

E. ROBINSON.
ARTIFICIAL HAND.
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1,304,099.

Patented May 20, 1919.

Fig. 3.

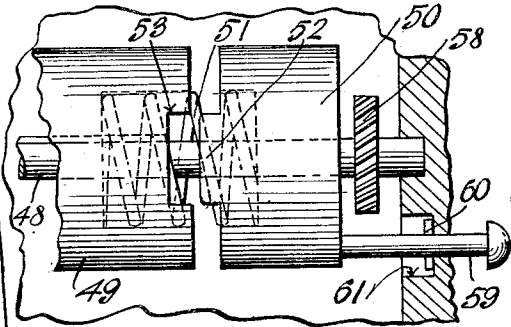
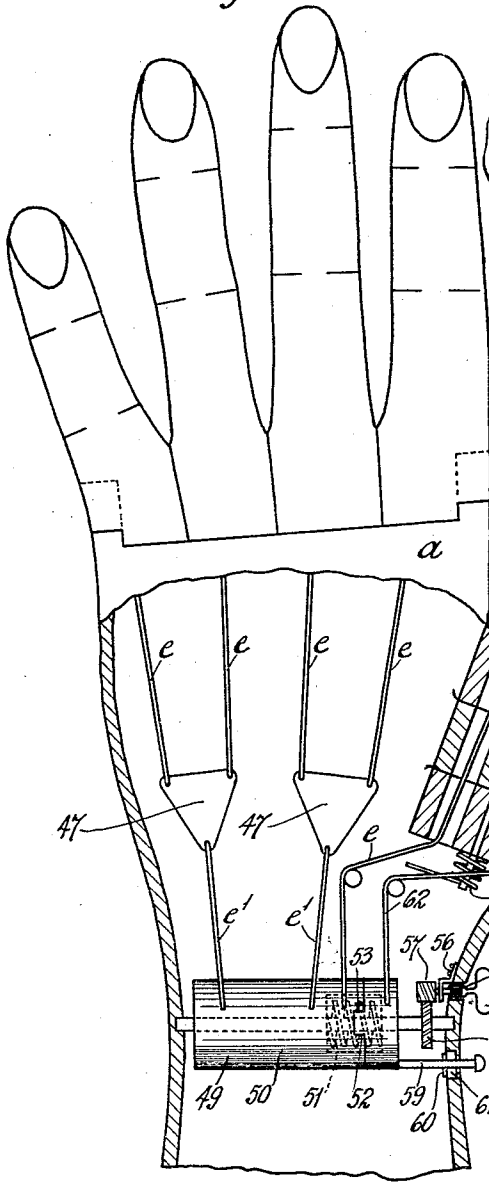


Fig. 4.

Fig. 1.

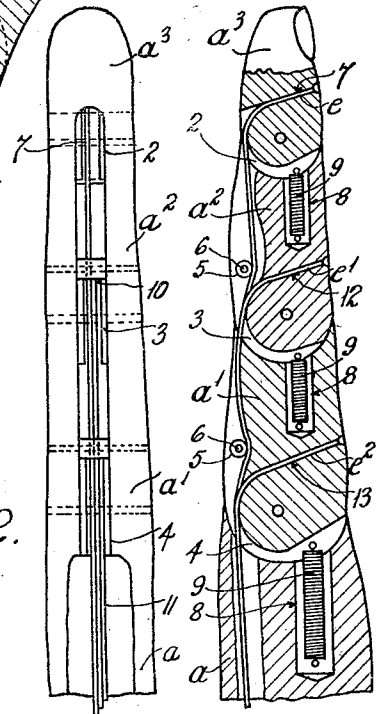


Fig. 2.

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ARTIFICIAL HAND.

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To all whom it may concern:

Be it known that I, ENOS ROBINSON, of 15 Imperial avenue, Millbrook, Southampton, in the county of Hants, England, have invented a new and useful Artificial Hand; and I do hereby declare the following to be a full, clear, and exact description of the same.

This invention relates to an improved artificial hand and its general object is to provide a construction which is simple and efficient and at the same time, permits of using the hand for many purposes in a natural manner.

Another object of the said invention is to provide improved means in the fingers and thumb of the hand for bending the joints thereof and returning the same to the normal position.

Still another object is to provide means whereby the fingers may be bent simultaneously with the turning of the thumb or may be bent without turning the thumb to meet different requirements.

A further object is to provide improved means for obtaining an automatic regulation of the degree to which the various fingers bend.

I attain these objects by the hereinafter described mechanism.

Referring to the drawings:

Figure 1 is a detached view in sectional side elevation of an artificial finger with finger bending means.

Fig. 2 is a detached plan view of Fig. 1.

Fig. 3 is a plan view partly in section showing means for actuating the fingers of the artificial hand.

Fig. 4 is a detached view drawn to an enlarged scale and illustrating details of the construction shown in Fig. 3.

In Figs. 1 and 2 the finger joints a^1 , a^2 and a^3 are jointed together and pivoted to the palm portion a in the known manner by means of tongues engaging cheeks and pins passing through said tongues and cheeks. The tongues are provided with grooves 2, 3 and 4 and the joint a^3 has a hole 7 passing to the back thereof and opening into the groove 2. The joints a^1 and a^2 are provided with sleeves or rollers 5 rotatably mounted on pins 6. A cord or chain e passes along the grooves 2, 3 and 4 and over the sleeves or rollers 5, and is threaded through the hole 7 where it is secured for example by forming a knot on the end thereof. Holes 8 are provided in

the joints a^2 and a^1 and the palm section a . Helical springs 9 are provided in the holes 8 and have one end secured near the bottom thereof and the other end in the groove of the tongue situated at the open end thereof.

The joints a^2 and a^1 are formed with holes 12 and 13 extending from the grooves 3 and 4 to the back of the joint. Cords or chains e^1 and e^2 are threaded through and secured in the said holes, for example, when the cords are employed by means of knots. By pulling the cord or chain e^2 the joint a^1 is bent and by pulling the cord or chain e^1 the joints a^1 and a^2 are bent. By pulling the cord e all three joints are bent. The springs 9 return the joints to their normal position when the cords or chains are released.

For the purpose of obtaining a turning movement of the thumb it may be formed as shown in Fig. 3 and be attached to the palm of the hand by means of a tongue 44 on the palm which tongue engages a slot formed in the thumb.

A pivot 45 is secured to the thumb and projects through the tongue 44. The thumb is turned into the position shown by a spring 46 secured to the thumb at one end and resting against the inner wall of the palm with its other end.

In the flexible connections for the purpose of permitting variable amounts of bend in the fingers, bars or triangular plates may be employed. Fig. 3 shows two plates 47 to the upper corners of which are secured the flexible connections e of two fingers. The lower corners of the plates 47 are secured to the finger operating mechanism by a connection e^1 . The connection e of the thumb is secured direct to the finger operating mechanism.

In order to render the turning movement of the thumb constructed as shown in Fig. 3 independent from the bending movement of the fingers the construction of finger actuating mechanism shown in Figs. 3 and 4 may be employed. On a spindle 48 is fixed a drum 49 to which are secured the flexible connections employed for the purpose of bending the joints. A second drum 50 is rotatably and slidably mounted on the spindle and a spring 51 is inserted between the drum in cavities formed in the end thereof. The spring 51 tends to force the drums 49 and 50 apart and to thereby disengage coupling means provided on their adjacent ends. In the drawing the coupling means consist of a

projection 52 on the drum 50 adapted to engage a slot 53 in the drum 49.

The spindle 48 is rotated by means of a key having a square hole which fits on the square end of a spindle 55 mounted in a bracket 56. To the spindle 55 is fixed a worm 57 which gears with a worm wheel 58 secured to the spindle 48.

The pin 59 is slidably mounted in the wall of the hand, see Figs. 3 and 4, and has a cross pin 60 which when the pin is turned into the proper position, engages the slot 61. When the cross piece 60 assumes the shown position the spring 51 forces the drum 50 away from the drum 49 as shown in Fig. 3. The drum 50 to which is attached the flexible connections 62 therefore does not turn when the drum 49 is turned. If the pin 60 is forced inward and turned until the cross pin 60 is out of register with the slot 61, the drum 50 is thereby engaged with the drum 49 and turns therewith. The connection 62 is thereby actuated and turns the thumb into a position where it and the first finger will meet in bent position.

What I claim then is:—

1. An artificial hand comprising finger and thumb joints; tongues forming part of said joints; grooves in said fingers; peripheral grooves in said joints; rollers in said grooves; flexible connections secured to different parts of said joints and guided by said grooves and rollers; and means in said fingers tending to straighten them, for the hereinafore specified purpose.

2. An artificial hand comprising finger

and thumb joints; flexible connections operatively connected to said joints, plates connected at several points to a plurality of said connections, and a flexible connection connected to each of said plates at a point between the points at which the first named flexible connections are connected.

3. An artificial hand comprising finger joints, a lateral thumb joint, an approximately longitudinal joint adapted to move laterally in the base of the thumb pivoted to rotate, and means for operating said lateral thumb joint alone or simultaneously with said longitudinal thumb joint.

4. An artificial hand comprising finger and thumb joints, flexible connections operatively connected to said joints, a pivotal joint at the base of the thumb, spring means tending to retain said thumb in its normal position, a flexible connection operatively connected to said pivotal joints, a spindle mounted on said hand, a drum secured to said spindle and having connected to it the first named connections, a drum loose on said spindle and having connected thereto the second named flexible connections, coupling means on the adjacent ends of said drum, spring means tending to separate said drums, disengageable means acting on said loose drum to retain same in engagement with said drums, and means for rotating said drum.

In testimony whereof I affix my signature in presence of a witness.

ENOS ROBINSON.

Witness:

G. O. SYMES.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."