Sept. 18, 1951 W. J. PHILPOTT 2,568,298

ARTIFICIAL HAND

Filed June 2, 1949

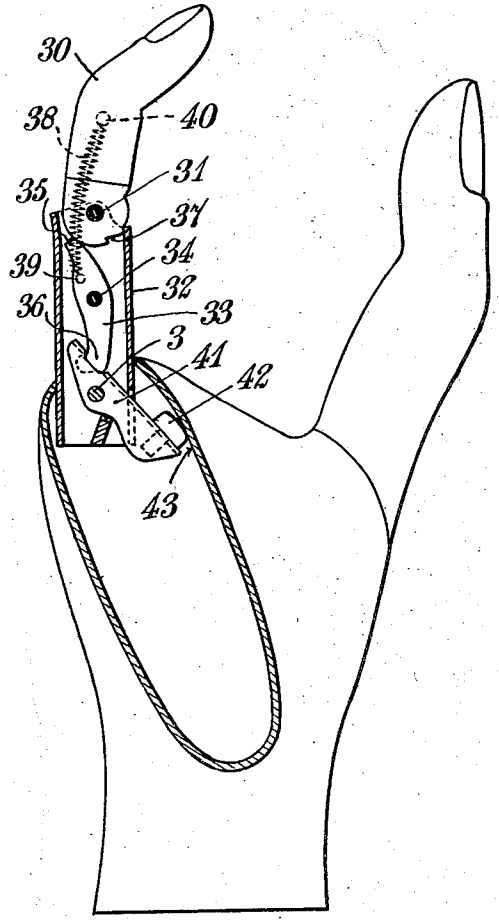

FIG. 1.

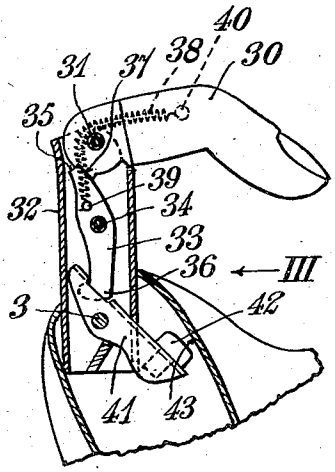

FIG. 2.

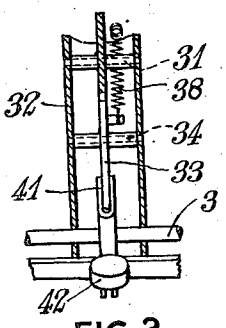

FIG. 3.

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ARTIFICIAL HAND

William James Philpott, London, England, assignor to Hugh Steeper Limited, a British company

Application June 2, 1949, Serial No. 96,702
In Great Britain June 4, 1948

1 Claim. (Cl. 3—12)

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This invention relates to artificial hands of the kind in which the digits are opened by the control of the wearer, and are closed automatically. In this kind of hand, the operating mechanism is housed within the palm casing, and the opening movement is subject to a locking mechanism by which inadvertent opening may be prevented.

The expressions "opening" and "closing," when used with respect to the digits or the hand, refer in this specification and in the following claim to the normal opening and closing of a hand when the fingers, as one entity, and the thumb, as another entity, move away from each other or towards each other, as in the opening and closing of a natural hand.

This invention relates more particularly to an articulated finger construction whereby one or more fingers may be flexed by the wearer of an artificial hand, flexion taking place at the middle joint of a finger, that is, the joint corresponding to the middle joint of a natural finger. Such flexion renders the finger capable of assuming two positions, which will be referred to as the normal and closed positions; in the normal position the finger is substantially in alignment with the rigid fingers, if any, of the hand, the rigid fingers being always in a slightly crooked position, as is usual with artificial hands. The invention is preferably applied to the third and fourth fingers only, the index and second finger being rigid. Further the invention is preferably used in conjunction with an artificial hand as described in my co-pending application Serial No. 96,701, filed June 2, 1949, wherein all the fingers are fixed on a common mounting, and are pivotable at their bases on a common shaft.

It is of advantage to provide the third and fourth fingers with the flexing movement at the middle joint, since if the artificial hand is also provided with a traversing thumb, for example as disclosed in my co-pending application Serial No. 96,703, filed June 2, 1949, then three positions are provided for gripping or carrying objects. These three positions are: between the thumb and index finger (the usual arrangement), between the thumb and third finger, and between the thumb and fourth finger.

According to this invention an artificial hand is provided with one or more than one finger having a pivoted lower joint, whereby the upper part of the finger may be bent relatively to the middle part, the arrangement being such that the upper part may be locked in any one of plurality of positions against opening, movement from a bent position to the normal position being automatic

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on operation of release mechanism. The release mechanism is operated automatically when the hand is opened to a predetermined degree by the control operated by the wearer. Return of the upper part of the finger to the normal position is preferably caused by a spring, which may also ensure proper locking engagement when the finger is bent.

In order that the invention may be clearly understood, a preferred construction will now be described in more detail as an example, and with reference to the accompanying drawings, in which—

Figure 1 is a side elevation, showing the fourth, or little, finger, part of the finger and part of the palm of the hand being shown in section. The finger is in the normal position, and the remaining fingers are not shown;

Figure 2 shows the finger in the bent position; and

Figure 3 is a diagrammatic view of the finger looking in the direction of the arrow III in Figure 2.

In this construction the finger is mounted at its base on a pivotal mounting shaft 3 common to all four fingers, so that for the opening and closing of the hand the fingers all move in unison, as described in my co-pending application Serial No. 96,703.

The upper part 30 of the finger is pivotally mounted on a spindle 31 (forming the middle joint) at the top of the lower part 32, for bending movement relatively thereto over an arc of approximately 75°. The adjacent ends of the two parts are suitably shaped and cut away as shown to permit such movement.

A catch lever 33 is mounted longitudinally and substantially centrally within the lower part, the walls of which provide end bearings for a spindle 34, which carries the catch lever 33, for rocking pivotal movement such that the upper and lower ends 35 and 36 respectively of the catch lever move in opposite directions about the spindle 34. The upper end 35 of the lever 33 is shaped to engage in a recess 37 in the lower surface of the upper part 30, such that when the upper part is bent the lever 33 engages in the recess 37 (see Figure 2), and is held there by a spring 38, so that the upper part is locked in the bent position.

The spring 38, which is a tension coil spring, is anchored at one end to a projection 39 on one side of the lever 33, above the spindle 34. The spring passes over the spindle 31, and its other end is anchored at 40 within the upper part. This

spring **38** has a dual function. Normally it tends to straighten the finger, that is, to cause the upper part to return to the normal position. When however the upper part is bent, against the spring, and is locked in the bent position, then the spring pulls on the lever **33**, holding it in position against the recess **37** to prevent unlocking.

A release lever **41** is mounted within the lower part, below the lever **33**, and engageable with the lower extremity of the latter. The release lever **41** is rockably mounted on the main pivot shaft **3**. The lower extremity of the release lever **41** projects from the finger and is provided with a rubber buffer **42**, which lies within the palm. Pressure on the buffer **42** rocks the release lever **41**, which in turn rocks the lever **33** to move the upper extremity **35** of the lever **33** out of engagement with the recess **37** in the upper part **30**, which is thus freed and moves to the normal position under the action of the spring **38**.

The necessary pressure on the buffer **42** is achieved by so placing it in relation to the inner surface **43** of the palm portion of the hand that, when the fingers are opened by operation of the control by the wearer, at a predetermined degree of opening the buffer comes into contact with the palm inner surface and rocks the release lever, when the upper part of the finger springs back to the normal position.

If the wearer then wishes to bend the fingers again, he may either bend them down with his other hand, or bend them merely by brushing them lightly against some object or part of his person.

What I claim is:

Artificial hand of the kind referred to comprising a palm portion, a plurality of digits

pivotally mounted on said palm portion and movable relatively thereto for opening of said hand, and for closing of said hand by spring means, the fourth and fifth (little) fingers of said digits each having also a pivotal middle joint, said joint connecting upper and lower parts of said finger for movement of said upper part independently of said lower part from a normal to one of a plurality of bent positions, a release mechanism housed within each of said fourth and fifth fingers, each said mechanism including a rocker arm pivotally mounted within said lower part and selectively engageable at its upper end with recesses in the lower extremity of said upper part, the lower end of said rocker arm being releasably engageable with a catch lever pivotally mounted in said lower part and capable of abutting said palm portion, and spring means associated with each said release mechanism for returning said upper portion from said bent to said normal position when said hand is opened by the wearer to a predetermined position such that said catch lever is moved by said palm portion to rock said rocker arm out of engagement with the said recess with which it is in engagement.

WILLIAM JAMES PHILPOTT.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
429,243	Lucas	June 3, 1890
1,380,835	Pecorella, et al.	June 7, 1921
1,422,714	Ingold	July 11, 1922
1,484,913	Surry	Feb. 26, 1924