

E.D. Hudson,

Apparatus for Executions,

No 50,128,

Patented Sep. 26, 1865.

Fig. 1.

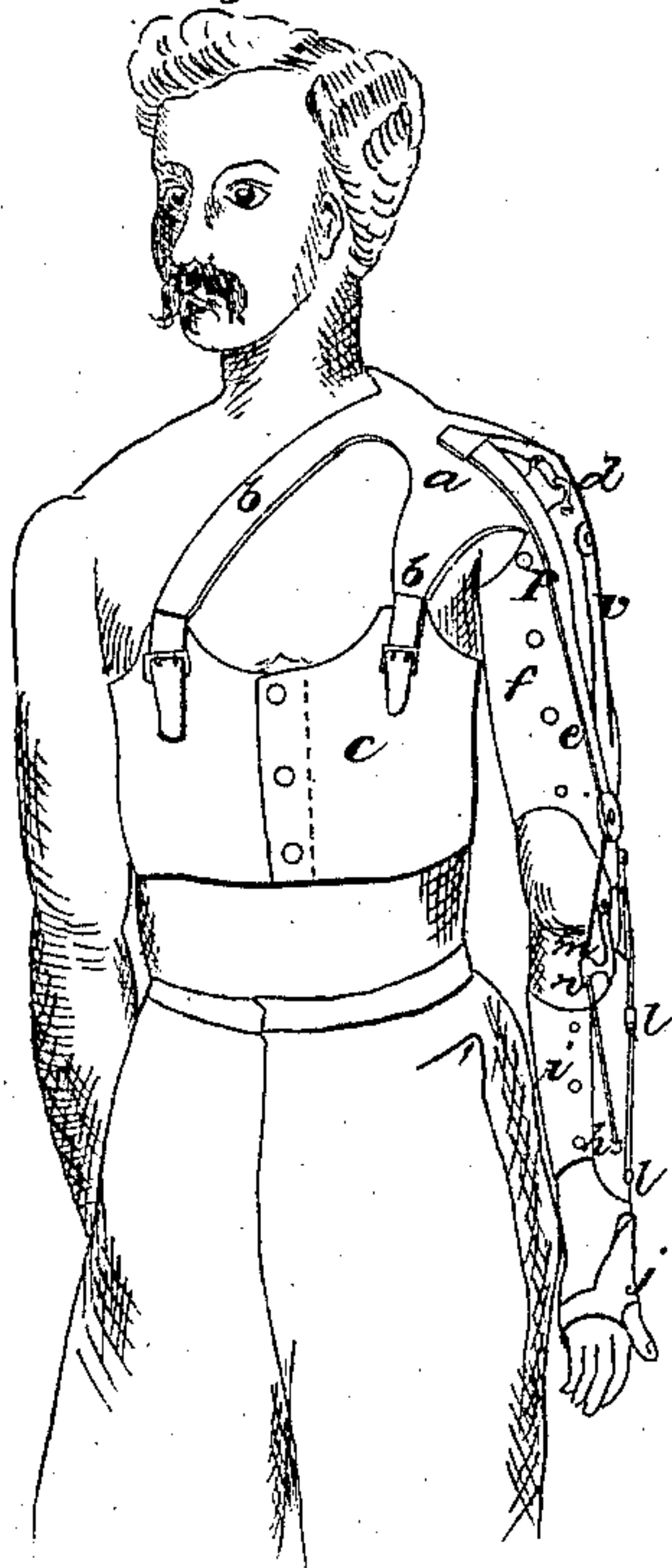


Fig. 2.

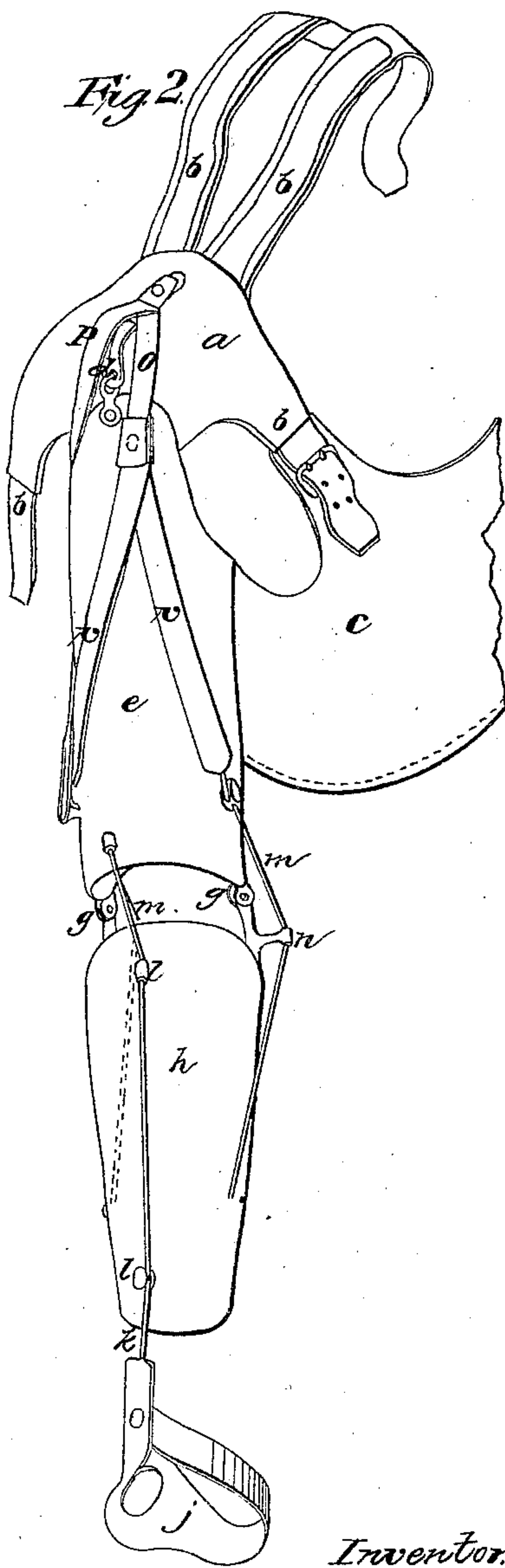
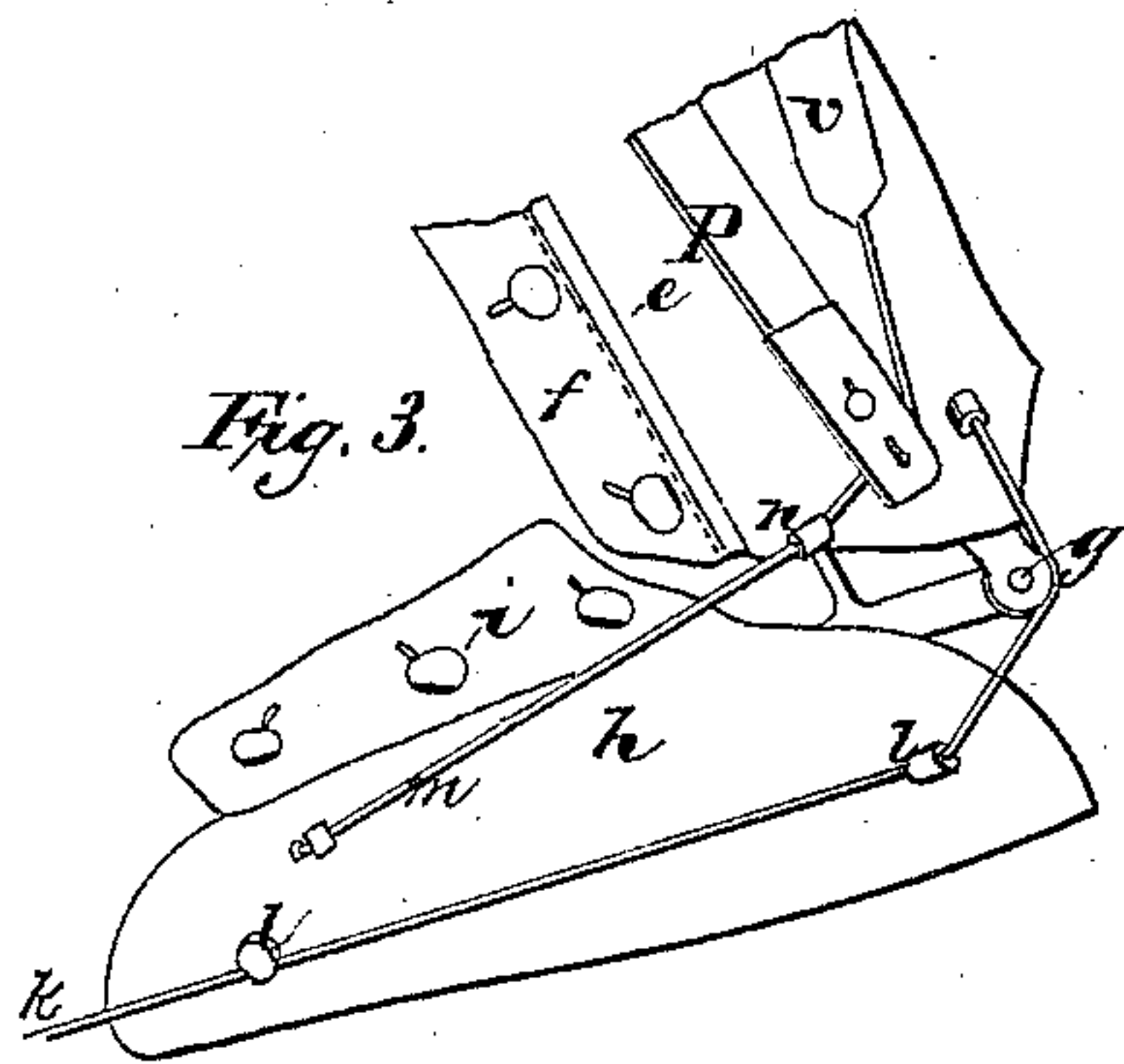


Fig. 3.



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IMPROVEMENT IN SURGICAL APPARATUS FOR EXSECTIONS.

Specification forming part of Letters Patent No. 50,128, dated September 26, 1865.

To all whom it may concern:

Be it known that I, E. D. HUDSON, M. D., of the city, county, and State of New York, have invented a new and useful Improvement in Surgical Apparatus for Exsections; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable those skilled in the art to make and use the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 represents an apparatus made according to my invention, showing how it is applied to a patient, and showing also the flexible bands by means of which the rigid parts of the apparatus are secured upon the arm of a patient. Fig. 2 shows the apparatus detached, the outside of the rigid parts being here exposed to view, together with the elastic band and cords, which are intended as auxiliaries to and substitutes for certain muscles of the arm. Fig. 3 is a detailed view of the joint which unites the upper and lower cases of the apparatus, the joint being shown flexed or bent in order to illustrate the action of the joint on the cord or tendon K.

Similar letters of reference indicate corresponding parts.

The object of this invention is to provide an apparatus to be worn by those who have suffered exsections of the shoulder-joint, os humeri, elbow-joint, and radius, or either of them, or of portions thereof, whereby the functions of the arm are in a main degree restored and the patient is enabled to perform most offices of usefulness and convenience to himself and others.

It has been common hitherto, whenever the patient has suffered the loss of any of the bones or joints of the arm or of the shoulder-joint, or whenever it has been thought necessary that any of them be removed, to amputate the arm, for the reason that, the foundation and support of the muscles having been removed, they were thenceforth not able to fulfill their functions, and therefore the better course was to remove the arm itself below the place of exsection or destruction of the bone, as being a useless appendage.

My invention is meant to save the patient from amputation, and to provide an artificial substitute, so to speak, for the bones and joints destroyed or exsected.

The apparatus here shown is a combination or aggregation of devices, which will not in all cases be required by the patient—as, for instance, in ordinary cases of extreme exsections of the shoulder-joint the case *h* need not be of full length and the tendons *m* and *k* and thumb-piece may be omitted. In cases of exsections of the middle third of the os humeri the scapula and shoulder pad *a* and its connections *b c*, the joint *d*, and the thumb-piece marked *j*, and the tendon K need not be worn by the patient. When the elbow-joint is exsected the patient may not always need the parts designated by the letters *a*, *b*, *c*, *d*, *o*, P, *k*, and *j*. When the exsection is in the forearm the same parts may be omitted as in case of the exsection of the elbow-joint. When the radius and wrist-joint are exsected the scapula-pad and its immediate connection and the band O and bands U need not be worn. But whenever in these and other cases the scapula-pad is not needed its place is to be supplied by a strap extending from the case *e* and going over to and around the opposite shoulder. These exceptions are not intended as arbitrary directions for using my invention, but only as suggestions in cases of ordinary character. In some cases of partial exsection the muscles may be so greatly impaired as to require the assistance of nearly the whole of the apparatus.

a is a scapula and saddle pad for the shoulder, the spine, acromion and caracoid processes of the scapula and the clavicle, and their interspaces.

b are straps continuing from the scapula-pad, to keep it *in situ* or place, extending to and attached to an auxiliary and waist band, *c*, made and applied as shown.

d is an arthrodeal or oscillatory joint, composed of two flat pieces of steel, united underneath the acromion process of the scapula by a swivel, the upper piece being bent to conform to the contour of the shoulder, and so as to carry and hold off the arm from the body, and the lower piece, continuing down the line of the arm, is riveted to a semicircular and somewhat spiral-shaped case, *e*, composed of wood, rawhide, or hard rubber, or other suitable material, to half encircle the arm from beneath the acromion process down to the condyles of the humerus, to give support to the arm; and for exsection of the upper third of

the humerus it is attached to the scapula-pad *a*, as a *point d'appui*, by the straps and joint of steel *d*.

f are aponeurotic bands continuous from the terminations of the semicircling case *e*, which encircle the arm, and are united with buttons from the axilla to near the elbow-joint, to bind and compact the muscles in their contractility and exercise and to render the case *e* an efficient support of the arm.

g g are ginglymus joints of steel, forming artificial elbow-joints when the elbow-joint has been excised, and to unite the case of the arm *e* to a similar case, *h*, for the forearm, designed for its support and fixedness.

i are aponeurotic bands continuous of the case for the forearm, to encircle it, and made fast by elastic bands and clasps.

j is an extensor pollicis or band or pad acting upon the ball of the thumb, which it encircles, with or without a strap passing around the hand, which extends backward and obliquely upward across the wrist, and is attached to a tendon, *k*, which passes under greaves *l l* at the carpal end of the case *h*, near its ulnar side, thence upward along the external side of the arm under a second greave *l*, thence up past the place of the external condyle of the humerus, where it is strongly attached and so arranged as to fall into a groove of the elbow-joint when it is flexed, which acts as a lever to extend the cord and supinate the hand when the forearm is flexed and the hand is carried to the head. The necessity and use of this part of the apparatus arise when the radius is excised and the supinator muscles impaired or destroyed. The forearm is thus restored to usefulness and the hand supinated or turned when carried to the head. The hand shown in Fig. 1 is turned as it will be when raised, in order to show the form of the thumb-band *j* and the manner of applying it.

U U are two elastic rubber straps, which represent the biceps muscles, to which they serve as auxiliaries when these muscles are impaired or their insertions destroyed, and which are attached to two tendons, *m m*, which pass down in front and along the sides of straps of the elbow-joints *g g*, over stanchions *n n*, and under greaves, and are attached near the carpal end of the case *h*. They are intended for flexing the forearm, lifting with the forearm and arm extended from the body.

O is an elastic strap to represent or aid the deltoid muscle to carry the arm out away from

the body, which is attached high up on the shoulder-pad and stretched downward and inserted to the middle of the humeral case *e*.

p is an elastic rubber strap, attached high up on the front of the scapula-pad *a*, and stretched down and backward and buttoned to the middle and inside of the humeral case *e*, to represent and aid the pectoral muscle, when it is impaired by an excision of the upper third of the humerus, to draw the arm forward over the chest and antagonize the latissimus dorsi muscle.

The instrument in parts is efficient to restore the arm or forearm to usefulness in cases of extreme exsections of the shoulder-joint, middle third of the arm, lower third of the arm, elbow-joint, upper third of the forearm, and of the radius and wrist-joint.

I claim as new and desire to secure by Letters Patent—

1. The apparatus for exsections of bones and joints of the arm and of the shoulder-joint, constructed substantially as described.

2. The scapula and saddle pad *a* for the shoulder, constructed substantially as described, and in combination with the universal joint, which connects it to the case *e*, substantially as described.

3. In combination, the scapula and saddle pad *a*, the case *e*, and the joint *d*, constructed substantially as described.

4. In combination, the elastic bands *P*, *O*, and *U*, with the scapula and saddle pad *a* and os humeri case *e*, constructed substantially as described.

5. The thumb-piece *j*, in combination with the cord or tendon *k* and the grooved elbow-joint, whereby the hand is turned over when it is raised, constructed substantially as described.

6. The cords or tendons *m*, representing the biceps or flexor muscles of the forearm, in combination with stanchions *n* on the frame of the elbow-joint and with the case *h* of the forearm, constructed and arranged substantially as described.

7. The flexible aponeurotic bands *f i*, applied to the rigid cases *e* and *h*, substantially as described, for the purpose of banding and confining the muscles.

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Witnesses:

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