

June 24 , 1924.

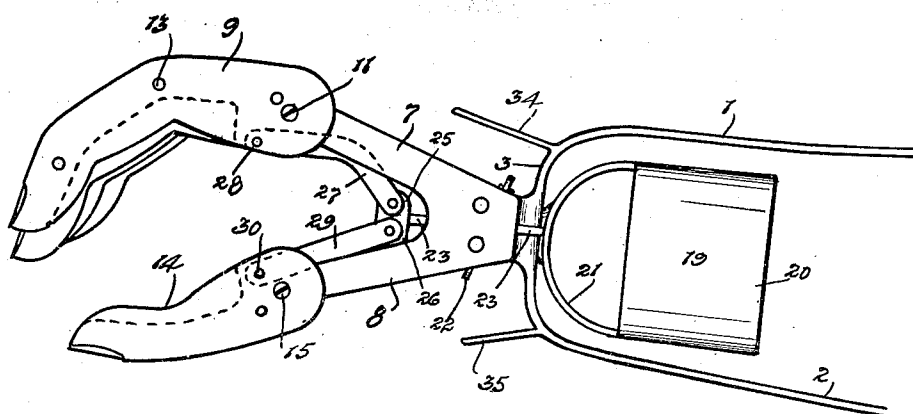
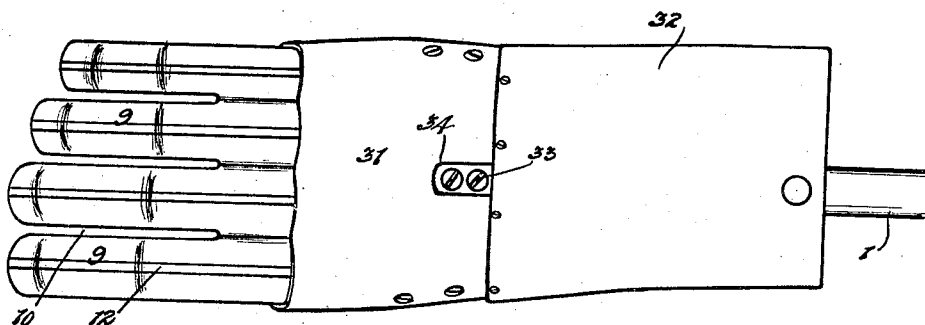
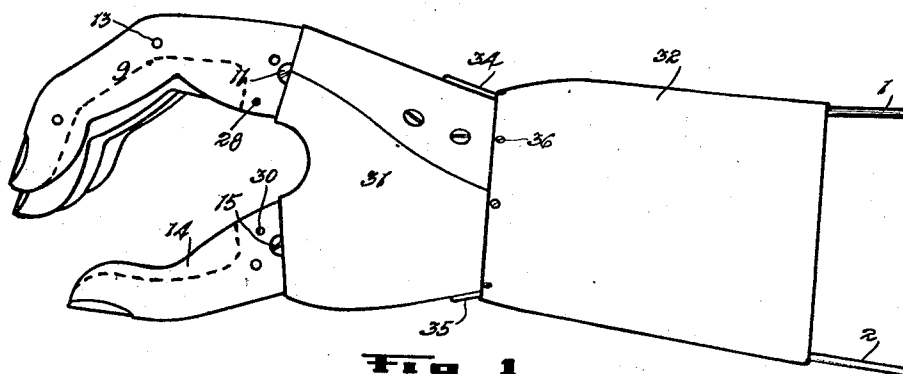
J. H. M. CARSON

1,499,052

ARTIFICIAL HAND

Filed Oct. 11, 1922

2 Sheets-Sheet 1

**INVENTOR**

J. H. M. Carson

By

3x L. Huston Aug 1871.

ATTYS

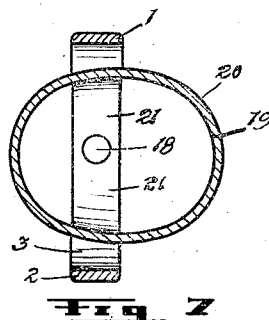
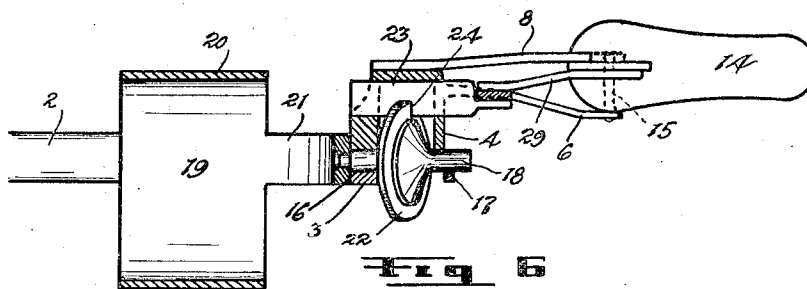
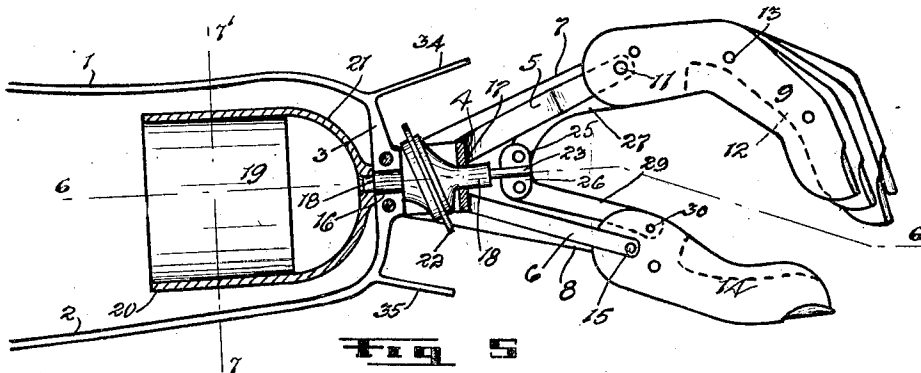
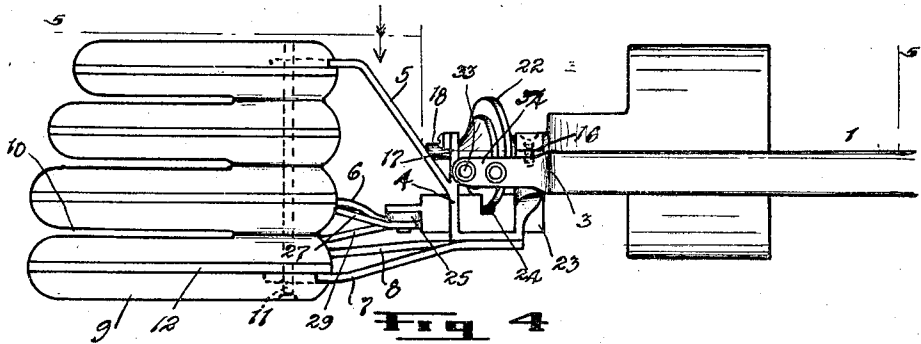
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ARTIFICIAL HAND

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2 Sheets-Sheet 2



INVENTOR
J. H. M. Carson
By *Sehustman & Co.*
ATTYS

Patented June 24, 1924.

1,499,052

UNITED STATES PATENT OFFICE.

JOHN HAMILTON MOORE CARSON, OF WINNIPEG, MANITOBA, CANADA.

ARTIFICIAL HAND.

Application filed October 11, 1922. Serial No. 593,846.

To all whom it may concern:

Be it known that I, JOHN HAMILTON MOORE CARSON, of the city of Winnipeg, in the Province of Manitoba, Canada, have invented certain new and useful Improvements in Artificial Hands, of which the following is the specification.

The invention relates to improvements in artificial hands and particularly to an artificial hand utilized for wrist or fore arm amputations and an object of the invention is to provide an artificial hand having movable fingers and thumb and with the movement of the fingers and thumb actuated and controlled wholly by the stump of the fore arm.

A further object of the invention is to provide an artificial hand where a very positive and effective grip can be had between the fingers and thumb and in the various positions depending on the size of the article gripped.

A further object is to construct the hand in a simple easily assembled and inexpensive manner and with comparatively few moving parts.

With the above more important objects in view the invention consists essentially in the arrangement and construction of parts hereinafter more particularly described and later pointed out in the appended claims, reference being had to the accompanying drawings in which:

Fig. 1 is a side view of the complete artificial hand.

Fig. 2 is a plan view thereof.

Fig. 3 is a view similar to Fig. 1 with the casing and cuff removed.

Fig. 4 is a plan view of the parts appearing in Fig. 3.

Fig. 5 is a longitudinal sectional view at 5-5' Fig. 4 and looking in the direction of the applied arrow.

Fig. 6 is a longitudinal sectional view at 6-6' Fig. 5 and looking downwardly.

Fig. 7 is a vertical cross sectional view at 7-7' Fig. 5.

In the drawings like characters of reference indicate corresponding parts in the several figures.

As hereinbefore intimated this artificial hand is particularly adapted for use where a person's hand has been amputated at the wrist or fore part of the fore arm. The stump of the fore arm is utilized to operate the artificial hand by a rotary action

imparted to the stump in either direction.

I have not considered it necessary to show the upper parts of the supporting bars as such form no part of this invention, it being only necessary in so far as my invention is concerned, that the supporting bars be fastened against rotation to the arm of the person and whilst allowing of the rotation of the fore arm stump between the supporting bars. The supporting bars 1 and 2 for the artificial hand are located above and below the fore arm and they are connected in advance of the stump by a cross portion 3, which latter portion provides a bearing for parts later described.

The cross portion 3 is extended to provide a substantially L shaped horizontally disposed bracket 4 and the bracket carries a stationary laterally extending finger supporting arm 5 and a downwardly extending thumb supporting arm 6. As is shown in Figure 5 these arms diverge when looking at them from the side.

To the bracket 4 I permanently fasten, as by riveting, a pair of forwardly diverging arms 7 and 8, the arm 7 being in reality a finger supporting arm directly opposed to that 5, whilst the arm 8 is a thumb supporting arm directly opposed to that 6.

The fingers 9 are separated by intervening spaces 10 but move as a unit being integrally formed at the knuckles. The fingers are in a semi-closed position and they are supported pivotally on a spindle or bolt 11 carried by the forward ends of the arms 5 and 7, it being understood that the inner ends of the fingers are recessed to freely admit the ends of the said bars.

The fingers are all reinforced by metallic plates 12 inserted in deep grooves cut in the top sides of the fingers and fastened to the fingers by riveting as indicated at 13.

The thumb 14 is slightly bent upwardly towards the first finger and it is also reinforced by an inserted metal plate corresponding to those 12. The inner end of the thumb is pivotally mounted on a cross spindle or bolt 15 carried by the forward ends of the arms 6 and 8, it being here observed that the thumb is recessed to receive the end of the arm 8.

The portion 3 connecting the supporting bars is formed to provide a bearing 16 and directly opposite this I provide a further bearing 17 in the bracket. These two bearings support rotatably a comparatively

short shaft 18 on the rear end of which I permanently mount a receiving socket 19 for the fore arm stump. This socket is in the form of an oval shaped band 20 disposed between the bars 1 and 2, the band being supported by a semi-circular strip 21 secured to the rear end of the shaft. This shape of socket comfortably fits the stub end of the fore arm and obviously should the fore arm be rotated the socket will turn with it and produce a rotary movement of the shaft.

To the shaft and between the bearings I permanently secure an operating member 22 in the form of a disc, the disc being contained in an inclined plane. The disc is amply reinforced by building up the shaft at either side thereof.

The bracket 4 is slotted to provide a pair of sliding bearings for a shifting bar 23, the shifting bar being supplied with a notch 24 in the inner side thereof which receives the outer edge of the disc. The arrangement is such that in the rotary movement of the disc the bar is end shifted. The forward end of the bar is fitted with upwardly and downwardly extending lugs 25 and 26. The lug 25 is pivotally connected by means of an operating link 27 to the fingers 9, it being here observed that the pivot pin 28 connecting the link to the fingers is situated somewhat in advance, but well below the pivot spindle 11.

The lug 26 is pivotally connected by an operating link 29 to the thumb 14, it being here observed that the pivot pin 30 connecting the link to the thumb is located somewhat in advance, but well above the pivot spindle 15.

According to the above arrangement it will be apparent that if the socket be rotated in one direction the bar 23 will be advanced which will result through the action of the links in the spreading of the tips of the fingers and thumb, and that should the socket be rotated in the opposite direction the connections will effect a closing in of the tips of the fingers and thumb.

Accordingly by manipulating the stump of the fore arm as wished one can grasp or release an object and in this connection I wish to point out that a very tight grasp can be effected and very easily maintained, this latter being due to the fact that the back thrust of the fingers and thumb in grasping in any position is dissipated in the disc and has practically no tendency to produce a rotary movement of the disc. Obviously once an article is gripped it takes very little pressure in the stump to maintain the grip. The working parts of the artificial hand

are enclosed within a casing 31 and a cuff 32. The casing is a two part or split one, the two parts being suitably fastened together after they are put in place. The casing is shaped to simulate the form of the palm of the natural hand and the lower part thereof is provided with an opening which receives the thumb, it being understood that the lower half is put in place by passing it into place over the thumb.

The casing is permanently attached to the bars 1 and 2 by screws 33 passing through permanent ears 34 and 35 extending from the bars. The lower forward ends of the bars and the socket are enclosed by the cuff 32 which is preferably of leather or similar material and has the forward end thereof suitably fastened as by small screws 36 to the rear end of the casing.

What I claim as my invention is:

1. An artificial hand of the type referred to wherein bars or members attached to the arm carry stationary finger and thumb arms to which the fingers and thumb are respectively pivoted and the rotation of the stump is adapted to operate the fingers and thumb through the medium of a rotary inclined disc which is connected thereto and engages with and operates a sliding bar which is in turn connected by links to the fingers and thumb substantially as set forth.

2. In an artificial hand according to claim 1, the combination with an arm terminating in a stump, of a pair of non-rotatable supporting bars secured to the upper part of the arm and having their forward ends connected in advance of the stump therebetween, a bracket secured to the connection between the arms, pairs of thumb and finger supporting arms carried by the bracket, united fingers pivotally supported from the finger arms, a thumb pivotally supported from the thumb arms and opposing the fingers, a shaft rotatably mounted in the bracket and in the connection between the supporting bars, a socket permanently secured to the shaft and embracing the stump, a disc like operating member secured to the shaft, said disc being contained in an inclined plane, a shifting bar slidably carried by the bracket and presenting a notch receiving the edge of the disc, and operating links pivotally connecting the forward end of the shifting bar to the fingers and thumb respectively.

Signed at Winnipeg this 18th day of August 1922.

JOHN HAMILTON MOORE CARSON

In the presence of—

GERALD S. ROXBURGH,
M. B. KELLEHER.