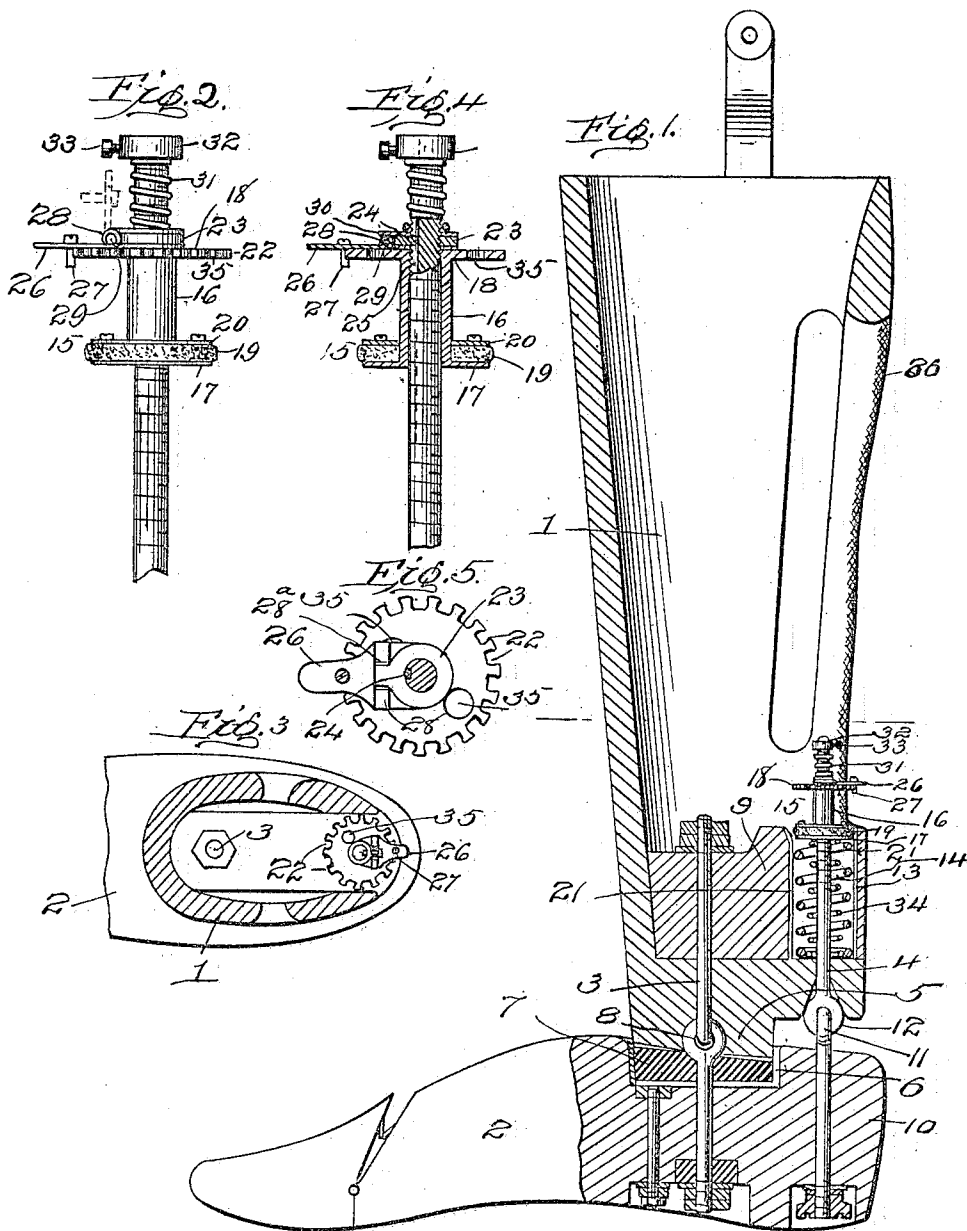


No. 809,876.

PATENTED JAN. 9, 1906.

G. E. WILKINS.
ARTIFICIAL LIMB.

APPLICATION FILED JAN. 28, 1905.



Witnesses

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GEORGE E. WILKINS, OF OSHKOSH, WISCONSIN.

ARTIFICIAL LIMB.

No. 809,876.

Specification of Letters Patent.

Patented Jan. 9, 1906.

Application filed January 28, 1905. Serial No. 243,138.

To all whom it may concern:

Be it known that I, GEORGE E. WILKINS, a citizen of the United States, residing at Oshkosh, in the county of Winnebago and State of Wisconsin, have invented new and useful Improvements in Artificial Limbs, of which the following is a specification.

This invention relates to improvements in artificial limbs, and has particular relation to the structure of an artificial leg suitable for replacing the lower leg and foot of a person.

The invention consists in certain novel constructions, combinations, and arrangements of parts, as will be hereinafter fully described and claimed.

In the accompanying drawings, Figure 1 is a vertical central section through an artificial leg constructed in accordance with the present invention, parts of the apparatus being shown in elevation. Fig. 2 is a detail side elevation of a portion of the heel-bolt, showing the means for controlling the tension thereof. Fig. 3 is a central horizontal section through the leg, taken at a point above the block which carries the ankle and heel bolts, the ends of said bolts being shown in elevation. Fig. 4 is a detail sectional view through the compressing-washer, the bolt being shown in elevation. Fig. 5 is a top plan view of the lock-washer, the upper flange of the compressing-chamber being shown beneath it.

The mechanism forming the subject-matter of the present invention is constructed for the purpose of improving the connection with the foot and leg portions of an artificial limb, and especially for the improvement in means for adjusting and controlling the tension of the heel-bolt of the artificial leg.

In the accompanying drawings, 1 indicates the leg portion of an artificial limb; 2, the foot portion thereof; 3, an ankle-bolt, and 4 a heel-bolt. The lower end of the leg 1 is reduced in size and is provided with a supporting end portion 5, which fits into a socket 6, formed in the upper surface of the foot 2. A yielding or cushion block 7 is mounted in the socket and permits of a rocking movement between the foot and leg to the extent permitted by the heel-bolt. The ankle-bolt is formed with a joint 8, which permits of such articulation between the parts. The leg portion 1 is hollow for the greater portion of its length, but is closed at its lower end, and a bolt-holding block 9 is mounted in the lower closed end of the said leg. This block receives the

upper ends of the ankle-bolt 3 and the heel-bolt 4.

The heel-bolt 4 is formed in two sections, one of which passes through the heel portion 10 of the foot and is secured therein in any suitable manner. The upper end of the lower section of said heel-bolt is provided with an eye 11, which engages a correspondingly-formed eye 12 in the lower end of the upper heel-bolt section. The upper portion of the upper heel-bolt section passes upwardly through a recess or socket 13, which is formed in the block 9. Within this recess is mounted the heel tension-spring 14. The said heel tension-spring is made approximately the size of the socket 13, in which it fits. The weight of the heel-bolt 4 is suspended upon the upper end of the tension-spring 14 by means of a washer or sleeve-nut 15, which is made of a suitable diameter to fit the recess 13, and is thus sufficiently large to rest upon the spring 14. The sleeve nut or washer 15 is so constructed that its lower end may extend into the socket 13, and yet its upper end may project a sufficient distance above the same to permit of the adjustment of the said washer or sleeve-nut for increasing or diminishing the tension of the spring 14. The said washer or sleeve-nut is thus formed of a tubular body portion 16, formed with an annular flange 17 at its lower end and an annular flange 18 at its upper end. The tubular body portion 16 of the said sleeve-nut or washer is internally threaded, so as to be capable of engaging the threads upon the upper end of the heel-bolt.

In order to prevent any rattling of the heel-bolt or of the spring within the recess 13, the lower portion of the sleeve-nut or washer is provided with yielding means, which projects therefrom around the periphery thereof in such a manner as to engage the walls of the recess 13 and prevent lateral movement of the upper end of the bolt and any vibration of the said sleeve washer or nut within the recess. In order to hold such a washer in place or other packing material, the lower end of the sleeve-nut or washer may be formed with projecting annular walls or flanges, between which the yielding material or packing may be held. I have illustrated in the drawings, however, a simple means of securing such a yielding material or packing in position, the said means comprising one or more annular or segmental plates 20, which are placed

above the packing material and press the same against the lower flange 17 of the sleeve-nut or washer. The plates 20 may be secured in place by screws or rivets, which connect the same with the lower flange 17 of the washer or nut 15. The packing or sound-deadening material is made to project beyond the peripheral edges of the lower flange 17 and the segmental plates or washer 20, so that the packing material is the only portion of the washer mechanism which engages the walls of the recess 13.

When the block 9 is formed of wood, as it usually is for the sake of lightness, it is generally desirable to provide the recess 13 with a metallic lining, as 21, to prevent undue wear upon the material of said block. It is not essential, however, that such lining be employed. The tubular portion with the washer or nut 15 is made of sufficient length to carry the upper flange 18 thereof above the block 9 and to keep the said flange a sufficient distance above said block to render the same easily accessible for turning the washer or nut, and thus adjusting the tension of the heel-spring 14. The diameter of the upper flange 18 is preferably made greater than the diameter of the lower flange, so that the periphery of the said flange will project a sufficient distance at the rear portion of the hollow leg to be easily reached by the fingers of any one desiring to adjust it. I preferably form the upper flange with a series of serrations or notches 22, the said notches serving the double purpose of facilitating the turning or adjusting of the nut or washer 15 and also affording means for locking the said washer or nut in its different positions. In order to lock the tension-washer 15, a locking-washer 23 is employed and is arranged above the flange 18. The said washer surrounds the upper section of the heel-bolt 4, but is not provided with threads, said washer having a sufficiently large aperture formed therein to slip easily over the threads of the bolt. The washer 23 is, however, formed with an inwardly-projecting detent or lug 24, which engages an elongated kerf or keyway 25, formed in the end of the upper heel-bolt section. The detent or lug 24 by its engagement with the kerf or keyway 25 prevents the washer from turning upon the bolt, though it may slip longitudinally thereon. The said locking-washer 23 is provided with a laterally-projecting pivoted arm 26, which carries a projection or lug 27, which is made of a proper width or thickness to permit of its extending into and engaging the recesses formed in the periphery of the flange 18. The pivoted or hinged arm 26 is capable of being turned upwardly from a horizontal locking position to an inclined or vertical position, as indicated in dotted lines in Fig. 2, at which time the said arm carries the projection or lug 27 out of engagement with the recess formed in the

periphery of the flange 18. The inner end of the arm 26 is formed with an eye 28, which engages a pintle 29, carried in similar eyes formed upon the lock-washer 23. A spring detent or lug 30 projects from the lock-washer 23 in such a manner as to engage flattened surfaces 28^a, formed upon the eye 28. The spring action of the lug 30 makes it possible to raise or lower the arm 26, but by its engagement with the flattened surfaces upon the eye 28 tends to hold the arm either in its raised or lowered positions. It will be observed that when the arm 26 is turned downwardly the lug is carried between the projections formed by the notches or serrations upon the edge of the washer 18, and since the lock-washer 23 cannot turn upon the bolt the tension washer or sleeve will also be prevented from turning upon the said bolt. By turning the arm upwardly and removing the lug 27 from between the projections upon the washer-flange 18 the washer may be released, so that it can be turned upon the threads of the bolt for tightening or loosening the tension-spring.

The lock-washer 23 is held against the face of the flange 18 by means of a spring 31, which surrounds the upper section of the heel-bolt 4, the said washer being held between the lock-washer 23 and an adjustable collar or ring 32. The collar or ring 32 is provided with internal screw-threads, which engage the threads of the heel-bolt, so that the said collar may be adjusted to different points upon the bolt, and thus always maintain a proper tension upon the spring 31. The collar is held in its adjusted positions by means of a set-screw 33, which extends through the collar and engages the heel-bolt.

I usually prefer to also use in the socket in addition to the tension-bolt 14 an antirattling spring 34, which is made smaller than the spring 14, so as to fit within the same, and is preferably made tapering in shape from one end to the other, so that one end of the spring engages the bolt quite closely, while the other end fills and touches the inner portion of the coiled tension-spring 14. The washer 15 controls the compression of both the heel tension-spring and the inner anti-friction-spring 34. Where screws are employed for securing the segmental washer-plates 20 upon the packing, they are preferably inserted from the washer side, and in order to facilitate their manipulation and permit of the passage of a screw-driver to the heads of said screws the upper flange 18 of the tension-washer may be provided with apertures 35, which may be arranged over the ends of the screws when it is necessary to assemble the parts or separate them, as when it is necessary to insert a new packing. In forming the locking-washer the said washer may be made of a single piece of material or may be formed of separate pieces secured to-

gether, the lower piece or plate thereof carrying the eyes through which the pintle of the hinged arm is passed, while the central portion carries the internal lug or detent 24, and the upper portion or plate is provided with a spring projection or lug which holds the hinged arm in its raised or lowered position. This and other minor changes which may be made in the construction of parts fall within the spirit and scope of the present invention.

The utility of the invention will be readily seen when it is understood that the tension of the heel-bolt may be readily varied by the wearer of the leg without the necessity of removing the leg. It is only necessary for him to lift the locking-arm 26, so as to disengage the washer, when the said washer may be turned upon the threads of the bolt for tightening or releasing the heel tension-spring, after which the locking-arm may be turned downwardly again for holding the washer in its adjusted position. The locking-washer is so arranged upon the bolt that the end of the arm projects through the longitudinal opening 36 at the rear of the leg, and may thus always readily be reached by the hand of the operator. The projections formed upon the periphery of the flange 18 also project a sufficient distance through the said rear opening 36 to be easily reached and engaged by the fingers of the operator in the event of it being necessary to compress the spring. In the event of the washer 15 descending below the reach of the spring 31 it is only necessary to loosen the set-screw 33, when the collar 30 may be rotated upon the threads of the heel-bolt, so as to bring the spring again into engagement with the locking-washer and force it downwardly upon the tension nut or washer 15. The range of adjustment of the parts is thus made amply great to cover the requirements in all cases. The construction of the device is such that the tension upon the heel-bolt may be made to exactly suit the use of the artificial leg, and a nice adjustment of the parts may be had. It will be apparent that this mechanism may be employed with any kind of a bolt which connects articulating sections of a limb or other device; but it is especially well adapted for the control of an artificial leg, facilitating the reaching of the parts and the effecting of their adjustment and yet not projecting from the leg a sufficient distance to be in the way.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In an artificial leg, the combination of a leg portion and a foot portion, of a heel-tension device, comprising a bolt, a tension-washer having its periphery extending beyond the walls of the leg portion, and means for locking the same in different positions.

2. A tension-controlling device for artificial legs, comprising a bolt, a compression-

spring, an elongated washer mounted on the bolt and having at one end a spring-compressing portion, and at the other end a projecting hand-engaging portion by which the washer may be turned for adjustment, and means for holding the washer in its adjusted positions.

3. A tension-controlling device for artificial limbs, comprising a bolt for connecting the parts of the limb, a compression-spring carried by the bolt, a washer engaging threads upon the bolt and having a cylindrical body portion and end flanges, one flange engaging the spring for compressing it and the other flange forming an annular projection upon the washer by which it may be turned for adjustment.

4. An antirattling tension-adjusting device for artificial limbs, comprising a bolt, a tension-spring, a washer for compressing the spring and a cushioning material carried by the said washer and engaging surrounding parts of the artificial limb to prevent the rattling of the parts.

5. A tension-controlling device for the articulating joint of an artificial leg, comprising a bolt connecting the parts, a spring surrounding the bolt and fitting in a socket in one of the parts, the said bolt having threads upon its ends, an elongated washer mounted on the threaded bolt and projecting into the said socket at one end for maintaining a proper tension upon the spring, the other end of the washer projecting outside the socket and formed with roughened edges whereby it may be easily turned by hand.

6. A tension device for the joints of artificial limbs, comprising a tension-spring, a washer engaging the spring, a detent engaging the washer for holding it in its adjusted positions, and means for holding the detent normally in contact with the washer.

7. A tension-controlling device for the joints of artificial limbs, comprising a spring, a compressing-washer having an operating-flange, a locking-washer mounted adjacent to the flange and means carried thereby for gripping the edge of the flange on the compressing-washer.

8. A tension-controlling device for the joints of artificial limbs, comprising a tension-spring, a compressing-washer therefor, a locking-washer capable of engaging the tension-washer and holding it against turning, a spring for holding the locking-washer against the tension-washer and means for adjusting the tension of the said latter spring.

9. A tension-controlling device for the articulating joints of artificial limbs, comprising a spring, a tension-bolt passing through the same having a threaded end, a kerf or groove formed in the said bolt, a spring-compressing washer mounted upon the bolt, a locking-washer also mounted upon the bolt and having a detent engaging the groove in

said bolt, and means carried by the said washer and capable of gripping the spring-compressing washer for preventing its turning on the bolt.

5 10. A tension-controlling device for the joints of artificial limbs, comprising a coiled spring, a bolt passing through the same, having a threaded end and a groove formed therein, a washer for compressing the spring
10 mounted upon the bolt, a locking-washer also mounted upon the bolt provided with an inwardly-extending detent or finger engaging the groove and a movable gripping-arm mounted upon the locking-washer and capable
15 of engaging the spring-compressing washer for preventing its turning.

11. A tension device for the heel-bolt of an artificial leg, comprising a bolt, a tension-spring surrounding the same, a compressing-
20 washer mounted on the said bolt and engaging the spring, the bolt being provided with an elongated groove, a locking-washer provided with means engaging said groove, a pivoted arm carried by the locking-washer
25 and provided with gripping means for engaging the spring-compressing washer, the arm being also capable of being turned out of engagement with the compressing-washer when it is to be adjusted and means for actuating
30 the locking-washer in engagement with the compressing-washer.

12. A tension device for the heels of artificial legs, comprising a jointed heel-bolt, the said leg being provided with a socket surrounding the same, a spring mounted in the socket and surrounding the bolt, an antirattling washer engaging the bolt, one end of the washer being provided with yielding packing material projecting from the periphery thereof, the packed end of such washer
40 being made to just fit the bore of the recess in the leg, a projecting washer-operating flange having notches in its periphery by which it may be turned for adjusting the washer, and

locking means mounted on the bolt and capable of engaging the said notches for preventing the turning of the spring-compressing washer. 45

13. A tension device for artificial-limb heel-bolts, comprising a bolt, a tension-spring surrounding the same, an elongated washer, the washer being formed with an elongated sleeve portion engaging the bolt, and annular flanges at each end thereof, a washer of yielding material secured to one of said flanges,
50 one or more plates for holding the washer in position against said flange, and means engaging the other flange for preventing the turning of the compressing-washer upon the bolt after it has been adjusted. 55

14. A tension device for the heels of artificial legs, comprising a heel-bolt having a threaded and grooved end portion, a compression-spring surrounding the bolt, a washer engaging the spring, the said washer
65 having end flanges separated upon the body portion of the washer, one of said washers engaging the spring while the other projects beyond the periphery of the leg, projections formed upon the said projecting flange, a
70 locking-washer mounted upon the bolt having a detent engaging the groove therein, a spring-controlled arm carried by the locking-washer, a detent projecting from the arm and capable of engaging the projections on the
75 flange of the compressing-washer, an adjusted collar mounted upon the bolt, and a spring interposed between the collar and the locking-washer for holding it normally against the spring-compressing washer. 80

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

GEORGE E. WILKINS.

Witnesses:

A. R. WATERHOUSE,
H. A. HENKEL.