

(No Model.)

D. W. KOLBE, Dec'd.

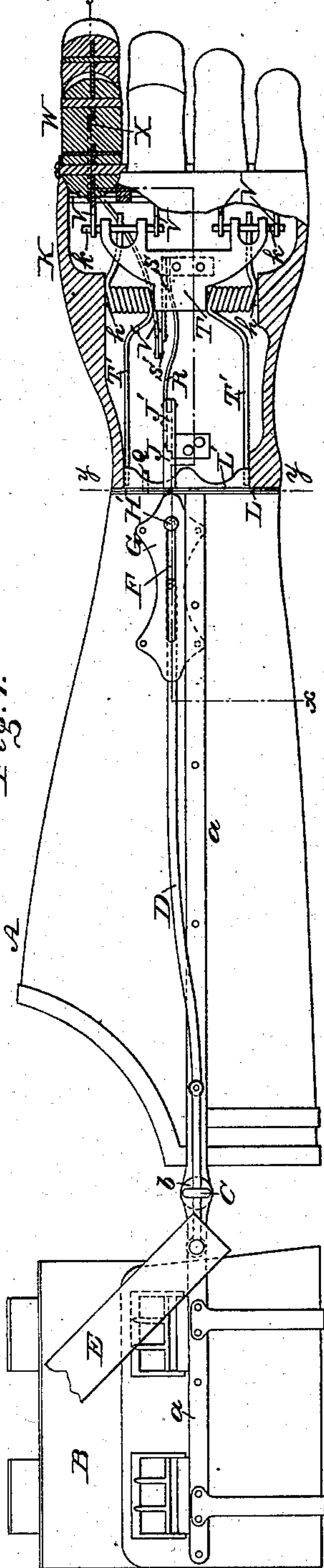
H. M. KOLBE, executrix.

ARTIFICIAL ARM.

No. 255,796.

Patented Apr. 4, 1882.

Fig. 1.



WITNESSES:

L. Douville  
W. F. Kircher

Fig. 2.

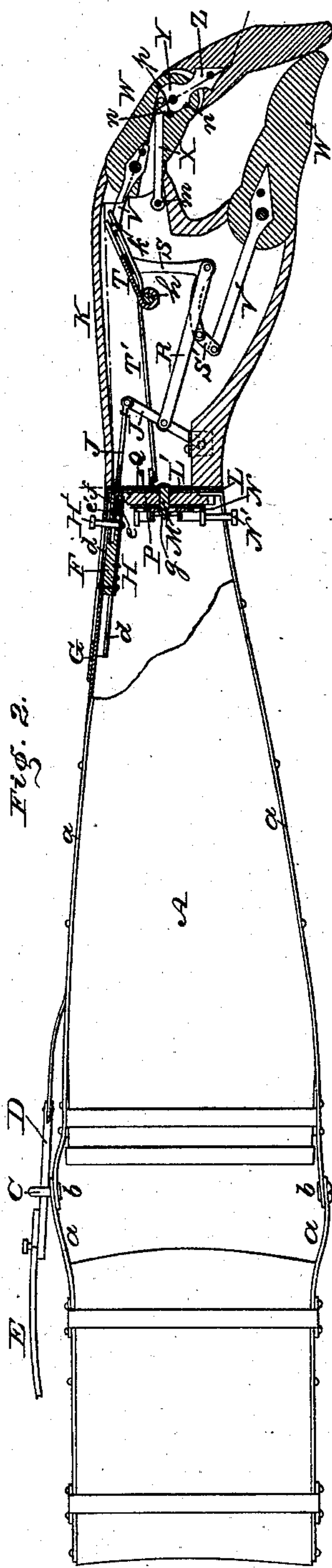
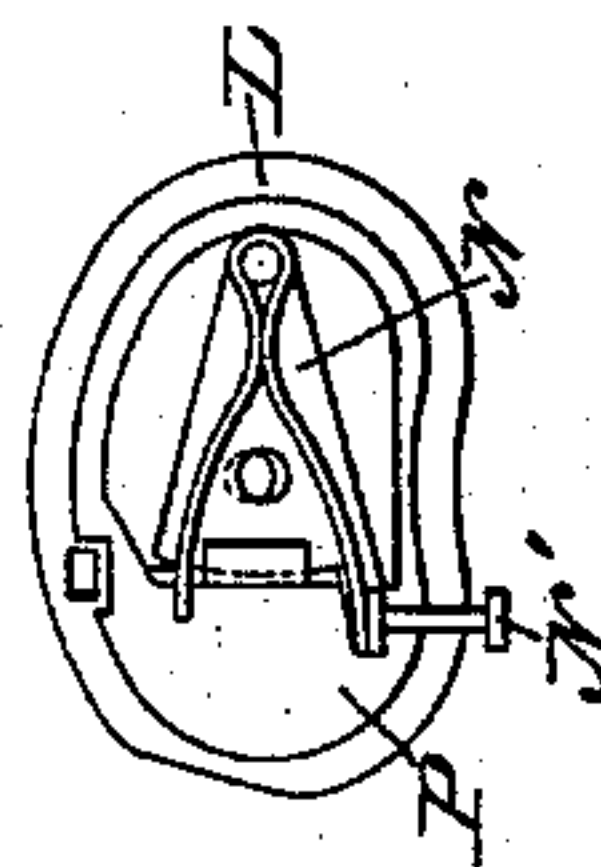


Fig. 3.



Dietrich W. Kolbe, INVENTOR:  
Hedwig M. Kolbe, Dec'd, Executrix,  
BY John A. Biedersheim ATTORNEY.



# UNITED STATES PATENT OFFICE.

HEDWIG M. KOLBE, OF PHILADELPHIA, PENNSYLVANIA, EXECUTRIX OF  
DIETRICH W. KOLBE, DECEASED.

## ARTIFICIAL ARM.

SPECIFICATION forming part of Letters Patent No. 255,796, dated April 4, 1882.

Application filed January 14, 1882. (No model.)

*To all whom it may concern:*

Be it known that DIETRICH W. KOLBE, deceased, formerly a citizen of the United States, and a resident of the city and county of Philadelphia, State of Pennsylvania, invented a new and useful Improvement in Artificial Arms, which improvement is fully set forth in the following specification and accompanying drawings, in which—

Figure 1 is a side elevation, partly sectional horizontally, of the artificial arm embodying the invention. Fig. 2 is a longitudinal section thereof in line *x x*, Fig. 1. Fig. 3 is a transverse section thereof in line *y y*, Fig. 1.

Similar letters of reference indicate corresponding parts in the several figures.

This invention consists in operating the mechanism of the fingers of the hand of an artificial arm by means of a jointed bar, which is attached to the shoulder of the other arm and adapted to conform to the motions of the elbow.

It also consists of a secure and conveniently-operated attachment for the hand and wrist portion.

It further consists of a peculiar fastening for the mechanism of the hand and operating-bar thereof.

It also consists of means for easily opening the hand, quickly closing the same, and firmly holding the parts when closed.

Referring to the drawings, A represents the socket of an artificial arm, adapted to receive the stump of the natural forearm, and B represents the fastening-band, to be strapped or otherwise secured to the natural arm, the socket and band being pivoted together by means of the straps *a*, the joints or pivots whereof are shown at *b b*. One of the pivots *b* has connected or formed with it an eye, C, which is adapted to turn with the pivot and constitute a swivel, through which is passed one portion of a jointed bar, D, the upper end whereof is attached to a strap, E, whose length is sufficient to reach the shoulder of the other arm around the back of the wearer, and is provided with buckles or other fastenings for securing it to said shoulder.

To the lower end of the bar D is pivoted a sliding tubular piece, F, which is fitted between guides *d d*, which are formed with or secured

to a metal plate, G, the latter being riveted or otherwise firmly connected to the socket A at the wrist portion thereof, it being noticed that the guides extend in the longitudinal direction of the arm.

To the under or inner side of the tubular piece F is secured a spring, H, having at its forward end a nose, *e*, which, when in its normal position, enters an opening, *f*, in the wall of the tubular piece F, and engages with the sliding bar J of the hand K, the mechanism of which opens and closes the hand being connected to said sliding bar J.

The wrist end of the socket is covered and strengthened by a metal plate, L, which is secured to said socket and the straps *a*, and has an opening for the sliding bar J, and a central opening for the pin M, by which the hand is attached to the socket, said pin being secured to the plate L' of the hand, and having a neck, *g*, which is engaged by a spring-catch, N, on the inner face of the plate L, said catch being pivoted to a block, P, secured to the plate L, the block having an opening coinciding with the central opening in the plate L, the catch having a similar opening which registers with the opening of the plate L and block P when the catch is forced back, for which purpose a button, N', is formed with or secured to the catch, and is conveniently accessible at the side of the socket A. Consequently, when the catch N is forced back, the pin M may be passed through the openings of the plate L and block P, and when the catch is let go the wall of its opening engages with the neck of the pin, thus securing the hand to the socket. A pin, Q, projects from the plate L and enters an opening in the plate L', or vice versa, thus preventing rotation of the hand on the socket. When the pin M is forced into its opening in the plate L the bar J enters the respective opening in said plate, and is directed into the tubular piece F, thus forcing out the nose *e* until said nose is opposite the opening *e'* of the sliding bar, said nose then springing into the opening *e'* and connecting the bar J and jointed bar D.

When the hand is to be disconnected from the socket the nose-carrying spring H is forced in by the button H' thereof and moved upward



or inward, the bar J readily sliding in the eye or swivel C, thus releasing the nose *e* from said bar J. The button N' is now forced in, thus moving the catch N clear of the pin M, and the hand may then be drawn away from the socket.

When the socket A is in position on the forearm and held by the band B, and the strap E is connected to the shoulder, and the hand attached to the socket, the bar J of the hand mechanism may be operated to open the hand by extending or moving forward the stump of the natural arm. The strap E, controlled by the shoulder, offers resistance to the forward movement of the jointed bar D. Consequently the advancing socket A causes the sliding bar J to be drawn into the same, whereby motion is imparted to the mechanism of the hand, so as to open the fingers.

When the natural arm is returned the spring-power of the mechanism of the hand restores said mechanism to its normal position, thus closing the fingers, in which movement the bar J is drawn back and the jointed bar D carried forward with it.

The mechanism for opening and closing the fingers of the hand is as follows, the palm being hollow to contain said mechanism: The sliding bar J, which has been referred to, has pivoted to it an upright arm, J', which is pivoted to the wall of the palm, and to said arm is pivoted a longitudinally-extending arm, R, to whose forward end is pivoted an elbow-lever, S. The rear end of said elbow-lever is pivoted to a link, S', and the front end is connected to a plate, T, which is mounted on a horizontal axis, *h*, the latter extending transversely and connected to the wall of the palm. The forward end of the plate T engages with levers V, which are securely fixed to the fingers W, the latter being pivoted to the palm, the object of said levers V being to operate the fingers at the knuckles. In the present case the levers are in pairs, connected by a cross-bar, *k*, and the plate T rests on the two cross-bars and simultaneously operates the levers.

On the axis *h* are coiled springs T', one end of each of which is connected to the wall of the palm, and the other bears upwardly against the cross-bar *k*, and consequently against the plate T, for restoring all the parts to their normal positions.

To the link S' is pivoted a lever, V', which is securely fixed to the thumb W', it being seen that the levers V V' are adapted to operate in reverse order and separate the thumb and fingers when the hand is to be open.

The second joints of the index and second fingers, and of all the remaining fingers, if desired, are pivoted to the third joints, and through the latter joints are passed levers X, the inner end of each of which is pivoted to the palm, as at *m*. The forward end of the lever X is pivoted to a crank-piece, Y, which is pivoted to the wall of the third joint, said piece having a forward extension, Z, which

enters the second joint, and is securely connected thereto, the crank-piece having shoulders *n*, which are adapted to abut against a stud, *p*, within the third joint, for limiting the motions of the second joint.

It will be seen that when the stump of the natural arm is moved forward and the sliding bar J is drawn back by the jointed bar D, as has been stated, the elbow-lever S is moved downward and rearward. This advances the lever V' of the thumb, and also depresses the plate T, and consequently the lever V of the fingers, thus moving the thumb and fingers in opposite directions and opening the hand. Simultaneously therewith the opening motion of the third joints, owing to the pivotal connection of the levers X with the palm and crank-pieces Y, causes the rotation of the latter, whereby the second joints turn on the third joints and straighten out, thus more closely simulating the opening motion of the human hand. When the stump of the human arm is drawn back the bar J is relieved of draft, whereby the spring T' is operative and the several levers, &c., and the fingers and thumb quickly return to their normal positions, it being noticed that the power of the spring is first exerted on the cross-bar *k*, so that the joints of the fingers are forcibly closed and held closed, and then transmitted to the plate T, and thus to the elbow-lever S and connected parts, the lever V' of the thumb, the sliding bar J, and the bar D, to which the strap E is connected.

What is claimed as new and as the invention of DIETRICH W. KOLBE, deceased, is—

1. Hand mechanism provided with a bar, J, in combination with the socket, the jointed bar D, and the swivel-eye C, substantially as and for the purpose set forth.

2. The perforated wrist-plate L and the wrist-plate L', with the pin M, having neck *g*, in combination with the perforated pivoted spring-catch N, substantially as and for the purpose set forth.

3. The sliding bar of the socket and the sliding bar of the hand mechanism, in combination with the sliding tubular piece F, having a spring-nose, *e*, and operating-button, substantially as and for the purpose set forth.

4. The thumb and finger levers V V', in combination with the hinged plate T, the elbow-lever S, the arm R, the link S', the arm J', the sliding bar J, and the springs T', substantially as and for the purpose set forth.

5. The palm and the third joints, with the pivoted levers V, in combination with the second joints, the pivoted levers X, and the crank-pieces Y Z, substantially as and for the purpose set forth.

HEDWIG M. KOLBE,  
*Executrix.*

Witnesses:

JOHN A. WIEDERSHEIM,  
A. P. GRANT.