Jan. 27, 1959 S. VASQUEZ 2,870,453

ARTIFICIAL LIMBS

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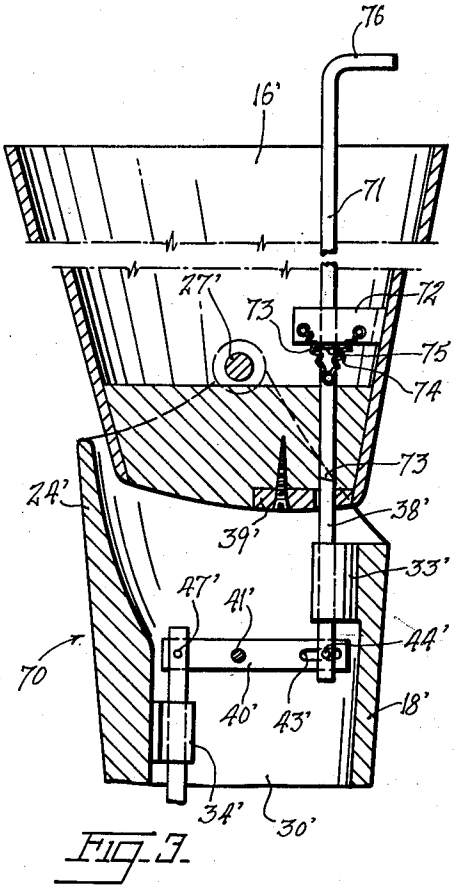



FIG. 3.




FIG. 1.

INVENTOR
SOFANOR VASQUEZ
BY
ATTORNEY

Jan. 27, 1959 S. VASQUEZ 2,870,453

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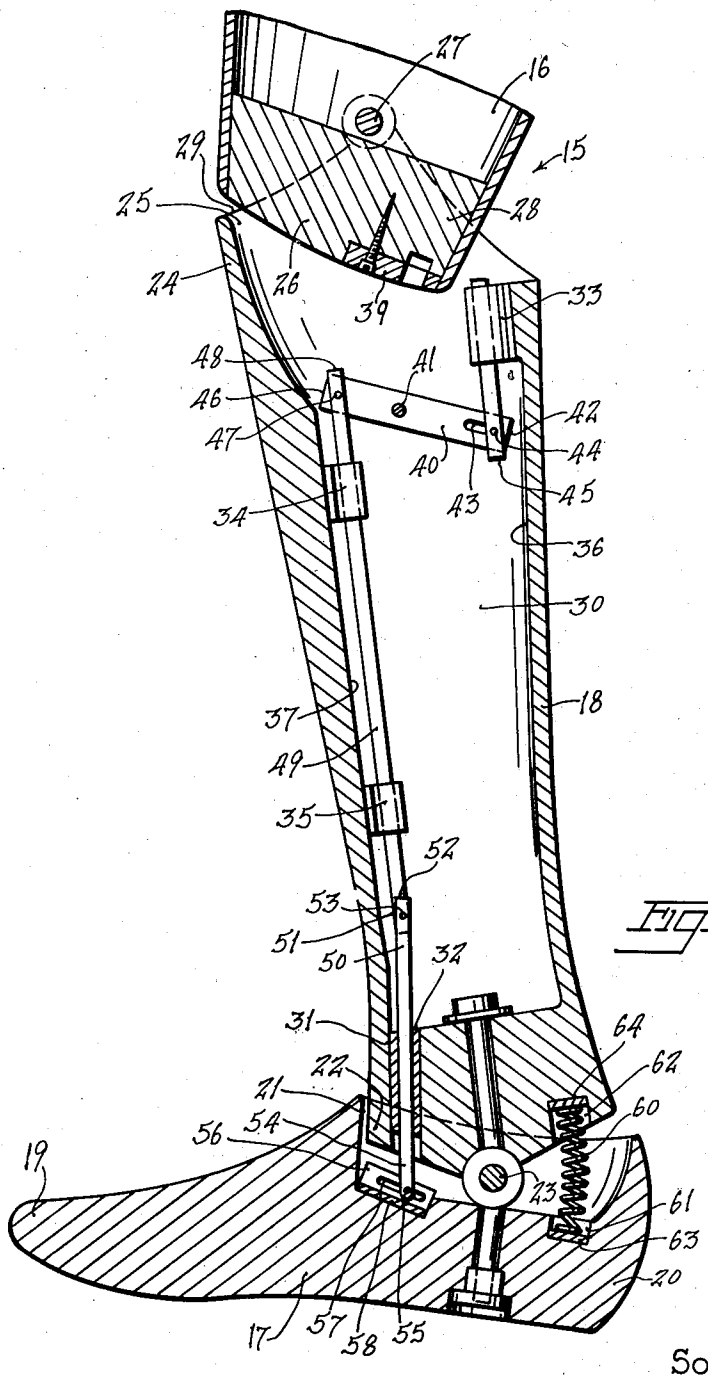



FIG. 2.

INVENTOR
SOFANOR VASQUEZ

BY Zoltan Holachek

ATTORNEY

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2,870,453

# ARTIFICIAL LIMBS

Sofanor Vasquez, Barranquilla, Colombia

Application May 16, 1955, Serial No. 508,726

2 Claims. (Cl. 3—26)

This invention relates to new and useful improvements in artificial limbs.

More particularly, the present invention proposes the construction of an improved artificial leg having pivotable thigh, calf and foot members which will automatically move to simulate leg movements when the wearer performs normal walking actions and which will automatically lock in place securely to support the wearer when he is resting upon the leg.

As a further object, the present invention proposes forming the artificial leg with a simple and efficient locking latch to lock the thigh and calf members in axial alignment and foot operable means to operate the latch by normal foot movements.

Still further, the present invention proposes constructing the artifical leg with a resilient spring normally biasing the calf member around the foot member, said spring being disposed in the leg so as automatically to be counteracted by movement of the toe portion of the foot.

Another object of the present invention proposes forming the artifical leg with a manually operable latch release for pivoting of the leg members without using the foot operable latch releasing means.

For further comprehension of the invention, and of the objects and advantages thereof, reference will be had to the following description and accompanying drawings, and to the appended claims in which the various novel features of the invention are more particularly set forth.

In the accompanying drawings forming a material part of this disclosure:

Fig. 1 is a vertical sectional view of an artifical leg constructed and arranged in accordance with the present invention.

Fig. 2 is a view similar to Fig. 1 but showing the leg parts in a walking position.

Fig. 3 is a fragmentary vertical sectional view similar to Fig. 1 but illustrating a modification of the present invention.

The artificial leg, in accordance with the first form of the invention illustrated in Figs. 1 and 2, is designated generally by the reference numeral **15**.

Artificial leg **15** has an upper thigh member **16**, a lower foot member **17** and an intermediate calf member **18**.

Foot member **17** has a toe portion **19** and a heel portion **20**. Foot member **17** also has a socket portion **21** and the lower end **22** of the calf member **18** is pivotally mounted in this socket portion **21** of the foot member **17** between the toe and heel portions by a pivot pin **23**.

Calf member **18** has an upper end **24** with a socket portion **25** into which the lower end **26** of upper thigh member **16** is pivotally mounted on a pivot pin **27**. The adjacent socket portions **25** and **28** of the calf and thigh members respectively and the stop edges **29** on the calf member **18** limit the degree of pivoting of the calf member on the thigh member.

Likewise, the socket portion **21** on the foot member



and socket portion or lower end **22** of the calf member **18** limit the degree of pivoting of the foot and calf members.

Calf member **18** has a central axial chamber **30** extending the length of the calf member, the lower portion **31** of the chamber being restricted to a bar or rod opening containing a bearing or sleeve **32**.

Mounting brackets **33**, **34** and **35** are mounted in the axial chamber **30** fixed to the walls of the chamber in spaced relation, the bracket **33** being mounted on the rear wall **36** and the brackets **34** and **35** being mounted on the front wall **37**.

A latch bar **38** is vertically and slidably mounted in the bracket **33** for latching engagement with the wall of a socket opening **39'** of a latch plate **39** fixed to the lower end of the upper thigh member. The latch plate **39** and latch bar **38** are mounted so as to be in latching alignment when the thigh and calf members are axially aligned.

A lever **40** is centrally fulcrumed on pivot pin **41** in the central axial chamber of the calf member extending across the chamber. One end **42** of lever **40** has a slotted opening **43** and is pivotally secured by a pin **44** to the lower end **45** of tne latch bar **38**, pin **44** extending through the slotted opening **43** for slidable movement.

Lever **40** has another end **46** which is connected by a pivot pin **47** to the upper end **48** of a connecting arm **49**.

Connecting arm **49** is one of a pair of connecting arms **49** and **50** vertically mounted adjacent the front wall of the axial chamber in the calf member, and arm **49** is slidably mounted in brackets **34** and **35**.

The lower end **51** of arm **49** is pivotally connected to the upper end **52** of arm **50** by a pivot pin **53**. Arm **50** extends slidably through the bearing or sleeve **32** in the lower end of the axial chamber of the calf member and into the socket portion of the foot member. The arm **50** has a lower end **54** connected by a hinge pin **55** with a push block **56**.

Push block **56** has a slot opening **57** through which pivot or hinge pin **55** slidably and pivotally extends. Push block **56** is disposed in the socket portion of the foot member and adjacent to and adapted to rest and bear upon a bearing plate **58** fixed to the foot member in the toe portion thereof in front of the fulcrum or pivot pin **23** connecting the calf and foot members.

A compression spring **60** is mounted in and between the heel portion **20** of foot member **17** and the calf member **18** in spring recesses **61** and **62** of the foot and calf members respectively. Bearing plates **63** and **64** are mounted in the spring recesses **61** and **62**, respectively.

Spring **60** normally urges or biases the foot and calf members apart at the heel portion of the foot and back of the calf member so as to pivot the calf member on pivot pin **23**.

The operation of the artificial leg **15** is as follows. When the wearer is standing upon the leg or whenever the leg is hanging vertically with all members (**16**, **17** and **18**) in axial alignment, the latch bar is engaged in socket **39'** and is held in such engagement by the linkage arms connected thereto.

When the wearer of the leg begins to walk on it, he presses down upon the toe of the foot portion which releases the latch bar and permits the calf member to pivot on pivot pin **27** connecting it to the thigh member. The natural movement of the leg swinging back reengages the latch bar at the proper time so that the leg is ready for the weight of the wearer again to be supported on it.

The modification of the invention illustrated in Fig. 3 is characterized by the provision of an artificial leg **70** constructed generally the same as leg **15** and with similar parts given the same reference numerals but primed

in Fig. 3 to distinguish the figures. In addition, however, leg 70 has a latch releasing lever 71 slidably mounted in bracket 72 in the thigh member 16'. The lower end 73 of the latch releasing lever 71 is disposed adjacent the latch bar 38' for pushing the latch bar from the latch plate 39'. A pair of springs 74 normally bias the latch releasing lever 71 from the latch bar 38' and a stop ring 75 keeps the lower end 73 of the lever 71 against the latch bar 38'. The upper end 76 of the latch release lever 71 extends from the upper end of the thigh member 16' for hand operation.

While I have illustrated and described the preferred embodiments of my invention, it is to be understood that I do not limit myself to the precise constructions herein disclosed and that various changes and modifications may be made within the scope of the invention as defined in the appended claims.

Having thus described my invention, what I claim as new, and desire to secure by United States Letters Patent is:

1. An artificial limb comprising an upper thigh member, a lower foot member with heel and toe portions, and an intermediate calf member having one end pivotally connected with the upper thigh member and one end pivotally connected with the lower foot member between the heel and toe portions, said calf member having a central axial chamber, coacting calf and thigh member latch means mounted in the calf and thigh members to hold said members in fixed axial alignment, foot operable latch operating means in the calf and foot members to release and reset said latch means, connecting linkage lever means in the central axial chamber of the calf member operatively connecting said foot operable latch operating means and said latch means, said latch means being a latch bar slidably mounted in the calf member and a latch plate fixed to the upper thigh member, said foot operable latch operating means being a push block and a bearing plate, said bearing plate being mounted in the lower foot member, said connecting linkage lever means being a lever centrally fulcrumed in the central axial chamber of the calf member, said lever having two ends one of which being pivotally and slidably connected to the latch bar, and a pair of connecting arms slidably mounted in the central axial chamber of the calf member and pivotally connected together and pivotally connected to the other end of said lever and to said push block, said lever end pivotally connected to the latch bar having a slot opening therein and a pivot pin slidably extending through said slot opening and fixed to said latch bar, said push block having a slot opening therein and a pivot pin extending through said slot opening in the push block and secured to one of the connecting arms, and resilient compression spring means mounted in and between said heel portion of the foot member and said calf member normally biasing said calf member around its pivotal connection with said foot member.



2. An artificial limb comprising an upper thigh member, a lower foot member with heel and toe portions, and an intermediate calf member having one end pivotally connected with the upper thigh member and one end pivotally connected with the lower foot member between the heel and toe portions, said calf member having a central axial chamber, coacting calf and thigh member latch means mounted in the calf and thigh members to hold said members in fixed axial alignment, foot operable latch operating means in the calf and foot members to release and reset said latch means, connecting linkage lever means in the central axial chamber of the calf member operatively connecting said foot operable latch operating means and said latch means, said latch means being a latch bar slidably mounted in the calf member and a latch plate fixed to the upper thigh member, said foot operable latch operating means being a push block and a bearing plate, said bearing plate being mounted in the lower foot member, said connecting linkage lever means being a lever centrally fulcrumed in the central axial chamber of the calf member, said lever having two ends one of which being pivotally and slidably connected to the latch bar, and a pair of connecting arms slidably mounted in the central axial chamber of the calf member and pivotally connected together and pivotally connected to the other end of said lever and to said push block, said lever end pivotally connected to the latch bar having an elongated slot opening therein and a pivot pin slidably extending through said slot opening and fixed to said latch bar, said push block having an elongated slot opening therein and a pivot pin extending through said slot opening in the push block and secured to one of the connecting arms, and resilient compression spring means mounted in and between said heel portion of the foot member and said calf member normally biasing said calf member around its pivotal connection with said foot member, and latch releasing means mounted in the thigh member manually to release said latch bar from the latch plate.


**References Cited** in the file of this patent

UNITED STATES PATENTS

| | | |
|---|---|---|
| 21,289 | Wilcox | Aug. 24, 1858 |

FOREIGN PATENTS

| | | |
|---|---|---|
| 305,433 | Germany | May 7, 1918 |
| 140,660 | Great Britain | Apr. 1, 1920 |
| 921,108 | France | Jan. 10, 1947 |