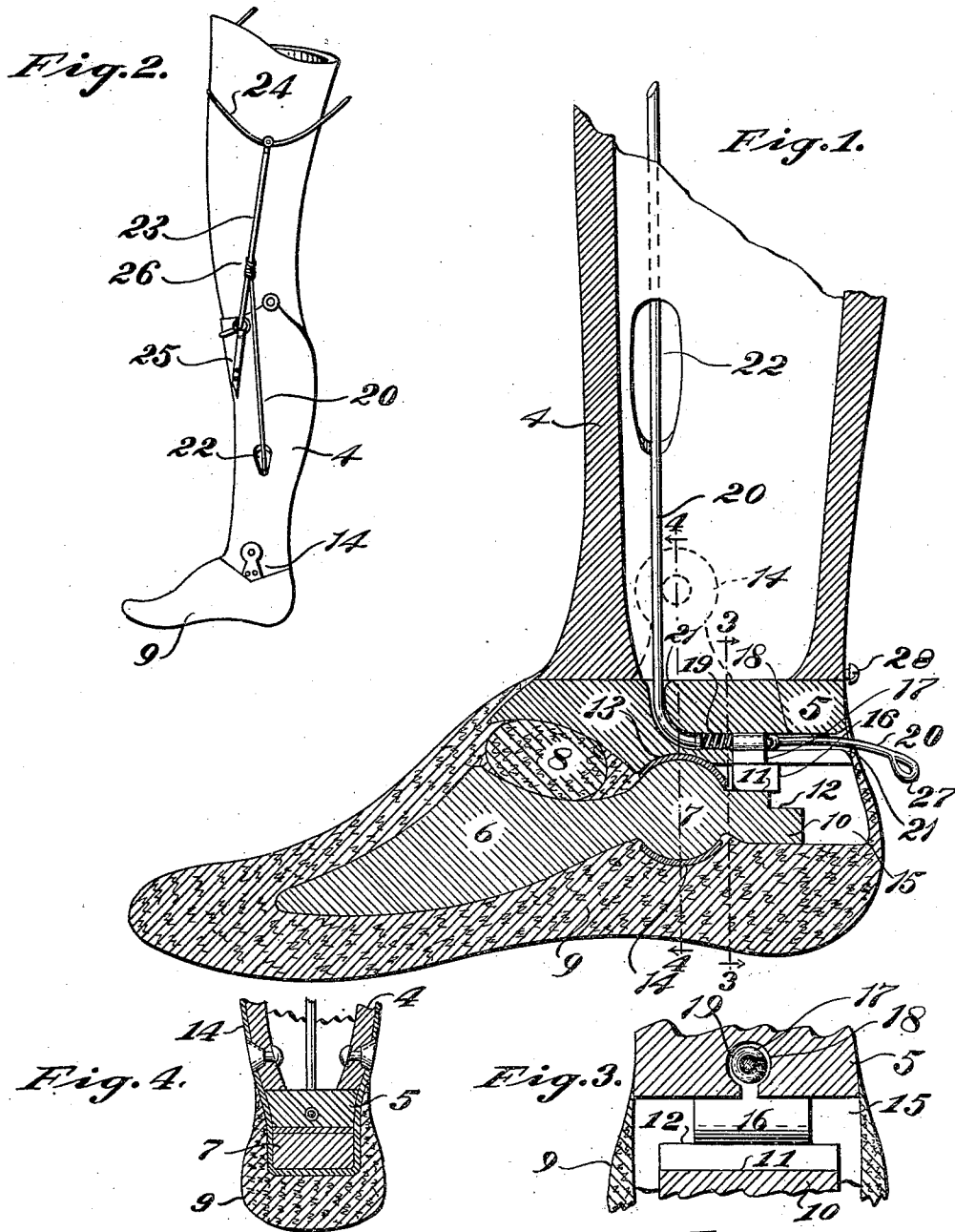


J. F. ROWLEY.
ARTIFICIAL FOOT.
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UNITED STATES PATENT OFFICE.

JAMES F. ROWLEY, OF CHICAGO, ILLINOIS.

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Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, JAMES F. ROWLEY, a citizen of the United States of America, and a resident of Chicago, Cook county, Illinois, have invented certain new and useful Improvements in Artificial Feet, of which the following is a specification.

The main objects of this invention are to provide a simple and improved form of ankle joint for artificial limbs; to provide for adjusting the limit of movement of such joint; and to provide for automatically controlling the movement of the joint in such manner that when the wearer is standing erect, the movement of the foot of the artificial limb will be confined between the limits which are proper for a correct walking action, and whereby when the wearer of the limb is seated, the relaxation of the tension on the suspender will automatically release the foot and permit it to lie flat upon the floor even when the leg is inclined backward at a considerable angle. These objects are accomplished by the device shown in the accompanying drawings, in which:

Figure 1 is a longitudinal section of a portion of the shin section and foot of an artificial limb constructed according to this invention. Fig. 2 is a side elevation of a complete artificial limb including a shin-section and thigh-section for use in cases where the amputation has been made above the knee, showing the connections of the ankle joint controlling mechanism with the suspender. Fig. 3 is a transverse section on the line 3—3 of Fig. 1. Fig. 4 is a reduced section on the line 4—4 of Fig. 1.

In the construction shown in the drawings, the lower leg member or shin section 4 is hollow and is provided at its lower end with the usual ankle block 5 to which the foot member or core 6 is fulcrumed to form an ankle joint at 7. The toe end of the core 6 is normally urged downwardly by a resilient rubber cushion 8 which is interposed between adjacent parts of the core and ankle block and normally urges the foot core to an extended position with respect to the shin section. The foot core and joint is surrounded by a mass of resilient sponge rubber 9 which gives form to the foot. The core 6 has a part 10 extending rearward of the ankle joint and having in its upper surface a plurality of steps or shoulders 11 and 12

located at different angular positions with respect to the fulcrum 7.

In the form shown, the ankle-block 5 has a concave seat 13 cooperating with a bulb on the foot core, fitting said seat. A stirrup 14 extends around the bottom of the bulb of the foot core and holds the same securely upon its seat. The stirrup 14 is U-shaped and is securely fastened to the shin member at each side. The co-acting parts of the joint are preferably of cylindrical curvature so as to confine the rotation of the core to a single plane. The padding of sponge rubber at the heel of the foot is hollowed out to form a cavity 15 within which the part 10 of the foot core may swing under the action of the cushion 8.

A stop block is slidably mounted on the ankle-block 5 and has a limited movement in the cavity 15 from a forward position for engaging the shoulder 11, as shown in Fig. 1, to a rearward position where it will clear both shoulders 11 and 12 of the foot core. The block 16 is provided with a headed part 17 which slides in a T-slot 18 in the ankle-block 5. The inner portion of the T-slot 18 is preferably cylindrical and forms a seat for the spring 19 which normally urges the stop block 16 to its rearward position. A cord or part 20 extends through a channel 21 in the ankle-block 5, then through the center of the spring 19, and through an aperture in the head 17. The cord is knotted at the rear of the head 17, and is provided with a loop 27 at the end. The other end of the cord 20 extends upwardly within the shin section 4, passes out through one of the ventilating holes 22, and is then fastened to the strap 23 which forms a part of the suspender which supports and controls the movement of the shin section. The strap 23 is connected by a loop 24, to the upper parts of the suspender which are not shown, and is connected to the shin section at 25, a considerable distance below the point of connection 26 between the cord 20 and the strap 23. The particular form of limb which is shown is one suitable for use where the amputation was at a point above the knee. The various parts which affect the movement of the foot are, however, also adapted for cases where amputation is below the knee. The operation of the device shown is as

follows: When the wearer stands in an erect position, the suspender will exert a slight tension on the strap 23 and thus cause a strain upon the cord 20. This will draw the stop 16 forward into position for engaging the shoulder 11, thus limiting the downward movement of the toe of the foot to about the position shown in Fig. 1. As soon as the tension on the cord 20 is relaxed, as would be the case when the wearer is seated, the spring 18 forces the stop 16 to its extreme rearward position and the foot is then free to swing forward and downward under the action of the resilient cushion 8 so as to accommodate itself to any angle at which the shin section may be inclined to the floor. This permits the foot to assume a perfectly natural position when the leg is inclined to a surface upon which the foot rests; but as soon as the wearer stands erect, as when standing still or walking, the stop 16 is automatically pulled forward so as to hold the foot in its normal position and prevent it from swinging downward to a position which would be unnatural in the act of walking. If it is desired to limit the movement of the foot-core to a point intermediate of the extreme limits of movement for which the joint is constructed, then the loop 27 at the end of the cord 20 may be fastened to the shin section by means of a screw 28. This will limit the forward movement of the stop 16 and cause the same to assume a position for engaging the shoulder 12 instead of the shoulder 11, when the cord is pulled by the suspender.

What I claim as my invention and desire to secure by Letters Patent is:

1. In an artificial limb, the combination of a shin section, a foot-member fulcrumed thereon, a stop movable transversely of the shin section and adapted to vary the limit of relative movement of said members on their fulcrum, and means for shifting said stop.

2. An artificial limb, comprising an upper member and a lower member connected by a joint providing for their relatively angular movement, a relatively movable stop acting between said members and adapted when shifted to establish different limits to the relative angular movement of said members, a suspender adapted for attachment to the body of the wearer, and adapted to shift said stop through movement of the body, and means for holding said stop in the position to which it is shifted by said suspender.

3. In an artificial limb, the combination of a shin-section, a foot-member fulcrumed thereon, a stop acting between said foot-member and shin section and movable into and out of position for preventing a certain relative movement thereof, and means

adapted to be connected with the body of the wearer above the limb and adapted to shift said stop through a certain movement of the wearer's body.

4. In an artificial limb, the combination of a shin section, a foot-member fulcrumed thereon, a stop acting between said foot-member and shin section and movable into and out of position for preventing a certain relative movement thereof, yielding means normally urging said stop out of such position, and means adapted to be operated from above for shifting said stop into such position.

5. In an artificial limb, the combination of a shin member, a foot-member fulcrumed thereon, one of said members having a plurality of shoulders corresponding to different relative angular positions of said members, and a movable stop engaging the other member and arranged to be shifted into contact with different shoulders to limit the relative movement of said members on their fulcrum.

6. In an artificial limb, the combination of a shin member, a foot member fulcrumed thereon, one of said members having a plurality of shoulders corresponding to different relative angular positions of said members, a movable stop engaging the other member and arranged to be shifted into contact with different shoulders to limit the relative movement of said members on their fulcrum, and a connection extending above the fulcrum for shifting the stop.

7. In an artificial limb, the combination of a shin section, a foot-member fulcrumed on said shin section, one of said parts having thereon a plurality of shoulders arranged in different angular positions with respect to said fulcrum, a stop movably mounted on the other of said parts and adapted to co-act with each of said shoulders for limiting the movement of said foot-member on its fulcrum, means normally urging said stop toward a position permitting the greatest range of relative movement of said parts, and a connection extending upwardly along said shin section for shifting said stop against the action of said means.

8. In an artificial limb, the combination of a shin section, a foot-member fulcrumed on said section and normally urged to extend the toe of the foot downwardly, said foot-member being extended rearward of its fulcrum, a movable block adapted to be shifted into and out of engagement with said rearward extension for controlling the movement of said foot-member, and means for shifting said block.

9. In an artificial limb, the combination of a shin section, a foot-member fulcrumed on said section and normally urged to extend the toe of the foot downwardly, said foot-member being extended rearward of its ful-

crum, a movable block adapted to be shifted into and out of engagement with said rearward extension for controlling the movement of said foot-member, a spring normally urging said block out of engagement with said extension, and a connection extending upwardly along said shin section and adapted to move said block into position for engaging said extension and securing said foot-member against a downward movement.

10. In an artificial limb, the combination of a shin section, a foot-member fulcrumed thereon, a resilient cushion interposed between said foot-member and shin section in front of its fulcrum and normally urging the toe of the foot-member downwardly, said foot-member being extended rearward of the fulcrum and said extended part having a plurality of shoulders opposed to the shin section and occupying different angular positions with respect to the fulcrum, a movable stop slidably mounted on said shin section and adapted to be shifted along the

same to engage different shoulders of the foot-member and thereby vary the limit of its movement, and means for shifting said stop.

11. In an artificial limb, the combination of a thigh section, a shin-section hinged thereto at the knee, a foot-member fulcrumed on said shin section, movable means adapted in one position to limit the foot-member to a certain angular movement with respect to the shin-section, and adapted in another position to permit a further angular movement of the foot-member with respect to the shin-section, and a suspender having a part adapted to control the relative movement of said thigh and shin-sections and having a second part adapted to control the movement of said means.

Signed at Chicago this 3rd day of February 1906.

JAMES F. ROWLEY.

Witnesses:

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