

L. AYDT.
ARTIFICIAL HAND.
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984,179.

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Fig. 1

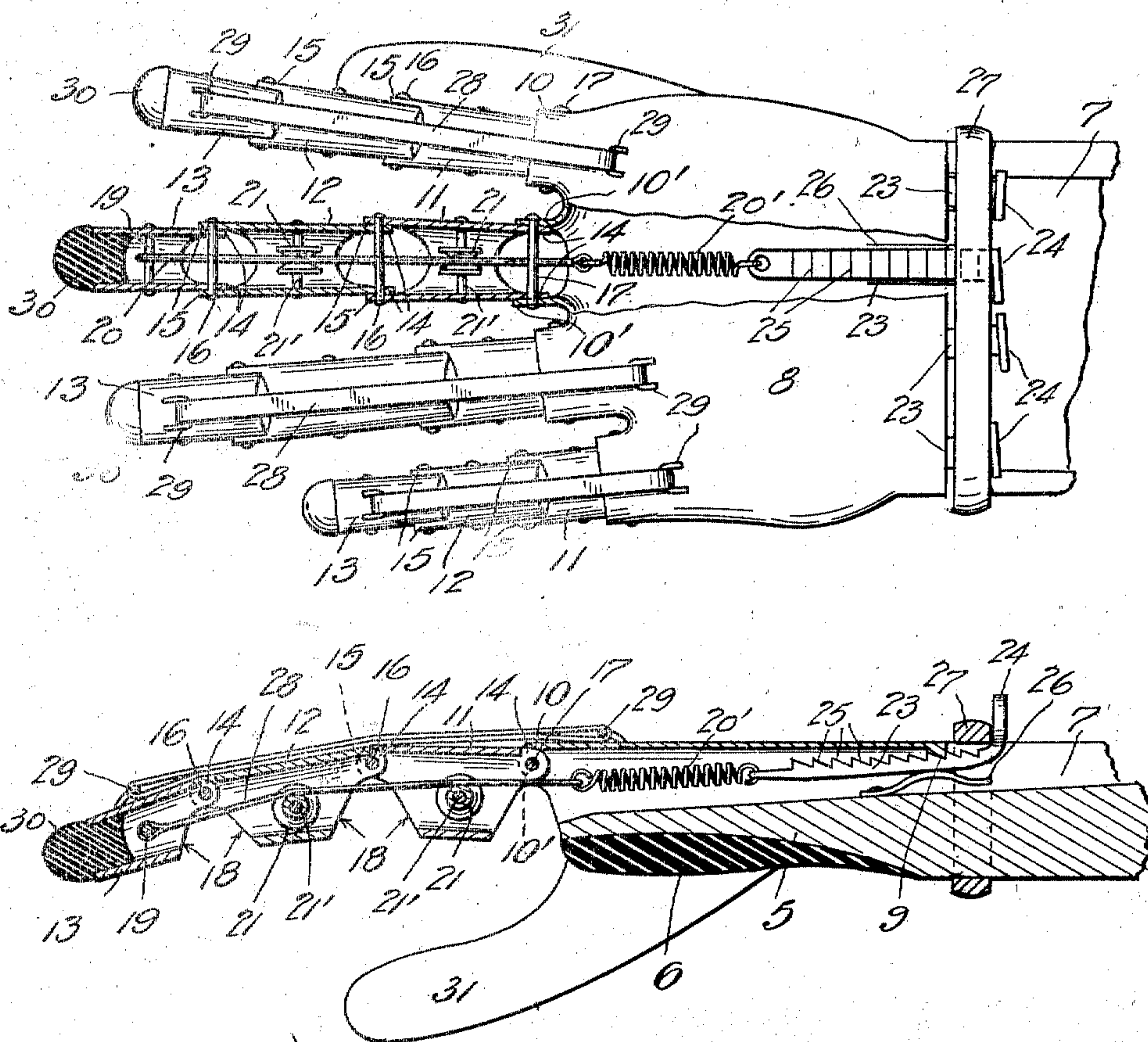


Fig. 2

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Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, LEONARD AYDT, a citizen of the United States, residing at Seattle, in the county of King and State of Washington, have invented certain new and useful Improvements in Artificial Hands, of which the following is a specification.

The object of this invention is to provide an artificial hand having fingers articulate for motions resembling those found in the natural ones and, similarly, arranged for independent, consentaneous and conjoint action in the performance of their various functions such, for example, as in the handling of knives, forks, mechanics' tools, etc.

With this end in view, the invention consists in the novel construction and combination of parts, as will be hereinafter described and claimed.

In the accompanying drawings, which show an embodiment of my invention, Figure 1 is a view of the top or back side of a hand, with portions broken away to disclose the mechanism. Fig. 2 is a longitudinal section of the same.

The reference numeral 5 designates the body of an artificial hand formed of wood or other suitable material, and is advantageously faced upon the front side with a palm 6 of rubber or equivalent yielding material. At the back side of said body is a recess 7 over which is rigidly secured a cover plate 8 terminating, adjacent to the wrist portion of the hand, in a transversely arranged flange 9 which extends into said recess. The outer end of the plate 8 is formed with a series of four finger-attaching projections 10 each substantially of an inverted U-shape in cross section to afford by their side elements 10' supports for the respective fingers. Each of the fingers comprises three tubular parts, or phalanges, 11, 12 and 13. The first and second rows of phalanges are provided with pairs of ears 14 and 15 at their inner and outer ends respectively; while the inner ends only of the remaining row, 13, are provided with pairs of ears 14. These ears are disposed to be at the back or in proximity to the hand knuckles, and are pierced to receive pins 16 which hingedly connect the ears of the adjacent ends of the several finger parts together, and likewise for pins 17 which connect the ears 14 of the phalanges 11 with the respective elements 10' of the aforesaid projections 10. The

front sides of the various phalanges are cut away to furnish bevel ends 18 to allow the fingers being more or less closed.

Secured to a pin 19 in each of the finger parts 13 is a flexor cord or tendon 20 such as of catgut, extending into the hand recess 7 through the intervening phalanges 11 and 12 and wherein the tendons are guided by sheaves 21 mounted upon transversely disposed shafts 21'. Within said recess, each of the tendons is connected to the end of a helical spring 20' whose other end is connected to a bar 23. At the opposite ends from the springs, the bars are turned upwardly to furnish handles 24, and the top faces of the bars are serrated to provide ratchet teeth 25 which are adapted to be engaged with the plate flange 9 at various adjustments of the fingers. To accomplish such engagement between the flange and the several bars a spring 26 is provided under each of the latter for pushing the same upwardly.

27 represents a hoop embracing the wrist part of the hand and also the bars 23.

Anterior tendons, such as of rubber elastic bands 28 are secured from their opposite end, as by staples 29, to the outer row of phalanges and the plate 8 to normally extend the fingers. Finger-tips 30 of rubber are desirably socketed in the finger parts 13.

31 represents a thumb secured to or formed integral with the body 5 of the hand.

In practice, the aforescribed artificial hand would be incased by a glove from the finger tips to within a short distance of the hoop 27.

The operation of the invention is as follows: When an object of irregular shape is to be grasped by the entire hand or where the object is to be grasped in the artificial hand between one or more of the fingers and the thumb or palm, as may be required, the fingers are accordingly operated by manipulating the appropriate handles 24 through pressures exerted individually thereupon through the medium of the fingers of the other or natural hand of the operator. Such manipulation puts tension upon the affected flexor springs 20' and cords 20 whereby the latter will cause the hooking of the respective fingers about the object. It is to be noted that, in thus putting a tension upon the springs 20' that the resilient action

thereof will cause the teeth of the various bars 23 to be reliably engaged with the flange 9. When the fingers are to be closed in unison, then the hoop 27 would be shoved up the wrist to drag all of the bars 23 therewith. The springs 26, during such finger closing movements of the bars, will press the same into engaging positions with the flange 9. To open the fingers the bars 23 are retracted from their engagement with said flange by a downward pressure from the natural hand upon the handles 24 and in opposition to the springs 26. When thus released, the power of the elastic bands 28 assert themselves to extend the fingers.

What I claim, is—

1. An artificial hand having articulated fingers, flexible tendons for the respective fingers, means for actuating said tendons to close the fingers independently of each other, and means whereby the tendons may be operated to close the fingers in unison.

2. In an artificial hand, a body, a series of jointed fingers which are hinged to said body, tendons secured to the third or outer phalanges of the respective fingers and extending into a recess provided in said body, a separably operable ratchet bar connected with each of said tendons, and devices provided in the body for engaging the respective ratchet-bars.

3. In an artificial hand, in combination with a hand body, a plurality of jointed fingers hinged to said body, tendons secured to the outer finger phalanges, a ratchet device connected with each of said tendons,

and means to secure said ratchet device in adjusted positions, of a hoop embracing the wrist of said hand-body and arranged to simultaneously effect the engagement or release of all of said ratchet devices.

4. In an artificial hand, a body, a series of jointed fingers which are hinged to said body, tendons secured to the third or outer phalanges of the respective fingers and extending into a recess provided in said body, a separably operable ratchet-bar connected with each of said tendons, devices provided in the body for engaging the respective ratchet-bars, and springs acting to effect the engagement of said bars with said devices.

5. In an artificial hand, in combination with a hand body, a plurality of jointed fingers hinged to said body, tendons secured to the outer finger phalanges, a ratchet device connected with each of said tendons, and means to secure said ratchet device in adjusted positions, of means to simultaneously effect the engagement or release of all of said ratchet devices.

6. In an artificial hand having articulated fingers, flexible tendons for the respective fingers, means for actuating said tendons to close the fingers independently of each other, means to retain said fingers in closed condition, and means whereby the tendons may be operated to close the fingers in unison.

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Witnesses:

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