W. E. LUKE.

ARTIFICIAL HAND.

APPLICATION FILED APR. 21, 1920.

1,380,664.

Patented June 7, 1921.

2 SHEETS—SHEET 1.

Fig. 1.

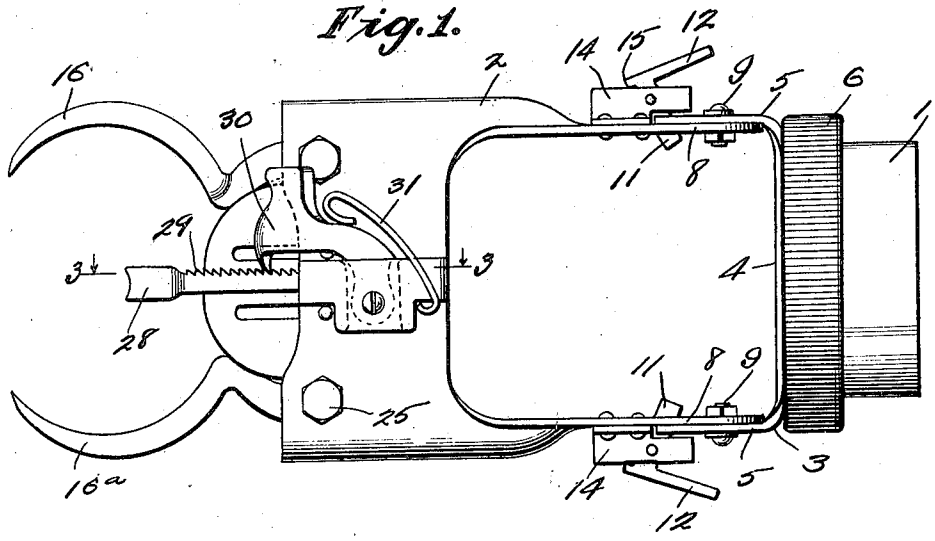
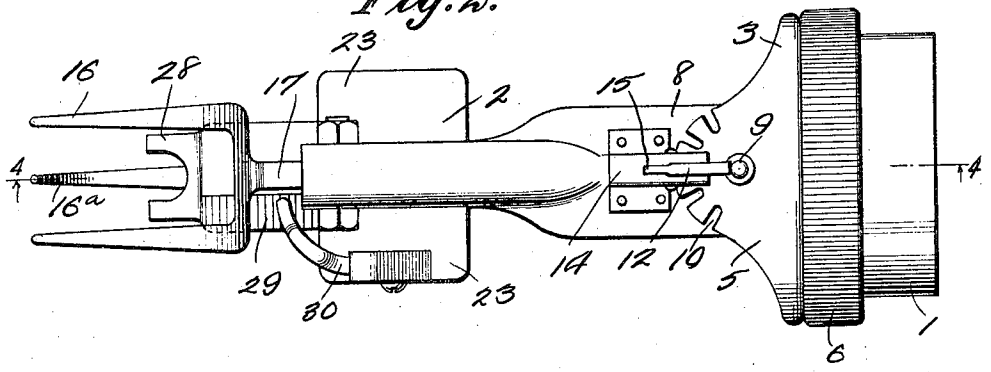



Fig. 2.



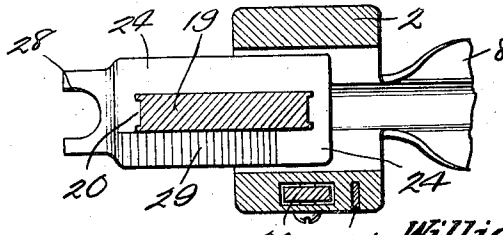




Fig. 3.

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2 SHEETS—SHEET 2.

Fig. 4.

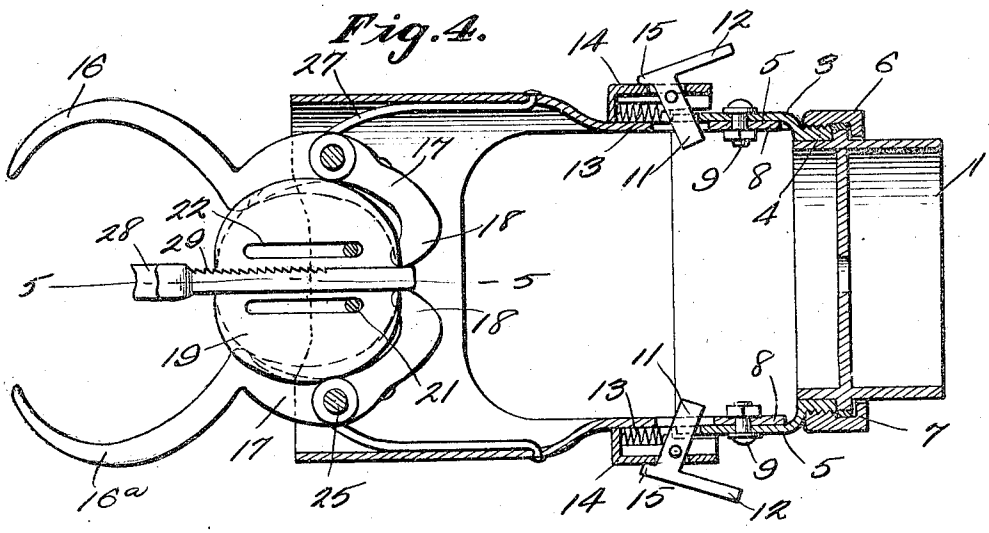



Fig. 5.

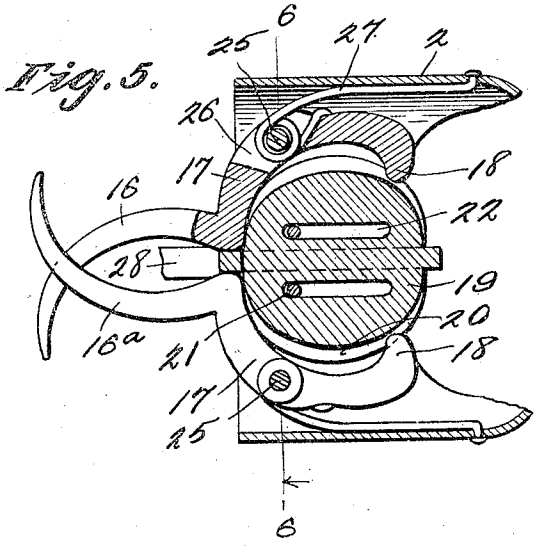
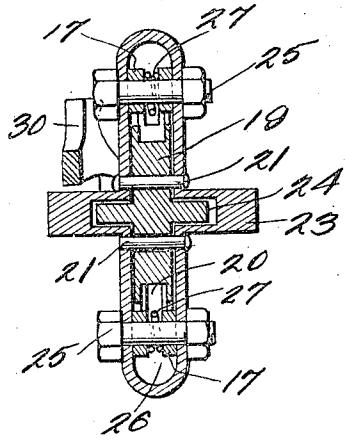



Fig. 6.




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# UNITED STATES PATENT OFFICE.

WILLIAM E. LUKE, OF KALISPELL, MONTANA.

## ARTIFICIAL HAND.

1,380,664. Specification of Letters Patent. Patented June 7, 1921.

Application filed April 21, 1920. Serial No. 375,509.

*To all whom it may concern:*

Be it known that I, WILLIAM E. LUKE, a citizen of the United States, residing at Kalispell, in the county of Flathead and State of Montana, have invented certain new and useful Improvements in Artificial Hands, of which the following is a specification.

A person suffering the loss of a hand is enabled to replace the loss in part by artificial means. The efficiency and range of usefulness of such means depend largely upon the capabilities and variety of adjustment thereof and ease with which the same can be manipulated.

The invention provides an artificial member embodying an attaching frame to be secured to the stump, a main frame adjustably connected to the attaching frame to be set to any required angular position and comprising fore and rear sections capable of relative angular adjustment and fingers pivoted to the fore section of the main frame and operable at will to grip or release an article.

The drawings illustrate a preferred embodiment of the invention. However, it is to be understood that in adapting the same to meet different conditions, various changes in the form, proportion, and minor details of construction may be resorted to without departing from the nature of the invention as claimed hereinafter.

Referring to the accompanying drawings:—

Figure 1 is a top plan view of an artificial hand embodying the invention.

Fig. 2 is a side view of the hand.

Fig. 3 is a sectional detail on the line 3—3 of Fig. 1.

Fig. 4 is a longitudinal section on the line 4—4 of Fig. 2.

Fig. 5 is a sectional detail on the line 5—5 of Fig. 4.

Fig. 6 is a transverse section on the line 6—6 of Fig. 5.

Corresponding and like parts are referred to in the following description and indicated in the several views of the drawings by like reference characters.

The device will be provided with suitable attaching means for securing it to the amputated stump and since such means are well understood in the art and will depend largely upon the nature of the amputation, it is not deemed essential to illustrate or refer thereto in detail.

The device comprises essentially an attaching frame 1 and a main frame, the latter being connected to the attaching frame in a manner to admit of its angular adjustment to any required position. The main frame comprises a fore section 2 and a rear section 3. These two sections are pivotally connected to admit of relative angular adjustment. The rear section 3 comprises a ring or band 4 and extensions 5, the latter being oppositely disposed and extending in paralleled relation. The ring 4 is externally threaded and receives the forward portion of the frame 1. A union 6 connects the main and attaching frames and engages an outer flange 7 of the frame 1, as shown most clearly in Fig. 4. The forward portion of the union 6 engages the ring 4 by a screw thread joint. When the union 6 is loose, the main frame may be turned to any required angular position. Upon tightening the union 6, so as to bindingly grip the flange 7 between the rear end of the ring 4 and the inner flange of the union, the main frame is made secure in the adjusted position.

The fore section 2 has parallel rear extensions 8 which overlap the inner sides of the extensions 5 of the rear section 3. Pivot fastenings 9 connect the overlapped extensions 5 and 8 and are oppositely disposed. The extensions 5 converge forwardly and their outer front edges are curved on the arcs of circles whose centers coincide with the pivot fastenings 9. A plurality of notches 10 is formed in the forward curved edges of the extensions 5. Latch members are mounted upon the extensions 8 of the fore section 2 and are adapted to coöperate with the notches 10 to hold the section 2 in the relative adjusted position. The latches are of L-form and comprise members 11 and 12. The members 11 extend inwardly and pass through openings formed in the extensions 8 and engage the notches 10 of the extensions 5. The members 12 are disposed beyond the main frame so as to be engaged and pressed inward at their free ends when it is required to disengage the members 11 from the notches 10 to admit of the section 2 being adjusted pivotally about the fastenings 9. Expansible helical springs 13 normally exert a pressure on the

members 11 to hold them in engagement with the notches 10. A housing 14 is secured to the outer side of each of the extensions 8 and receives a spring 13 and has the latch member pivotally connected thereto. Each of the latch members is formed with a projection 15, which constitutes a stop and engages the housing 14 to limit the outward movement of the member 12 at its free end. This is shown most clearly in Fig. 4.

The fingers are pivotally connected to the forward portion of the main frame and may be of any desired construction. The fingers are of similar formation but may comprise any number of gripping elements. In the present instance the fingers are designated by the numerals 16 and 16ª. Each of the fingers is provided with a shank 17. The fingers curve throughout their length. The shanks 17 likewise curve longitudinally. The fingers 16 and 16ª are shown as consisting of a plurality of gripping elements whereas the finger 16ª is shown as embodying a single element. It is to be understood that the fingers may embody any desired number of gripping elements to insure a firm grip being obtained upon the article to be held. The rear end of the shanks 17 terminate in projections 18 which are adapted to engage the edges of a slide 19 which is mounted in the main frame to receive a reciprocating movement. The edges of the slide 19 are grooved as indicated at 20 to receive the projecting ends 18 of the shanks 17. The edges of the slide 19 are curved to provide a compact structure and cams for the projections 18 to ride upon to effect a closing of the fingers when the slide 19 is pressed inward. The front portion of section 2 is of flattened form and receives the slide 19 and the shanks of the fingers. The slide 19 is disposed centrally of the section 2 and is directed in its movements by guide means which embody in part pins 21 and parallel slots 22, the latter being formed in the slide 19 and the pins 21 passing through the slots 22 and supported at their ends in the sides of the sections 2. Lateral extensions 23 are provided at opposite sides of section 2 and are grooved in their inner faces to receive ribs 24 at opposite sides of the slide 19. The shanks 17 are disposed beyond the slide 19 and are pivotally connected to the section 2 by fastenings 25 which may consist of bolts, rivets, or analogous securing means. The portions of the shanks 17 receiving the pivot fastenings 25 are slotted, as indicated at 26, and receiving the coils of springs 27 which have their outer ends engaging the section 2 and their inner ends engaging the shank 17 of the fingers. The springs 27 normally tend to hold the fingers 16 and 16ª in open position. When the slide 19 is pressed inward, as shown in Fig. 5, the projections 18 ride upon the inner end thereof, thereby closing the fingers on the article received between them. The slide 19 when free is pressed forward by the action of the projection 18 riding upon the inner or rear end thereof.

A pressure piece 28 projects forwardly from the slide 19 and is centrally disposed. The pressure piece 28 is located between the fingers and is adapted to be engaged by the object received between the fingers and adapted to be gripped thereby. When the object is received between the fingers and exerts a pressure on the part 28 the latter is moved inward thereby causing a corresponding rearward movement of the slide 19 with the result that the fingers are closed upon the object which is gripped thereby. The gripping of the objects is proportionate to the pressure exerted upon the part 28. Outward movement of the slide 19 is prevented by restraining means which are automatic in action. As shown the restraining means consist of teeth 29 a detent or pawl 30. The pawl 30 is pivoted to one of the lateral extensions 23 and its active end is disposed to engage the teeth 29 so as to hold the slide when pressed inward. A spring 31 coacts with the pawl 30 to normally hold it in engagement with the teeth 29. When the pawl is disengaged from the teeth 29, the slide 19 moves forward and the fingers spring apart thereby releasing the object gripped thereby. If it is desired to grasp any object the artificial hand will be pushed toward the object so that it will be engaged by the pressure piece 28 thereby moving the slide rearwardly toward the arm of the operator and thereby closing the finger pieces as has been described.

As hereinbefore stated the appliance is of such construction as to admit of it being firmly secured to the amputated stump and is susceptible of a variety of adjustment so that the main frame and fingers may be moved to any desired angular adjusted position and made secure. The fingers are adapted to operate with equal facility in any adjusted position, both to grip the object to be held or to release the same. The construction is such as to provide an appliance which is relatively light, compact in arrangement and easily manipulated both when gripping and releasing the object to be held or liberated and is also adapted to be firmly attached to the stump and conveniently and readily released therefrom.

What is claimed is:

1. In an artificial hand, a frame, fingers pivotally connected to the frame, and a slide operable between the fingers to effect a positive opening and a closing thereof.

2. In an artificial hand, a frame, a slide on the frame, and fingers pivoted to the

frame beyond the slide and having projecting portions yieldably held in contact with the slide and movable therewith to effect a positive opening and closing of the fingers.

3. In an artificial hand, pivoted fingers, a slide in coöperative relation with the fingers to effect a closing thereof, and restraining means for holding the slide pressed inward to maintain the fingers in closed position upon an object gripped therebetween.

4. In an artificial hand, a supporting frame, fingers pivoted thereto, a slide mounted on the frame and operable between the fingers to effect an opening and a closing thereof, and a pressure piece connected with the slide and adapted to be engaged by an object received between the fingers to effect a closing of the latter thereon.

5. In an artificial hand, a supporting frame, fingers pivoted thereto, a slide operable between the fingers to effect an opening and a closing thereof, a pressure piece connected with the slide, and spring means normally tending to hold the fingers in open position and the slide projected.

6. In an artificial hand, a supporting frame, fingers pivoted to the frame a slide operable between the fingers to effect a closing thereof, spring means normally holding the fingers in open position and the slide projected, a pressure piece for moving the slide inward, and detent means for holding the slide pressed inward and the fingers in closed position.

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

WILLIAM E. LUKE.

Witnesses:
MORRIS W. BOTTORF,
FRED A. LUKE.