Specification of Thomas Brown : artificial limbs.

A.D. 1867, *6th June.* N° 1663.

SPECIFICATION

OF

THOMAS BROWN.

ARTIFICIAL LIMBS.

LONDON:
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A.D. 1867, 6th June. N° 1663.

Artificial Limbs.

LETTERS PATENT to Thomas Brown, of No. 96, Newgate Street, in the City of London, Civil Engineer, for the Invention of "Improvements in Artificial Limbs."—A communication from abroad by Amasa A. Marks, of the City, County, and State of New York, United States of America.

Sealed the 22nd November 1867, and dated the 6th June 1867.

PROVISIONAL SPECIFICATION left by the said Thomas Brown at the Office of the Commissioners of Patents, with his Petition, on the 6th June 1867.

I, Thomas Brown, of No. 96, Newgate Street, in the City of London, Civil Engineer, do hereby declare the nature of the said Invention for "Improvements in Artificial Limbs," a communication, to be as follows:—

The first part of the said improvements relates to the knee joint of an artificial leg and to the means for holding the said joint in any desired position, and consists chiefly in the employment of a T-shaped bracket or standard, which takes the place of the tibia, and whose lower or T-shaped end is provided with journals, which are fitted to work freely in oblique boxes secured in the interior of the knee pan. The centres of the said boxes coincide with the centre of the said knee pan, and these boxes are so situated that they are readily accessible, so that their caps can be easily removed when it is desired to separate the parts of the leg. When the knee joint is bent, as in sitting, it is retained in position by the action of a pear-shaped button with a spherical head, which works in a socket formed in the head of an oscillating vertical sliding rod or bolt; this rod or bolt is acted on by a spring, and is so situated in relation to the head of the button that when the knee joint is bent

the same is kept closed, and has no tendency to open spontaneously. The lower portion of the spring is inclosed in a box or tube of wood or other suitable material; the lower end of this box is rounded and fitted to work in a suitable concave bearing a socket formed inside the back part of the leg. When the leg is straightened or extended the said spring forces the rod or bolt up against the button and prevents the spontaneous bending of the leg, and if the same is bent at right angles the action of the spring on the button is such that the joint has a tendency to close rather than to open. If the person wearing the said leg sits down the knee joint bends readily, but will not allow the leg to stretch spontaneously.

The said improvements consist also in forming the wearing parts of the hand and foot partly of soft or "sponge" rubber and partly of hard rubber or wood. The soft rubber is used for the heel and body of the foot, and for the fingers and body of the hand, and imparts thereto the required degree of elasticity (corresponding as near as possible to the natural movements of these members), the hard rubber or wood being used to give the proper degree of solidity to enable the hand or foot to be secured to the wooden stumps attached to the remaining portion of the arm or leg to which the said hand or foot is to be applied; by this means the springs, pivots, joints, and other costly mechanism ordinarily employed in artificial hands and feet may be despensed with, and the same are rendered more easy to use and move durable.

The material known as "sponge" rubber which is employed to form the external portions of the hands and feet possesses great strength combined with elasticity; these portions are made in proper moulds of any required size and form. The hard or unelastic rubber or wood which serves to connect the hand or foot to the wooden stumps on the arm or leg is enclosed within the soft rubber. A ball-and-socket joint is used with the hand to allow the same to be set and secured in any required position, while the foot is directly and permanently attached to the stump, so that the said foot can be controlled absolutely by the movement of the remaining part of the natural leg of the wearer.

The natural movement of the foot is more closely imitated by these improvements than by any other means before known. The hand forms an artificial "show" limb, which conceals the loss of the real member, and which when grasped by another person has a more natural feeling than a rigid artificial hand.

Brown's Improvements in Artificial Limbs.

SPECIFICATION in pursuance of the conditions of the Letters Patent, filed by the said Thomas Brown in the Great Seal Patent Office on the 5th December 1867.

TO ALL TO WHOM THESE PRESENTS SHALL COME, I, THOMAS BROWN, of No. 96, Newgate Street, in the City of London, Civil Engineer, send greeting.

WHEREAS Her most Excellent Majesty Queen Victoria, by Her Letters Patent, bearing date the Sixth day of June, in the year of our Lord One thousand eight hundred and sixty-seven, in the thirtieth year of Her reign, did, for Herself, Her heirs and successors, give and grant unto me, the said Thomas Brown, Her special licence, that I, the said Thomas Brown, my executors, administrators, and assigns, or such others as I, the said Thomas Brown, my executors, administrators, and assigns, should at any time agree with, and no others, from time to time and at all times thereafter during the term therein expressed, should and lawfully might make, use, exercise, and vend, within the United Kingdom of Great Britain and Ireland, the Channel Islands, and Isle of Man, an Invention for "IMPROVEMENTS IN ARTIFICIAL LIMBS," upon the condition (amongst others) that I, the said Thomas Brown, my executors or administrators, by an instrument in writing under my, or their, or one of their hands and seals, should particularly describe and ascertain the nature of the said Invention, and in what manner the same was to be performed, and cause the same to be filed in the Great Seal Patent Office within six calendar months next and immediately after the date of the said Letters Patent.

NOW KNOW YE, that I, the said Thomas Brown, do hereby declare the nature of the said Invention, and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement, reference being had to the accompanying Sheet of Drawings forming a part of this Specification :—

The first part of the said improvements relates to the knee joint of an artificial leg, and to the means for holding the said joint in any desired position, and consists chiefly in the employment of a T-shaped bracket or standard which takes the place of the tibia, and whose lower or T-shaped end is provided with journals, which are fitted to work freely in oblique boxes secured in the interior of the knee pan. The centres of the said boxes coincide with the centre of the said knee pan, and these boxes are so situated that they are readily accessible, so that their caps can be easily removed when

it is desired to separate the parts of the leg. When the knee joint is bent, as in sitting, it is retained in position by the action of a pear-shaped button with a spherical head, which works in a socket formed in the head of an oscillating vertical sliding rod or bolt; this rod or bolt is acted on by a spring, and is so situated in relation to the head of the button that when the knee joint is bent the same is kept closed and has no tendency to open spontaneously. The lower portion of the spring is enclosed in a box or tube of wood or other suitable material. The lower end of this box is rounded and fitted to work in a suitable concave bearing or socket formed inside the back part of the leg. When the leg is straightened or extended the said spring forces the rod or bolt up against the button and prevents the spontaneous bending of the leg; and if the same is bent at right angles the action of the spring on the button is such that the joint has a tendency to close rather than to open. If the person wearing the said leg sits down the knee joint bends readily, but will not allow the leg to stretch spontaneously.

A bolt or other locking device of any suitable character may be combined with the mechanism of the knee joint, and arranged in such a manner that it can be adjusted or operated by the thumb or finger, or in any other convenient manner.

Description of the Drawings.

Figure 1 is a section of an artificial leg constructed according to my improvements, shewing the mechanism of the knee joint with the parts in the position they assume when the leg is straight as in standing.

Figure 2 is a back view of the said leg with parts in the same position.

Figure 3 is a side view, partly in section, illustrating the action of the said mechanism when the leg is bent as in sitting.

Like letters indicate the same parts in each of the Figures.

The T-shaped bracket or connection *a* is formed of iron, steel, or other suitable metal, and when made hollow or tubular, as represented, possesses great strength without adding materially to the weight of the limb. The shank a^1 is preferably constructed with the flange or base a^2, which is firmly secured by means of the screws *b* to the portion *c* of the leg, which portion is formed of wood or other material sufficiently strong and light. The journals a^3 of the bracket *a* are supported in the boxes or bearings *d* which are preferably formed in the solid portion of the part *e* of the leg. The said bearings are provided with the caps *f*, whose adjustment on the said journals is effected by means of the screws *g* or other suitable devices. The pear-shaped projection or button *h* is securely fixed or formed upon the back of the bracket *a*, and

the head of the said button is so formed and arranged in relation to the rod *i* that the latter which is kept in contact with the said head by the spring *j* will allow the button *h* to work freely in the socket i^1 as the leg moves in either direction. The spring *j* bears against the shoulder i^2 of the rod *i*, and against the lower end of the interior of the box or tube *k*, and keeps the rod *i* up to the button *h* with an even pressure while the tube oscillates upon its extremity k^1, which rests in the concave bearing e^1. This arrangement of the mechanism allows the knee joint to work freely and pleasantly in walking, but holds it when at rest, and also keeps the lower part *e* from swinging too loosely from the bearings *d*. It will be seen that the rod *i*, button *h*, and tube *k* are arranged to operate in such a manner that when the parts of the leg are in the position illustrated in either Figure 1 or Figure 3, the force of the spring *j* tends to keep the parts in such position, and that the leg will not move therefrom spontaneously.

The said improvements consist also in forming the wearing parts of the hand and foot partly of soft or sponge rubber, and partly of hard rubber or wood. The soft rubber is used for the heel and body of the foot, as shewn at *m*, Figure 1, and for the fingers and body of the hand, and imparts thereto the required degree of elasticity corresponding as near as possible to the natural movements of these members. The hard rubber or wood *n* is used to give the proper degree of solidity to enable the hand or foot to be secured to the wooden stump attached to the remaining portion of the arm or leg to which the said hand or foot is to be applied. By this means the springs, pivots, joints, and other costly mechanism ordinarily employed in artificial hands and feet may be dispensed with, and the same are rendered more easy to use and more durable.

The material known as "sponge" rubber, which is preferably employed to form the external portions of the hands and feet, possesses great strength combined with elasticity; these portions are made in proper moulds of any required size and form. The hard or unelastic rubber or wood which serves to connect the hand or foot to the wooden stumps on the arm or leg is enclosed within the soft rubber. A ball-and-socket joint is preferably used with the hand to allow the same to be set and secured in any required position while the foot is directly and permanently attached to the stump, so that the said foot can be controlled absolutely by the movement of the remaining part of the natural leg of the wearer. The natural movement of the foot is more closely imitated by the aid of these improvements than by any other means before known, and a hand constructed as herein described forms an artificial "show" limb which completely conceals the loss of the real

member, and which when grasped by another person has a more natural feeling than a rigid artificial hand.

Having thus fully described the said improvements as communicated to me by my foreign correspondent, and shown how the same may be conveniently and advantageously carried into practise, I claim,— 5

First, the oblique boxes or bearings *d* in combination with the gudgeons or journals a^3 of the T-shaped bracket *a*, and with the parts *c*, *e*, of an artificial leg for the purposes and substantially in the manner set forth.

Second, the pear-shaped button *h* on the bracket *a* arranged in combination with the spring *j*, rod *i*, and oscillating box or tube *k*, for the purposes and 10 substantially in the manner set forth.

Third, making feet and hands for artificial limbs of soft rubber combined with hard rubber or wood, substantially as and for the purposes herein set forth.

In witness whereof, I, the said Thomas Brown, have hereunto set my 15 hand and seal, this Fifth day of December, in the year of our Lord One thousand eight hundred and sixty-seven.

THOMAS BROWN. (L.S.)

Witness,

THO^S. N. PALMER, 20

Clerk to Messrs. Haseltine, Lake, & Co.,

8, Southampton Buildings, W.C.

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BROWN'S Specification.

(1 SHEET)

FIG. 1.

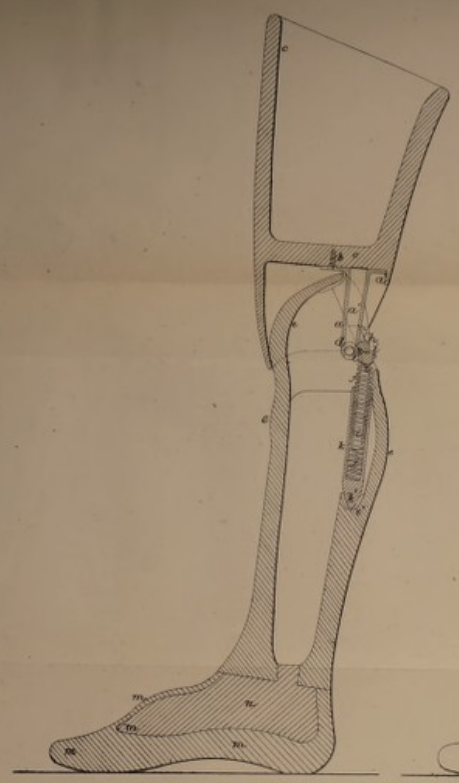


FIG. 3.

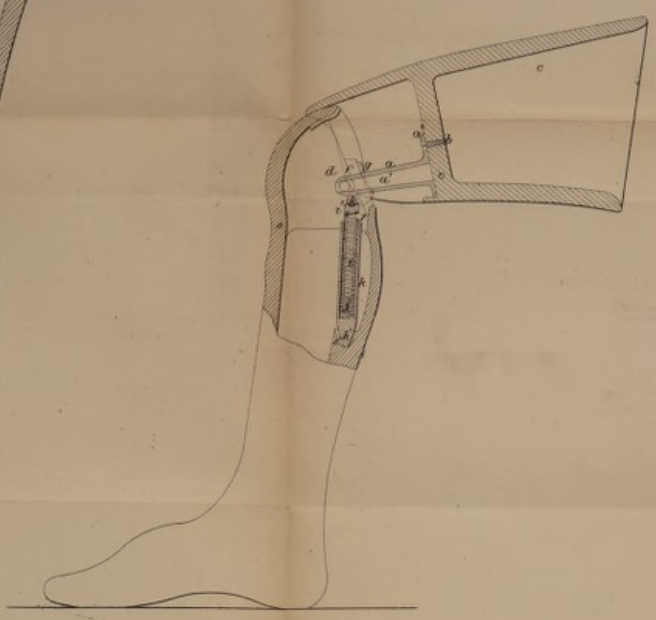
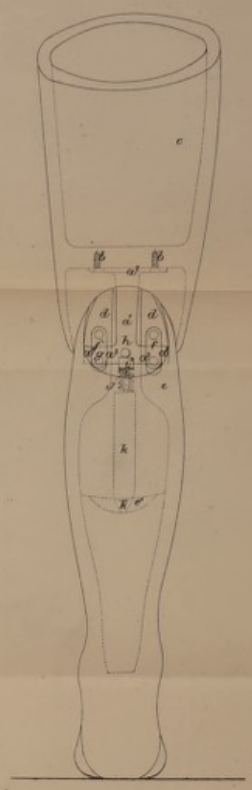


FIG. 2.



The filed drawing is partly colored.

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