L. G. CARON.

ARTIFICIAL HAND AND ARM.

APPLICATION FILED MAR. 26, 1919.

1,332,485.

Patented Mar. 2, 1920.

2 SHEETS—SHEET 1.

Fig. 1.

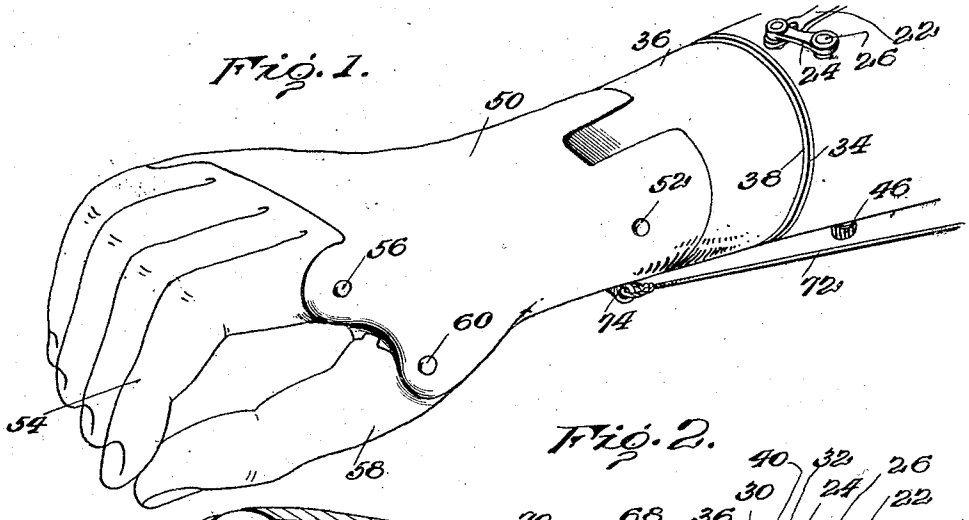


Fig. 2.

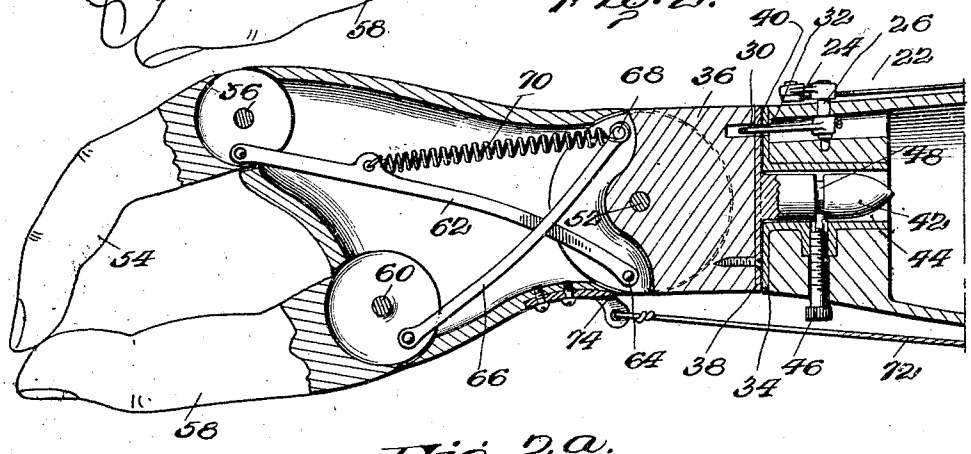
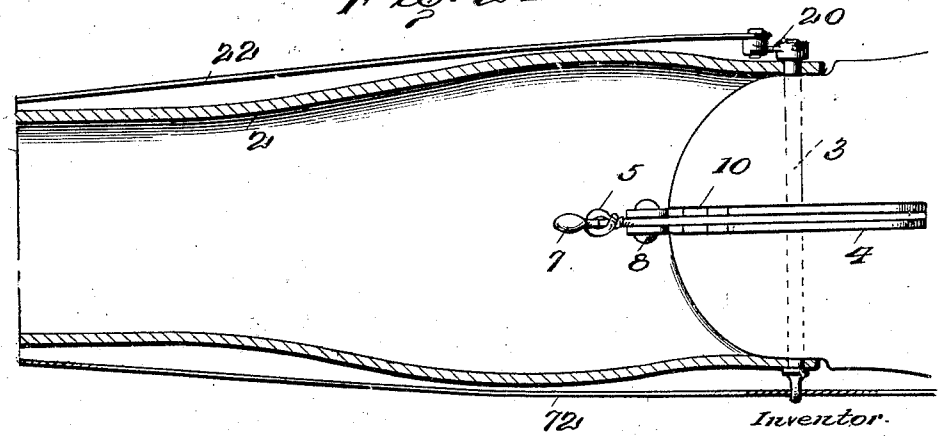


Fig. 2a.



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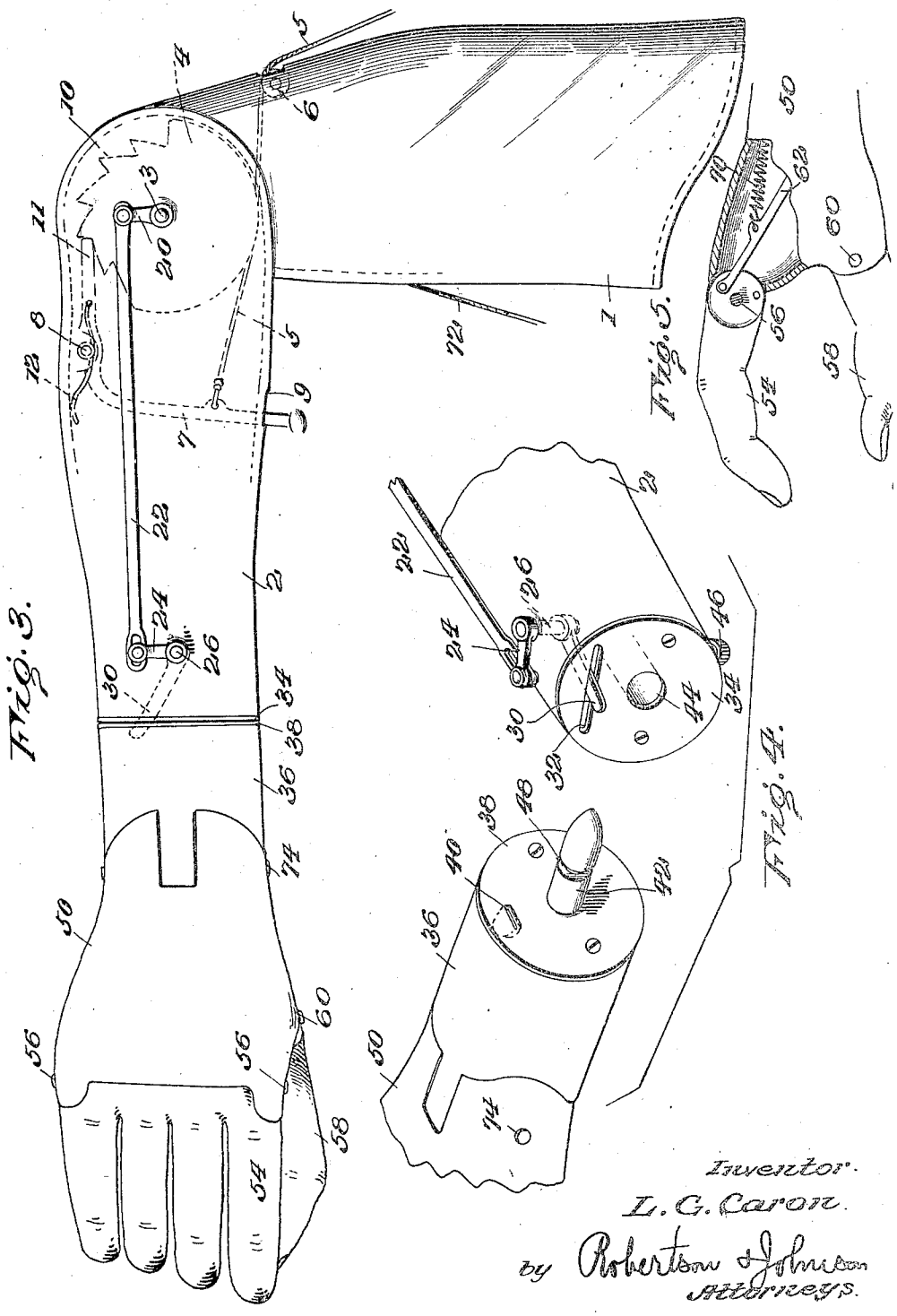

Fig. 3.

Fig. 5.

Fig. 4.

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UNITED STATES PATENT OFFICE.

LOUIS G. CARON, OF WASHINGTON, DISTRICT OF COLUMBIA, ASSIGNOR TO UNIVERSAL ARTIFICIAL LIMB & SUPPLY CO., INC., OF WASHINGTON, DISTRICT OF COLUMBIA, A CORPORATION OF DISTRICT OF COLUMBIA.

ARTIFICIAL HAND AND ARM.

1,332,485. Specification of Letters Patent. Patented Mar. 2, 1920.

Application filed March 26, 1919. Serial No. 285,313.

To all whom it may concern:

Be it known that I, LOUIS G. CARON, a citizen of the United States of America, and a resident of Washington, in the District of Columbia, have invented certain new and useful Improvements in Artificial Hands and Arms, of which the following is a specification.

This invention relates to artificial members for use in cases where the natural arm has been removed either above or below the elbow and the object of the invention is to improve the artificial hand and arm shown in my United States Patent No. 1,272,006, granted July 9, 1918.

The present invention is much simpler than that shown in my aforesaid patent, and the preferable embodiment of it is shown in the accompanying drawings and will now be hereinafter described and claimed.

In the drawings accompanying and forming part hereof:

Figure 1 is a perspective view of a hand made in accordance with my invention.

Fig. 2 is a longitudinal section of the same.

Fig. 2^a is a longitudinal section of the arm member forming a continuation of the part shown in Fig. 2.

Fig. 3 is a perspective view of an arm and hand made in accordance with my invention.

Fig. 4 is a perspective view of parts thereof.

Fig. 5 is a side elevation, partly in section, of a modification.

Referring now to the details of the drawings by numerals: 1 (Fig. 3) is an upper arm socket member adapted to fit on the stump of the upper arm, and 2 is the forearm member hinged thereto, the hinge pin 3 preferably extending from side to side of the joint. On this hinge pin is secured the curved guide 4 and over this guide passes a cord 5, one end of which projects out through a hole in the upper arm member as indicated in Fig. 3, a small guide sheave 6 being preferably provided to reduce the friction and give the cord a proper lead. The free end of the cord is connected with any suitable harness, not shown, such as is common in artificial members of the same general type. The other end of the cord after passing around the guide 4 is secured to an arm 7 pivoted at 8 on the interior of the forearm member and extending through a short slot 9 so that the arm has a limited movement longitudinally of the forearm member. By a pull on the cord 5, the forearm member may be swung on the hinge pin 3. To lock the forearm member against the extension after being flexed, I provide an arc-shaped rack 10 concentric with the hinge pin 3 and preferably formed on the aforesaid curved guide 4. With this rack there engages a dog 11 preferably rigidly connected with the operating arm 7 so that when the arm is drawn up by the cord, the first movement of the arm disengages the dog. The spring 12, engaging the dog and the aforesaid member, tends to yieldingly maintain the dog in engagement with the rack. All these parts are substantially like those shown in my aforesaid Patent No. 1,272,006 and as there explained, it is evident that as long as a slight pull is maintained on the cord, the dog will be out of engagement with the rack and the arm thus left free to swing in either direction. The instant, however, tension on the cord is released the dog will engage the rack and hold the forearm member bent on the upper arm member to any desired extent.

To the aforesaid hinge pin 3 I secure, preferably on the exterior of the arm, a crank arm 20 which is connected by a rod 22 with a similar crank arm 24, the latter being connected to a rock shaft 26 so that the arm 24 and the shaft 26 move together. The construction is such that when the forearm 2 is moved on the hinge pin 3 the connecting rod 22 simultaneously moves the crank arm 24 to rock the shaft 26. To the other end of the rock shaft 26 is secured an operating arm 30 projecting through a slot 32 in a plate 34 connected to the end of the forearm. To the wrist member 36 is connected a similar plate 38, the latter having an opening 40 into which projects the operating arm 30 before referred to. The plate 38 is also provided with a stem 42 which enters an opening 44 in the forearm member, the latter being provided with a set screw or other holding device 46 which is adapted to enter a groove 48 in the end of the stem 42. These parts are so constructed that when the wrist member is attached to the arm member, the set screw permits the wrist

member to receive rotary movement with respect to the forearm member 2 and such rotary movement is accomplished by the movement hereinbefore described of the crank arms 20, 24, connecting arm 22 and the operating arm 30 in a manner which will be readily understood from the drawings. As indicated in Figs. 1, 2 and 3, the wrist member 36 has connected to it a hand member 50 by means of a pivotal pin 52 which permits the hand member 50 to move on the wrist member 36. The hand member 50 is preferably formed hollow and has connected to it a finger section and a thumb. The finger section 54 is preferably all in one piece and is pivotally supported by the hand member on the pivotal pin 56. The thumb, designated by the numeral 58, is supported by the hand member on the pivotal pin 60. As illustrated in Fig. 2, the finger section is connected by a link 62, preferably located on the inside of the hollow hand member, with a pivotal pin 64 on the wrist member 36, while the thumb 58 is connected by a similar link 66 with a pivotal pin 68 also on the wrist member 36; these links 62 and 66 crossing each other, as illustrated, a spring 70 being employed preferably connecting the link 62 with the pivotal pin 68. The construction of these parts is such, see Fig. 2, as will cause the spring 70 to draw on the link 62 and pull the finger section toward the thumb section. However, when the hand member is moved with respect to the wrist member, on the pivotal pin 52, the links 62 and 66 are so moved with respect to the finger section 54, the thumb 58 and the wrist portion 36 that the fingers are moved away from each other against the tension of the spring 70.

Should it be desirable to have the fingers so that they will be normally held open, instead of normally closed as in Fig. 2, it is merely necessary to shift the link 62 to the opposite side of the finger section and to connect the spring as illustrated in the modification shown in Fig. 5.

In order to move the hand section 50 with respect to the wrist section 36, on the pivotal pin 52, I provide a cord, designated 72, one end of which is connected to a hook or other device 74 on the hand member and the other end of which is connected to the usual harness attachment at the shoulder. It follows from this construction that when the arm is moved so as to draw on the cord 72 that the hand section is moved with respect to the wrist section, and this moves the links against the tension of the spring 70, thereby causing relative movements of the fingers and the thumb, opening the same when made according to Fig. 2, or closing the same when made according to Fig. 5.

From the foregoing and the accompanying drawings, it will be seen that I have produced a very simple form of hand and arm and that the parts are so simple that in the hand itself there are only four main parts—the hand portion, the wrist portion, the finger section and the thumb, which are connected together by the two links 66, 64 and the spring 70.

It will be obvious that modifications and changes may be made in the form and construction of my invention without departing from the spirit thereof, the scope of which may be determined from the appended claims.

What I claim as my invention is:

1. In a device of the character described, the combination of a wrist member, a hand member pivoted to said wrist member, a finger and a thumb each pivoted to the hand member, and links pivotally connecting the finger and the thumb with the wrist member, whereby as the hand member is moved with respect to the wrist member, the finger and thumb will be relatively moved.

2. In a device of the character described, the combination of a wrist member, a hollow hand member pivoted to said wrist member, a finger and a thumb each pivoted to the hand member, a link within the hand member connecting the finger to the wrist member, and a second link within the hand member connecting the thumb with the wrist member whereby as the hand member is moved with respect to the wrist member the finger and thumb will be relatively moved.

3. In a device of the character described, the combination of a wrist member, a hollow hand member, a finger and a thumb each pivoted to the hand member, and links located within the hand member and crossing each other, one of said links pivotally connecting the finger with the wrist member and the other link pivotally connecting the thumb with the wrist member, whereby as the hand member is moved with respect to the wrist member the finger and thumb will be relatively moved.

4. In a device of the character described, the combination of a wrist member, a hollow hand member, a finger and a thumb each pivoted to the hand member, links located within the hand member and crossing each other, one of said links pivotally connecting the finger with the wrist member and the other link pivotally connecting the thumb with the wrist member, whereby as the hand member is moved with respect to the wrist member the finger and thumb will be relatively moved, and a spring for holding said finger and thumb in normal position.

5. In a device of the character described, an upper arm member, a forearm member pivoted to the upper arm member, a wrist member connected with the forearm member so as to permit rotary movement with respect thereto, a crank arm extending from the pivot connecting the forearm member

with the upper arm member, an operating arm for moving the wrist member with respect to the forearm member, a crank arm projecting therefrom, and a connection between said crank arms.

6. In a device of the character described, an upper arm member, a forearm member pivoted to the upper arm member, a wrist member connected with the forearm member so as to permit rotary movement with respect thereto, a crank arm extending from the pivot connecting the forearm member with the upper arm member, an operating arm for moving the wrist member with respect to the forearm member, a crank arm projecting therefrom, and a connecting rod operatively connecting said crank arms.

7. In a device of the character described, an upper arm member, a forearm member pivoted to the upper arm member, a wrist member connected with the forearm member so as to permit of rotary movement with respect thereto, said wrist member having a plate with an opening therein, and the forearm member having a disk adjacent to the wrist plate and having an operating arm projecting therethrough into the opening in the disk of the wrist member, a crank arm extending from the pivot connecting the forearm member with the upper arm member, and a connection between said crank arm and the aforesaid operating arm whereby when the forearm is moved with respect to the upper arm member, said crank and said connection move the said operating arm to rotate the wrist member with respect to the forearm member.

In testimony whereof I affix my signature.

LOUIS G. CARON.