

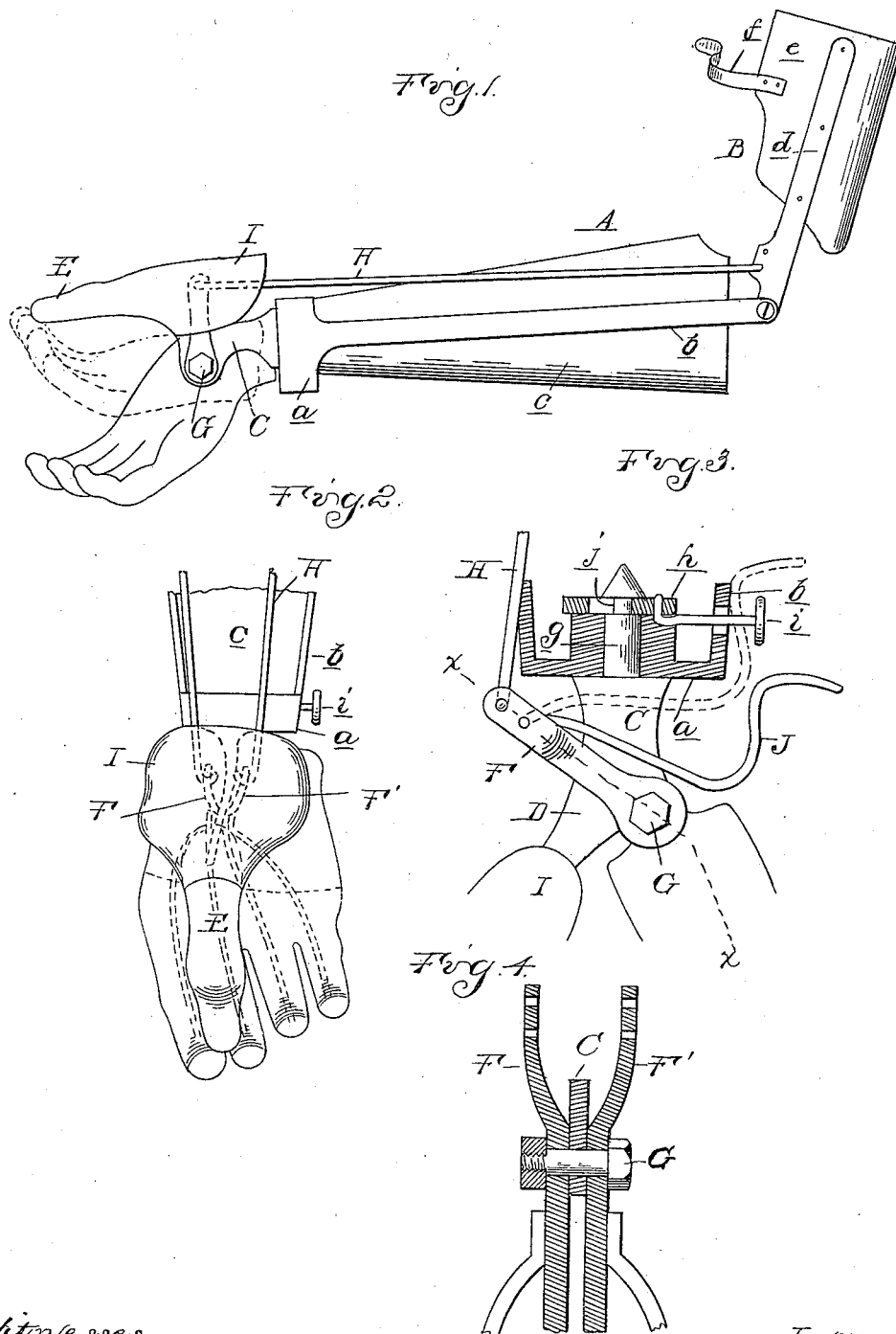
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Patented Mar. 20, 1900.

H. SCHENK.  
ARTIFICIAL HAND AND ARM.

(Application filed Apr. 19, 1899.)

(No Model.)



Witnesses  
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# UNITED STATES PATENT OFFICE.

HENRY SCHENK, OF SANDUSKY, OHIO.

## ARTIFICIAL HAND AND ARM.

SPECIFICATION forming part of Letters Patent No. 645,740, dated March 20, 1900.

Application filed April 19, 1899. Serial No. 713,620. (No model.)

*To all whom it may concern:*

Be it known that I, HENRY SCHENK, a citizen of the United States, residing at Sandusky, in the county of Erie and State of Ohio, have invented certain new and useful Improvements in Artificial Hands and Arms, of which the following is a specification, reference being had therein to the accompanying drawings.

My invention relates to artificial hands of that class in which a relative movement of the grasping-jaws is obtained by a connection with an elbow-lever.

The invention consists in the peculiar construction of a hand comprising a rigid thumb and fingers movable in relation thereto; further, in the peculiar construction of the fingers and actuating means therefor, whereby different groups of fingers are independently movable, and, further, in the peculiar construction, arrangement, and combination of parts, as more fully hereinafter described and claimed.

In the drawings, Figure 1 is a side elevation of my artificial hand as in use. Fig. 2 is an elevation of the hand looking toward the palm. Fig. 3 is a sectional elevation showing the pivotal connections between the fingers and thumb, and Fig. 4 is a section at right angles thereto on line *x x*.

A is the socket for the forearm, which is of any suitable construction, preferably comprising the metallic end cap *a*, the metallic side bars *b*, secured to said cap, and the sleeve *c*, formed of leather or other soft material, adapted to be laced or otherwise secured to the arm.

B is the upper-arm section, comprising the side levers *d*, pivotally secured to the bars *b* opposite the elbow-joint of the arm, and the leather flap *e*, having the straps *f* for securing it to the arm.

To the lower end of the socket A is detachably secured the hand, which is of the following construction.

C is a head, preferably made of steel and provided with a pin or shank *g*, adapted to be swiveled in a socket formed centrally in the cap *a*.

*h* is a latch for holding the pin in its socket

which is connected to a knob or button *i* on the side of the socket and engages with the annular groove *j* in the pin.

The head C is provided with an extension D, which forms the core of the thumb E, the latter being formed in any suitable manner.

F and F' are levers pivotally secured to the head C, upon opposite sides thereof, by means of the bolt or pivot-pin G. These levers pass through the palm of the hand and are bifurcated, so as to form cores for the four fingers, being bent into a hook shape, so as to give the appearance to the hand of being partially closed. The hand and fingers are preferably made of some soft material covering the skeleton frame and with sufficient flexibility to permit of a limited independent movement of the levers. The outer ends of the levers are connected by the rods H to the levers *d* of the upper-arm section a short distance above the pivotal connection with the rods *b*.

In operation when the hand is secured to the arm of the user and the arm is bent at the elbow the rods H will move the levers F F' so as to carry the fingers away from the thumb, as shown in full lines in Fig. 1. In this position the hand may be engaged with any object which could be grasped by the natural hand, and by a slight straightening of the arm the fingers are drawn toward the thumb, so as to firmly clamp the article.

Many articles, for grasping which the hand may be employed, are of such a shape that were all the fingers to move together only one of them would bear upon the article. To overcome this difficulty, the levers F and F' may be moved differentially by giving the arm a slight twisting movement at the same time that it is being straightened, or where an article is simply lifted the hand itself will swivel on the pin *g* into a position where the pressure exerted by the two groups of fingers is equalized. Thus almost any article may be firmly grasped by the hand in a similar manner to that in which the natural hand would act.

The relative positions of the thumb and finger are such that when moved together the thumb will bear between the first and second

fingers, both of which are attached to the lever F. This enables the user to pick up very small objects and to hold them firmly.

The actuating-arms of the levers F and F' are concealed by the shield I, which forms the upper portion of the thumb, and the rods H are concealed by the coat-sleeve, so that the whole hand has a very natural and life-like appearance and when gloved would scarcely be distinguished from a natural hand.

In order to provide means for holding an article in the hand and at the same time to permit of the free movement of the arm, I preferably provide the hook J, (shown in Fig. 3,) which is connected to the levers F and F' and is adapted to be engaged with the side of the socket a, as shown in dotted lines, to lock said levers in a position in which the hand is closed. When this hook is so engaged, the hand will remain closed even when the elbow is bent, these rods H being sufficiently flexible to permit of their bowing laterally without moving the levers F and F', or, if desired, said rods may be temporarily disconnected from the levers. When not in use, the hook J may be moved into the position shown in full lines, Fig. 3, where it will not interfere with the operation of the levers. The hook J is, preferably, slightly bowed to form a spring, which will permit of a slight yielding of the fingers when locked by said hook.

What I claim as my invention is—

1. In an artificial hand, the combination with an arm-socket, of a rigid thumb secured thereto, and a palm member having permanently-hooked fingers movable toward or from said thumb.

2. In an artificial hand, the combination with an arm-socket of a rigid thumb secured thereto, permanently-hooked fingers pivotally secured to said socket, and means for moving said fingers differentially toward or from said thumb.

3. The combination, with the socket for the

forearm and levers hinged thereto at the elbow upon opposite sides thereof, and secured to the upper arm, of a rigid thumb secured to said socket, two levers pivoted to and upon opposite sides of said thumb each bifurcated to form respectively the first and second and the third and fourth fingers of the hand, and rods connecting the opposite ends of said levers respectively to said opposite arm-levers.

4. An artificial hand comprising the head C; having the pin or shank g and the extension D forming the core of the thumb, the levers F F' pivoted to said head upon opposite sides thereof having hooked bifurcations and forming a skeleton for the palm and fingers of the hand, in combination with the socket A for the forearm in the end of which said pin g is swiveled, the upper arm-levers d pivoted to said socket at the elbow on opposite sides thereof, and rods H connecting said levers d respectively to the actuating-arms of the levers F and F'.

5. In an artificial hand, the combination with thumb and finger members one of which is movable in relation to the other, of a yielding elbow connection for operating said movable member to open and close the hand and a lock for holding the hand in its closed position against the action of said elbow connection.

6. In an artificial hand the combination with thumb and finger members one of which is movable in relation to the other, of a hook for locking said movable member, in the closed position of the hand, and flexible elbow-rods for normally operating said movable member by the elbow movement of the arm, said rods being adapted to spring laterally when said hook is in engagement.

In testimony whereof I affix my signature in presence of two witnesses.

HENRY SCHENK.

Witnesses:

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