anchor members, although in practice the leg and foot may be provided with some sort of flexible sheathing (not shown) which might afford some degree of attachment.

From the foregoing it will be apparent that my joint permits both twisting and tilting of the foot relative to the leg, the joint is fully cushioned and it affords sufficient resistance to too free tilting and twisting of the limb.

I claim:

In an artificial limb having a foot portion and a leg portion, a leaf spring embedded in the foot portion, a top anchor member secured to the leg portion, and a pair of nested spiral springs interposed between said leaf spring and said top anchor member, the upper end of the outer spring being anchored to said top anchor member and the lower end of said outer spring being anchored to the leaf spring at a point spaced 180° from the point at which the top end thereof is anchored to the top anchor member; and the respective ends of the inner spring being anchored to said top anchor member and said leaf spring, respectively, at points spaced, respectively, 90° from the said anchor points of the outer spring.

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REFERENCES CITED

The following references are of record in the file of this patent:

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