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L. C. THORNTON

2,398,977

ARTIFICIAL LIMB

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Fig. 1.

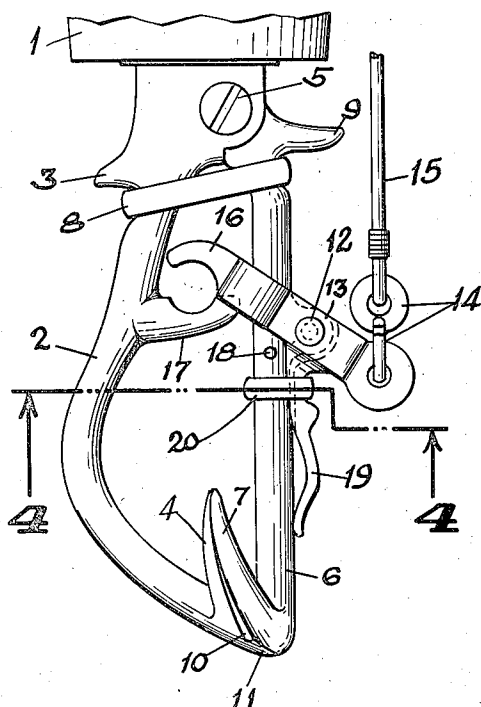


Fig. 2.

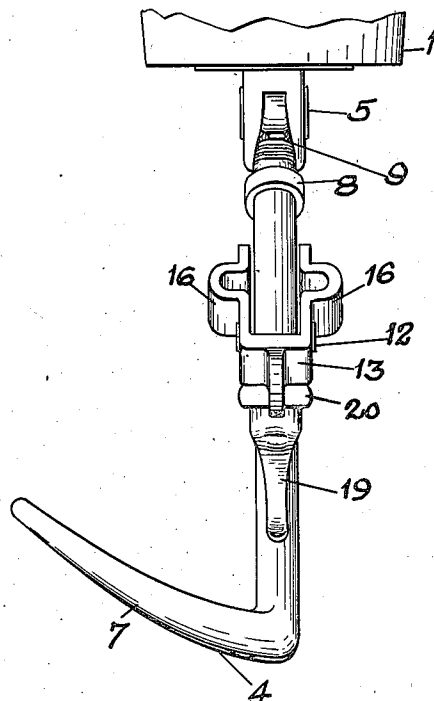


Fig. 3.

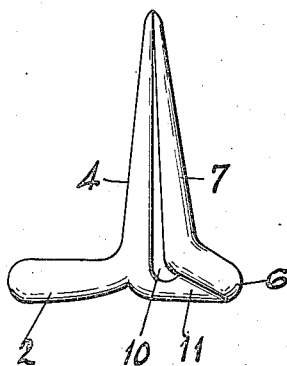
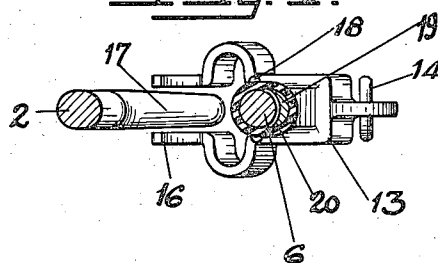


Fig. 4.



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4. Claims. (Cl. 3—12)

This invention relates to improvements in artificial limbs, and more particularly to a novel mechanical hand.

An object of my invention is to provide an artificial hand having mechanical means for operating two relatively movable jaws in a manner whereby objects may be conveniently picked up, held and released.

Another object of my invention is to provide an artificial hand of the kind characterized, embodying, in addition to two relatively movable jaws, novel means for picking up, holding and releasing an object other than that which might be then held by the jaws.

A further object of my invention is to provide an artificial limb having a number of mechanical arrangements which permit the simultaneous holding of different objects, or the simultaneous picking up of an object while another object is being held, or the simultaneous picking up of an object while another object is being held and still another object is being released.

A still further object of my invention is to provide a mechanical limb wherein a number of mechanical combinations arranged for independent operation are conveniently actuated by the same means.

Other and further objects of my invention will be pointed out hereinafter, or will be indicated in the appended claims, or will be obvious to one skilled in the art upon an understanding of the present disclosure. For the purpose of this application I have elected to show herein certain forms and details of an artificial limb which is representative of my invention; it is to be understood, however, that the embodiment of my invention herein shown and described is for the purpose of illustration only, and that therefore it is not to be regarded as exhaustive of the variations of the invention.

In the accompanying drawing:

Fig. 1 is a front elevation of an artificial limb embodying the preferred principles of my invention;

Fig. 2 is a side view of the same;

Fig. 3 is an end view of the same; and

Fig. 4 is a sectional view taken on the line 4—4 of Fig. 1.

Referring to the accompanying drawing, the numeral 1 designates a supporting member which in practice is ordinarily carried by the remaining part of a person's arm. Secured to the supporting member 1 is a depending rigid member 2 which is provided near its upper end with an outwardly disposed protuberance 3 and at its lower

end with an angular jaw 4. Pivotal secured as at 5 to the upper end of the rigid member 2 is a movable depending member 6 having an angular jaw 7 at its lower end which normally engages with the fixed jaw 4. Suitable spring means 8, shown for illustration purposes as embodying a rubber band encircling the fixed member 2 and the movable member 6, tends to urge the movable jaw 7 toward the fixed jaw 4. The spring means 8 is normally lodged in suitable grooves provided in the members 2 and 6, and the protuberances 3 and 9 on the said members, respectively, provide abutments which prevent the upward shifting of the said spring means. The jaws in their engaging positions are disposed at a slight angle with respect to one another, thereby permitting only their upper ends to contact with one another. A gradually widened intervening space 10 is thereby provided between the jaws, which is enclosed at its lower end by an inwardly projecting member 11 carried by the fixed member 2. The member 11 provides a support for articles positioned between and engaged by the jaws.

Pivotal secured as at 12 to an outwardly protruding boss carried by and located between the ends of the movable member 6, is a bifurcated lever 13, the outer end of which is connected by links 14 to a strap 15 that extends across the back of the person wearing the device and is looped around or is otherwise secured to his opposite shoulder. An upward pull on the strap 15, occasioned by a suitable flexing of the shoulder muscles or by otherwise exerting a pull thereon will actuate the lever 13 about the pivot 12 so its bifurcated end 16 is moved toward an inwardly disposed protuberance 17 carried by the rigid member 2. The lower side of the bifurcated end 16 of the lever 13 and the upper side of the protuberance 17 are curved in opposite directions so as to provide suitably shaped complementary surfaces for effectively engaging with round, cylindrical or other shaped objects held therebetween. An upward pull on the strap 15 will cause the bifurcated end 16 of the lever 13 to firmly engage with an object placed between it and the protuberance 17. A pin 18 projecting from opposite sides of the movable member 6 is so arranged as to provide a stop for the lever 13, thereby limiting its pivotal movement when the strap is pulled upwardly. The position of the stop pin 18 is such that the bifurcated end 16 of the lever 13 is not allowed to proceed downwardly beyond the protuberance 17. A continued upward pull upon the strap 15 after the lever is prevented

from further pivotal movement by either the stop pin 18 or by an object engaged and held between the bifurcated end 16 and the protuberance 17, will cause the movable member 6 to be actuated against the pressure of the spring means 8 and about the pivot 5 in a direction away from the fixed member 1, thereby opening the jaws 4 and 7 and thus permitting an object to be placed therebetween for subsequent engagement and holding. A release of the upward pressure on the strap 15 will enable the spring means 8 to return the movable member 6 toward the fixed member 2 and thereby effect the firm engagement of the jaws with an object positioned therebetween.

The lever 13, opposite the pivot 12, is provided with a depending rigid arm 19 which is normally positioned in parallel and engaging relation with respect to the member 6. The arm 19 is preferably bent outwardly between its ends to provide a space for the positioning of an object to be held therein. The pivotal movement of the lever 13 in a manner effecting the downward movement of its bifurcated end 16 will cause the arm 19 to be moved outwardly from the member 6. Suitable spring means, shown for illustration purposes as a rubber band 20 encircling the member 6 and the arm 19, serves to return the arm to a position against the member and to also return the lever to an inclined position whereby its bifurcated end 16 is raised above the protuberance 17. The spring means 20 operates automatically to return the lever 13 to its normal position after the upward pressure on the strap 15 is released. While I have shown rubber bands as the automatic spring means for actuating the movable member 6 and the lever 13 back to their normal positions, it is apparent that other types of resilient or mechanical means may also be used successively for this purpose.

Having described my invention, what I claim is:

1. In an artificial limb, a fixed jaw having a projecting member thereon, a movable jaw arranged for relative movement toward and away from the fixed jaw, a lever pivotally mounted on the movable jaw and having an object engaging member arranged for movement toward the projecting member of the fixed jaw, means connected to the lever for actuating it and also the movable jaw, whereby the object engaging member of the lever may be moved toward and into an object engaging relation with respect to the projecting member of the fixed jaw, and the movable jaw may be operated away from the fixed jaw.

2. In an artificial limb, a fixed member having a fixed jaw and a fixed object engaging member, a movable member carrying a movable jaw arranged for engagement with the fixed jaw, a lever member pivotally mounted on and carried by the movable member and arranged for clamping engagement with respect to the fixed object engaging member, means connected to the lever for actuating it into clamping relation with respect to the fixed object engaging member, the said means being arranged to also actuate the movable member in a direction whereby the movable jaw is disengaged from the fixed jaw, spring means for urging the jaws toward one another, and separate spring means for urging the lever in a direction whereby it is not in clamping relation with respect to the fixed object engaging member.

3. In an artificial limb, clamping jaws arranged for clamping relation with respect to one another, means for urging the jaws into clamping relationship, a projecting member carried by one of the jaws, a pivoted lever carried by the other jaw and arranged for independent pivotal movement and for clamping engagement with respect to the projecting member, common means for actuating the lever in a direction whereby a clamping relationship is effected with the projecting member and for also effecting a relative separation of the jaws, and spring means for urging the lever in a direction away from the projecting member.

4. In an artificial limb, two relative movable members having jaws arranged for clamping relationship, means for urging the jaws toward each other, a pivoted lever carried by one of the members and having a clamping jaw, a fixed clamping projection carried by the other relatively movable member and arranged for clamping relationship with the clamping jaw of the lever, spring means for urging the lever in a direction whereby its jaw is separated from the clamping projection, and common means actuated by a continued pressure for first moving the lever whereby its jaw effects a clamping relationship with respect to the clamping projection, and secondly, moving that relatively movable member which carries the lever in a direction whereby its jaw is moved away from the jaw of the other relatively movable member.

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