

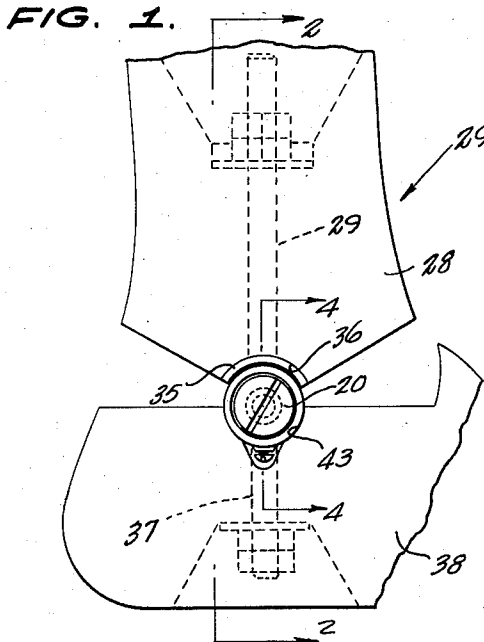
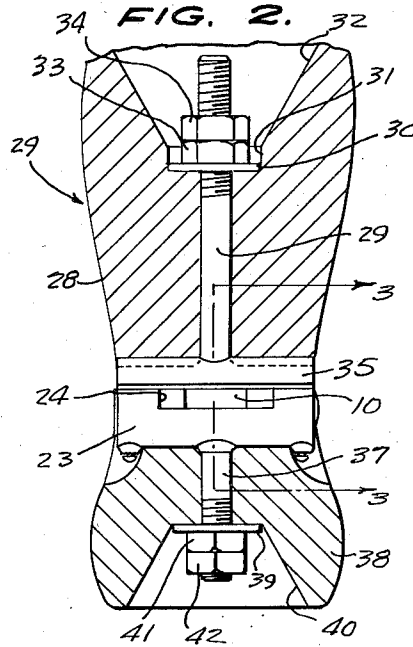
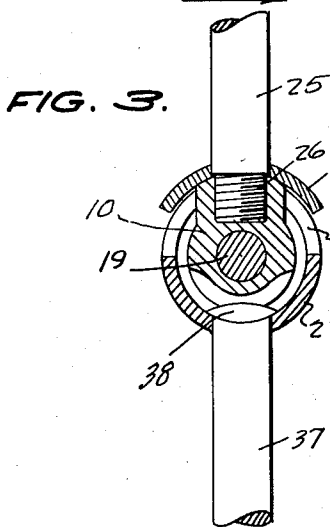
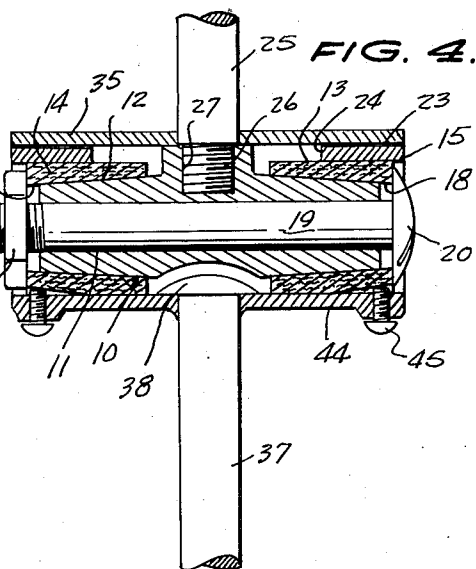
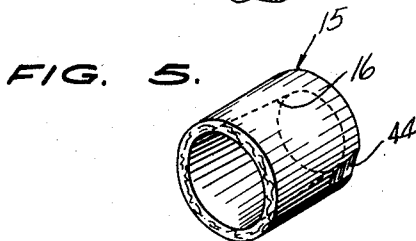
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ARTIFICIAL LIMB ANKLE JOINT ASSEMBLY

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ARTIFICIAL LIMB ANKLE JOINT ASSEMBLY

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3 Claims. (Cl. 287-97)

The present invention relates generally to artificial limb constructions and in particular to an ankle joint assembly for an artificial limb.

An object of the present invention is to provide an ankle joint assembly for an artificial limb which lends itself to the simulation of natural articulated movement of a person's ankle, one which permits the user thereof to walk with a natural gait, one which has long wearing characteristics, one which may be economically manufactured from inexpensive materials, and one which is highly effective in action.

Another object of the present invention is to provide an ankle joint assembly for an artificial limb which is readily adjustable for its swiveling articulated movement, one which is sturdy in construction and simple of structure, and one which is serviceable, durable and efficient for the purpose intended.

These and other objects and advantages of the present invention will be fully apparent from the following description when taken in connection with the annexed drawing, in which:

Figure 1 is a fragmentary elevational view of the lower portion of an artificial limb with the rearward portion of the foot portion of the limb attached thereto.

Figure 2 is a sectional view taken on the line 2-2 of Figure 1;

Figure 3 is a sectional view, on an enlarged scale, taken on line 3-3 of Figure 2;

Figure 4 is a further sectional view, taken on line 4-4 of Figure 1, and on an enlarged scale; and

Figure 5 is a perspective view of one of the bearing elements of the assembly.

Referring in greater detail to the drawings in which like numerals indicate like parts throughout the several views, the ankle joint assembly for an artificial limb according to the present invention comprises a horizontally disposed spindle support member 10 having a bore 11 extending longitudinally therethrough from one end to the other. The support member 10 is provided with a tapered bearing surface 12 inwardly of one end and a similar tapered bearing surface 13 inwardly of the other end. A bearing element 14 having its inner wall conformably shaped to fit the bearing surface 12 is circumposed about and rotatably supported on the bearing surface 12, and another bearing element 15 also having its inner wall conformably shaped to fit the bearing surface 13 is circumposed about and rotatably supported on the bearing surface 13. The bearing element 15 is seen in perspective view in Figure 5 and is shown to be of substantially cylindrical shape with a tapering inner wall, as shown in dotted lines and indicated by the reference numeral 16.

Each of the bearing elements 14 and 15 have a portion adjacent one end projecting beyond the adjacent end of the support member 10 as indicated by the reference numerals 17 and 18, respectively.

A take-up mounting bolt 19 is positioned so as to ex-

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tend through the bore 11 in the support member 10 with a head 20 on one end abuttingly engaging the face of the projecting end portion 18 of the bearing element 15 and with a lock nut 21 abuttingly engaging the face of the projecting end portion 17 of the bearing element 14. The lock nut 21 is threadably engaged upon the threaded portion 22 of the bolt 19 at the end of the latter opposite to the head 20 and secures the bearing elements 14 and 15 upon the adjacent bearing surfaces 12 and 13, respectively.

A sleeve 23, having a closed slot 24 in its upper face intermediate the ends thereof, is circumposed about and embracingly engages the bearing elements 14 and 15.

An upright ankle bolt 25 having a reduced and threaded end portion 26 extends perpendicularly from the upper face of the support member 10 between the bearing surfaces 12 and 13 with the lower end 26 threaded and secured in a threaded bore 27 provided in the support member 10 intermediate the ends thereof and in the space provided between the inner ends of the bearing elements 14 and 15. The ankle bolt 25 extends through the slot 24 provided in the sleeve 23.

Means is provided on the upper end of the ankle bolt 25 for securing the bolt to the ankle portion 28 of an artificial limb, the latter being indicated generally by the reference numeral 29 in Figures 1 and 2. Specifically, this means consists in a washer 30 seated in a circular recess 31 in the ankle portion 28 of the artificial limb 29, the recess 31 being connected in communication with a hollowed out portion 32 in the artificial limb 29. A pair of nuts 33 and 34 are in locking engagement with the bolt 25 above the washer 30 and serve as a means for securing the spindle support member 10 in transversely positioned relation with respect to the artificial limb 29. The securement means also includes an arcuately mounting plate 35 conformably shaped to fit the upper portion of the sleeve 23 and having an aperture through which extends the bolt 25, the mounting plate 35 being received within a transversely arranged groove 36 provided in the lower end of the ankle portion 28 of the artificial limb 29.

An upright heel bolt 37 having a head 38 on its upper end extends perpendicularly through a hole provided in the lower face of the sleeve 23 intermediate the ends of the latter with the head 38 fixed to the sleeve 23. The heel bolt 37 is in longitudinal alignment with the ankle bolt 25.

Means is provided for securing the heel bolt 37 to the heel portion 38 of the artificial limb 29. Specifically, this latter means consists in a washer 39 received in the upper end portion of a recess 40 provided in the heel portion 38 and a pair of lock nuts 41 and 42 threadably engaged on the lower end portion of the bolt 37 and forming the means by which the sleeve 23 is engaged by its lower face in a transversely arranged groove 43 provided in the heel portion 38 of the artificial limb 29.

Securing means is provided for retaining the sleeve 23 in a fixed position relative to the bearing elements 14 and 15 and embodies a longitudinally extending flat portion 44 in the outer periphery of each of the bearing elements 14 and 15 and positioned so as to extend inwardly from the outer ends of the latter when they are in the assembled position within the sleeve 23. Machine screws 45, constituting screw elements, extend transversely through tapped holes provided in the adjacent portions of the sleeve 23 inwardly of each end of the latter on the underface thereof and abuttingly engage the adjacent flat portion 44 of the respective ones of the bearing elements 14 and 15.

In use, the nut 21 is tightened on the bolt 19 to adjust the frictional engagement of the bearing elements 14 and

15 with the tapering surfaces or bearing faces 12 and 13, respectively, of the support member 10. This adjustment provides the means by which the heel portion 38 of the artificial limb 29 is permitted to have a rocking movement simulating the movement of a natural foot and ankle and thereby permitting the user thereof to have a natural gait substantially indistinguishable from the gait of a person with both of his limbs.

What is claimed is:

1. An artificial limb ankle joint assembly comprising a horizontally disposed spindle support member having a bore extending longitudinally therethrough, said support member having a tapered bearing surface extending inwardly from each end thereof, a bearing element rotatably supported on each of said bearing surfaces and having a portion adjacent one end projecting beyond the adjacent end of said support member, a take-up mounting bolt extending through the bore of said support member and having a head on one end abuttingly engaging the projecting end portion of one of said bearing elements, a lock nut abuttingly engaging the projecting end portion of the other of said bearing elements and threadably attached to the other end of said bolt, a sleeve circumposed about and embracingly engaging said bearing elements, said sleeve having a closed slot therein, an upright angle bolt extending perpendicularly through said sleeve slot and between said bearing surfaces and having the lower end fixed to said support member, means on the upper end of said ankle bolt for securing said ankle bolt to the ankle portion of an artificial limb, an upright heel bolt extending perpendicularly from said sleeve intermediate the ends thereof and having the upper end fixed to said sleeve, and means on the lower end of said heel bolt for securing the latter to the heel portion of an artificial limb.

2. An artificial limb ankle joint assembly comprising a horizontally disposed spindle support member having a bore extending longitudinally therethrough, said support member having a tapered bearing surface extending inwardly from each end thereof, a bearing element rotatably supported on each of said bearing surfaces and having a portion adjacent one end projecting beyond the adjacent end of said support member, a take-up mounting bolt extending through the bore of said support member and having a head on one end abuttingly engaging the projecting end portion of one of said bearing elements, a lock nut abuttingly engaging the projecting end portion of the other of said bearing elements and threadably attached to the other end of said bolt, a sleeve circumposed about and embracingly engaging said bearing elements, said sleeve having a closed slot therein, an upright ankle bolt extending perpendicularly through said

sleeve slot and between said bearing surfaces and having the lower end fixed to said support member, means on the upper end of said ankle bolt for securing said ankle bolt to the ankle portion of an artificial limb, an upright heel bolt extending perpendicularly from said sleeve intermediate the ends thereof and having the upper end fixed to said sleeve, means on the lower end of said heel bolt for securing the latter to the heel portion of an artificial limb, and securing means extending from said sleeve to each of said bearing members for retaining the sleeve in a fixed position relative to the bearing elements.

3. An artificial limb ankle joint assembly comprising a horizontally disposed spindle support member having a bore extending longitudinally therethrough, said support member having a tapered bearing surface extending inwardly from each end thereof, a bearing element rotatably supported on each of said bearing surfaces and having a portion adjacent one end projecting beyond the adjacent end of said support member, a take-up mounting bolt extending through the bore of said support member and having a head on one end abuttingly engaging the projecting end portion of one of said bearing elements, a lock nut abuttingly engaging the projecting end portion of the other of said bearing elements and threadably attached to the other end of said bolt, a sleeve circumposed about and embracingly engaging said bearing elements, said sleeve having a closed slot therein, an upright ankle bolt extending perpendicularly through said sleeve slot and between said bearing surfaces and having the lower end fixed to said support member, means on the upper end of said ankle bolt for securing said ankle bolt to the ankle portion of an artificial limb, an upright heel bolt extending perpendicularly from said sleeve intermediate the ends thereof and having the upper end fixed to said sleeve, means on the lower end of said heel bolt for securing the latter to the heel portion of an artificial limb, and securing means extending from said sleeve to each of said bearing elements for retaining the sleeve in a fixed position relative to the bearing elements, said securing means embodying a longitudinally extending flat portion on the outer periphery of each of said bearing elements and screw elements extending transversely through adjacent portions of said sleeve and abuttingly engaging said bearing element flat portions.

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