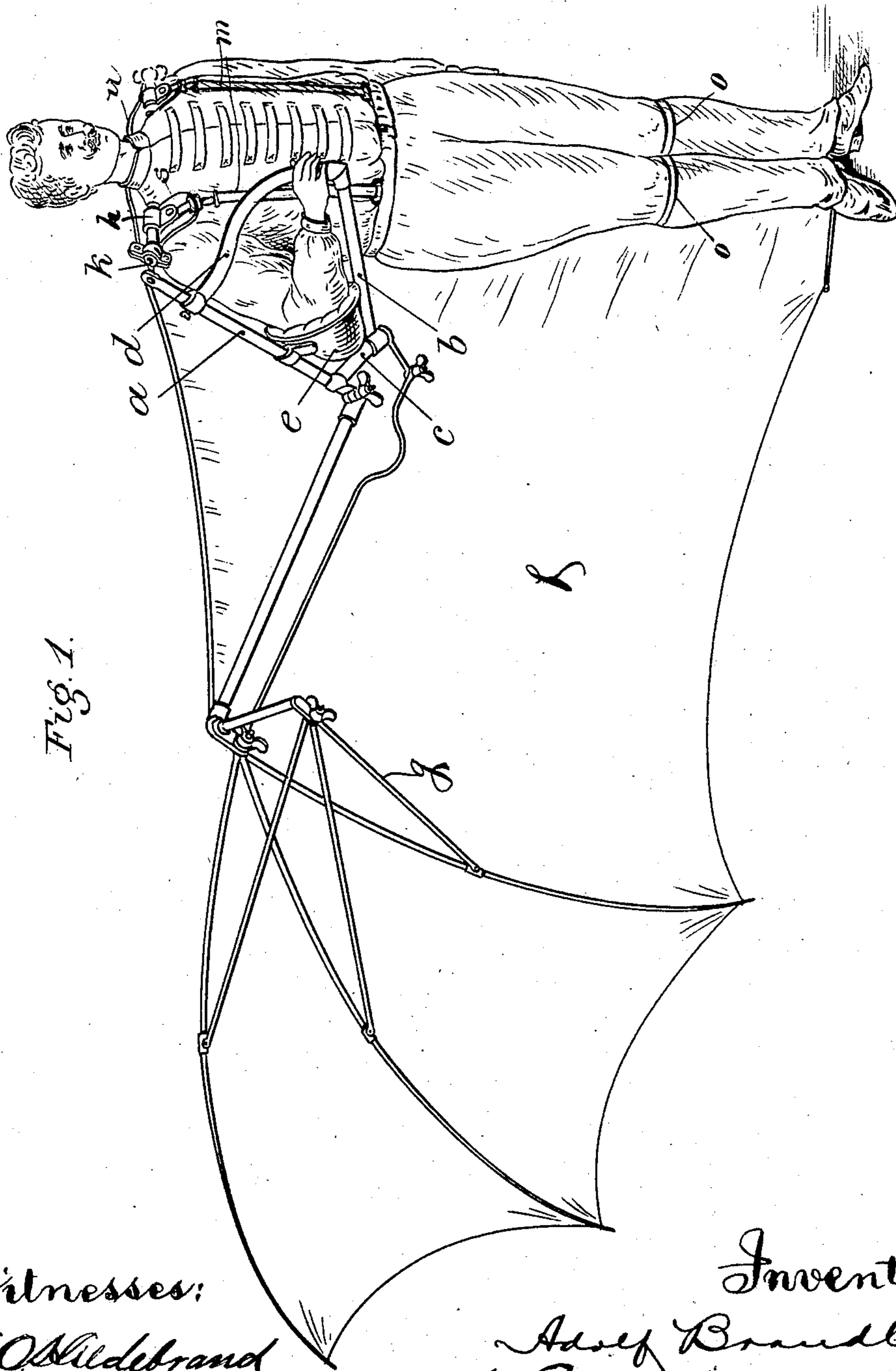


No. 849,971.

PATENTED APR. 9, 1907.

A. BRANDL.
FLYING APPARATUS.
APPLICATION FILED APR. 16, 1906.

3 SHEETS—SHEET 1.



Witnesses:
E. O. Midebrandt
N. Reynolds.

Inventor:
A. Brandl
by George Massie
Attorney

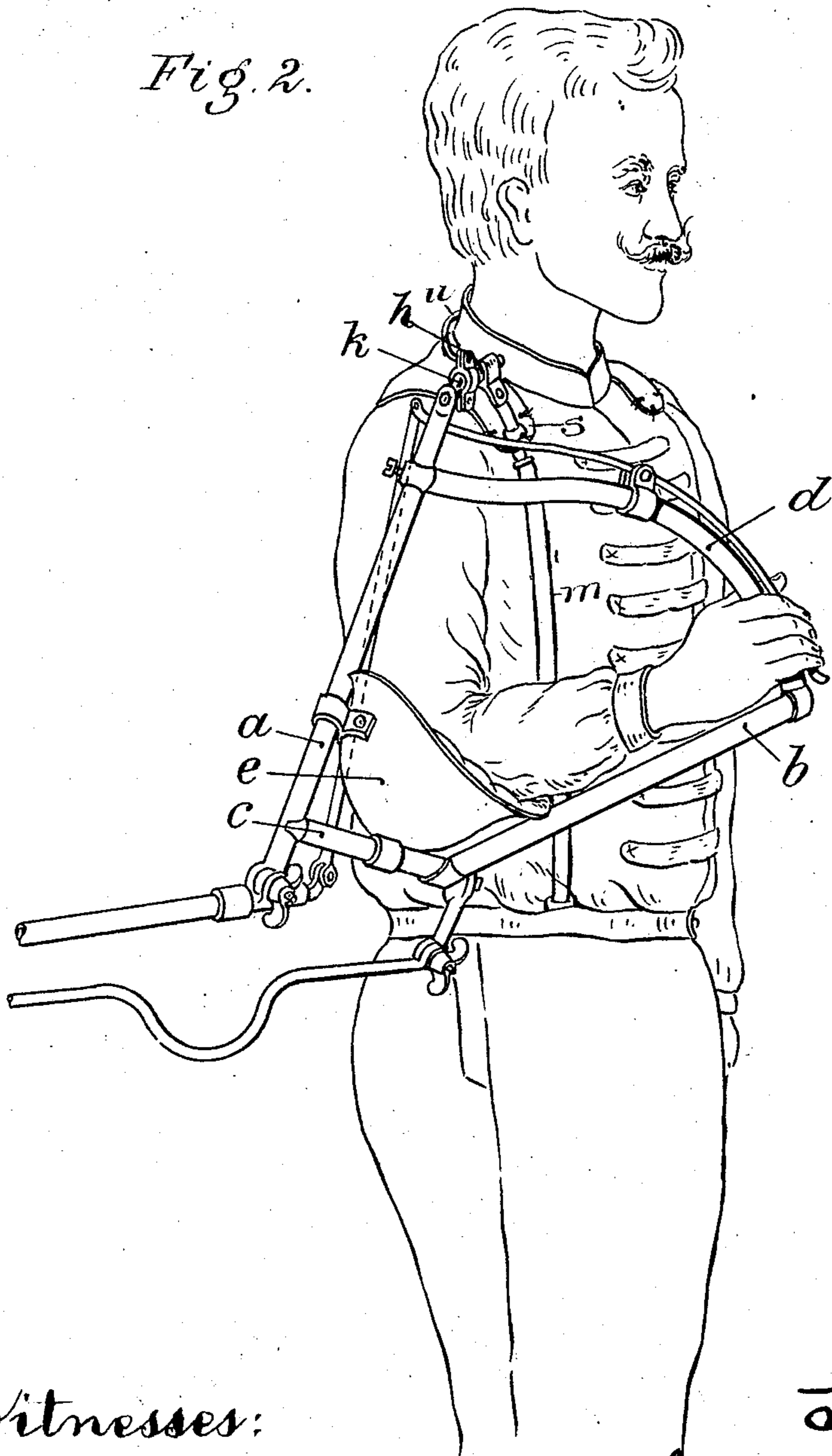
No. 849,971.

PATENTED APR. 9, 1907.

A. BRANDL.
FLYING APPARATUS.
APPLICATION FILED APR. 16, 1906.

3 SHEETS—SHEET 2.

Fig. 2.



Witnesses:

E. O.ildebrand
N. Reynolds

Inventor.

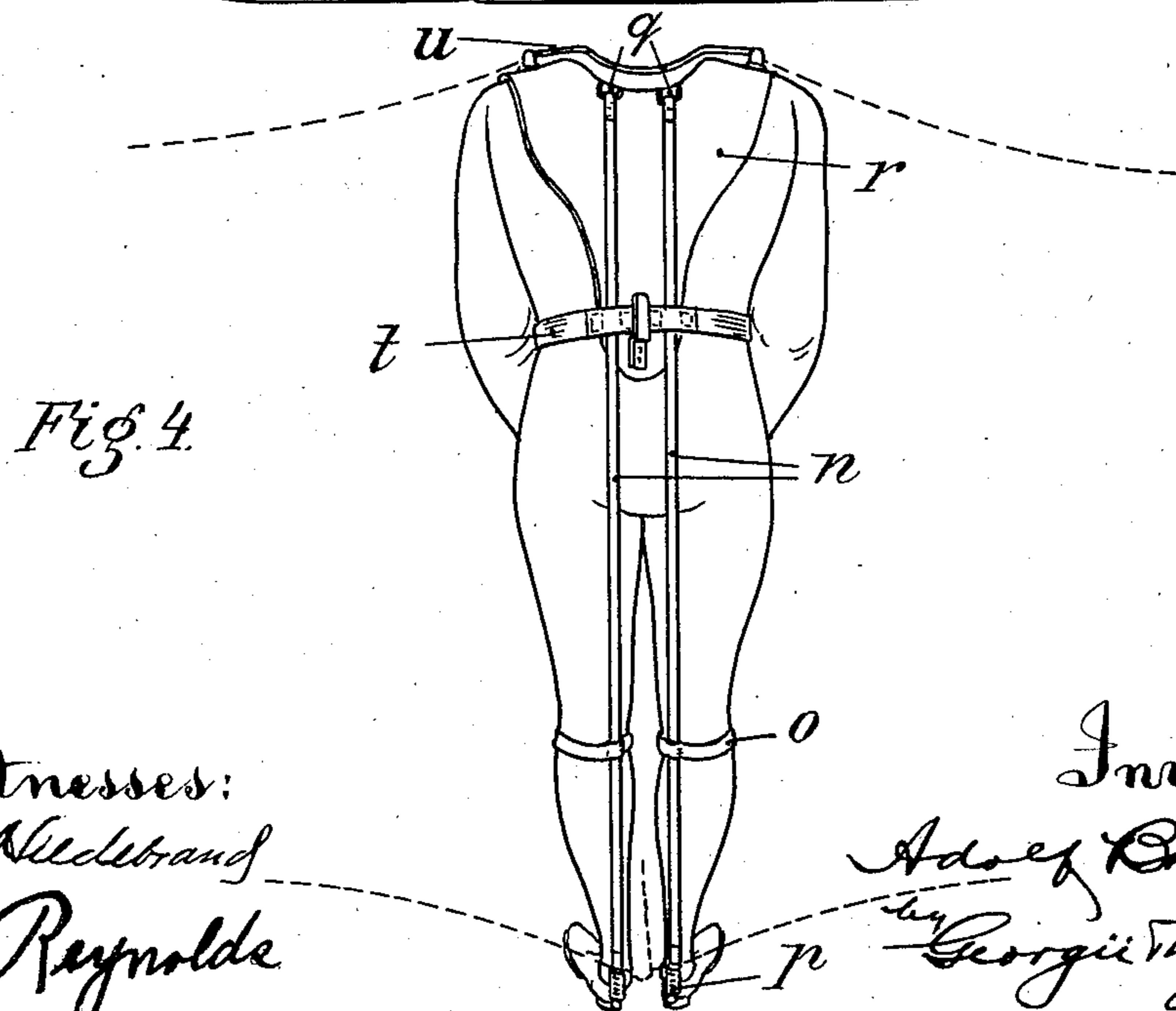
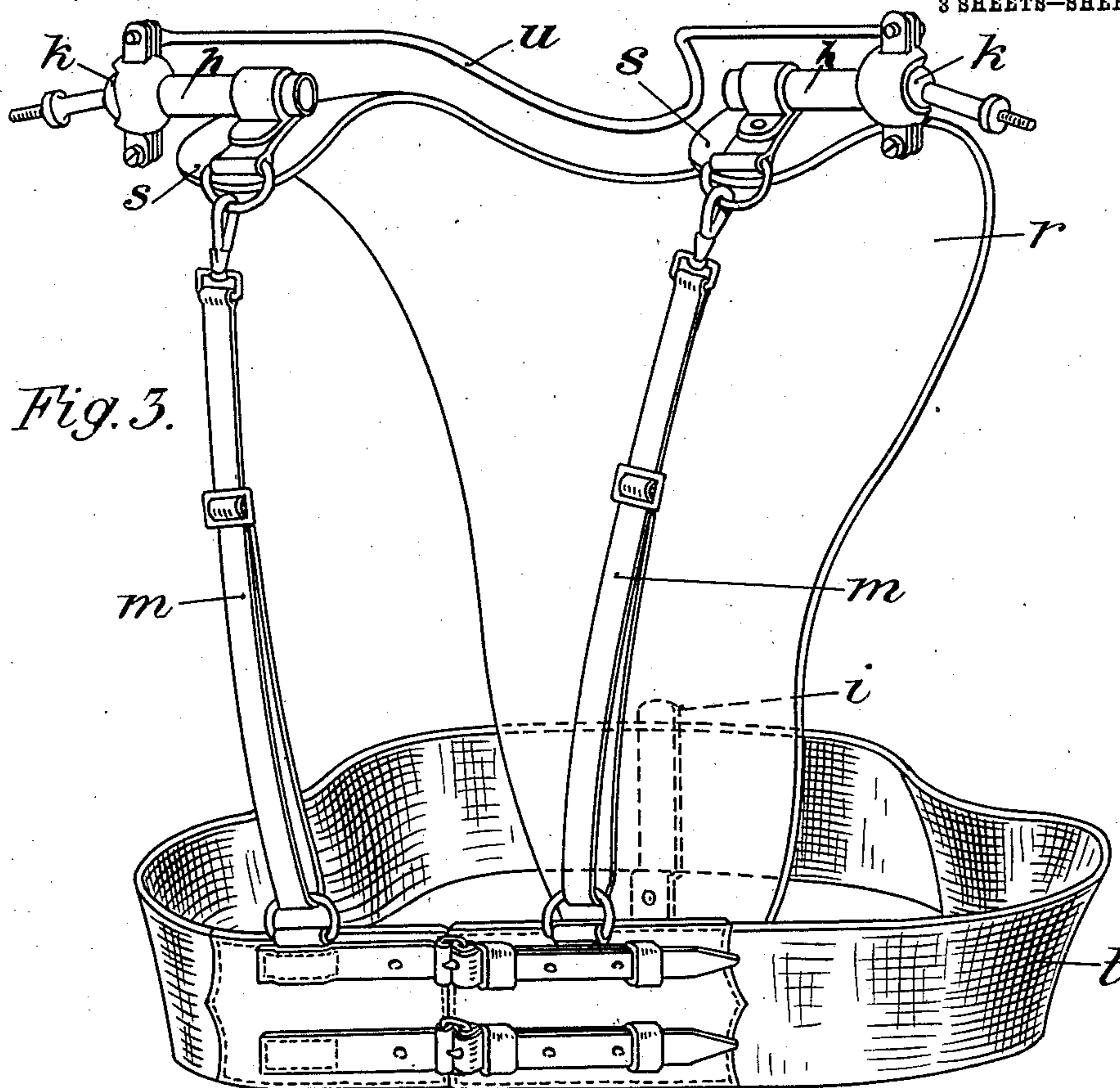
Adolf Brandl
by George Massie
attorneys

No. 849,971.

PATENTED APR. 9, 1907.

A. BRANDL.
FLYING APPARATUS.
APPLICATION FILED APR. 16, 1906.

3 SHEETS—SHEET 3.



Witnesses:
E. M. Debrand
N. Reynolds

Inventor:
Adolf Brandl
by Georgie Massie
Attorney

UNITED STATES PATENT OFFICE.

ADOLF BRANDL, OF MUNICH, GERMANY.

FLYING APPARATUS.

No. 849,971.

Specification of Letters Patent.

Patented April 9, 1907.

Application filed April 16, 1906. Serial No. 312,013.

To all whom it may concern:

Be it known that I, ADOLF BRANDL, a citizen of Germany, residing at Munich, Bavaria, Germany, have invented certain new and useful Improvements in Flying Apparatus; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to flying apparatus, and more especially to means for detachably securing a wing to the body of the operator. In devices of this general character heretofore presented it has been usual to secure the wing to the operator by means of straps and lacings, which not only hamper the free movement of the arm, but require the services of an assistant to attach and detach the wings.

The object of this invention is to provide means of attachment by which the wings may be put on and off at will by the operator without assistance and which permit of the greatest range of movement of the arms with changes in position to bring new muscles into operation and prevent tiring.

The invention, as hereinafter more particularly described, and defined in the accompanying claims, will be readily understood by reference to the accompanying drawings, representing a preferred embodiment of the same.

In the drawings, Figure 1 is a general view of a wing attached to the body of the operator. Fig. 2 is an enlarged detail showing that part in which the invention more particularly resides. Fig. 3 is a perspective view showing the attachment of the frame to the body, and Fig. 4 is a rear elevation showing the attachment of the wings along the body.

The essential novelty of the invention resides in a frame conforming generally to the arm of the operator in its bent position and composed of tubular pieces.

The side *a*, corresponding to the upper arm, is joined to the side *b*, corresponding to the forearm, by a short piece *c*, although the piece *c* might be dispensed with under some circumstances, the two pieces *a* and *b* being directly joined at the point where they would intersect if extended or they might be curved slightly to a meeting-point as a substitute for the piece *c*. The other side of the frame is formed by a similar tubular piece *d*, curved in an arc about a center lying in the

angle between the two pieces *a* and *b*. A cup suitably upholstered is arranged in the angle between the pieces *a* and *b* for the reception of the operator's elbow, the dimensions of the parts being such that when the operator's elbow rests in the cup the hand is in a position to grasp the curved piece *d*.

The wings, of suitable fabric *f*, stretched upon a frame *g*, of any suitable construction or pattern, are attached to the frame previously described and supported by the side *a*, which in turn is secured to the shoulder of the wearer at the point *h* by a universal connection *k*.

The manner of operation of the device and the advantages due to the particular construction will be obvious from an inspection of the drawings. It will be seen that to prevent fatigue, due to retaining the arms in one position, the operator may change his grasp upon the piece *d* by moving the hand to and from its point of connection with the piece *b*, so that the arm is bent at the elbow to a greater or less extent and yet in each position rests with the same security in the elbow-cup *e*. By thus changing the position of the hand also a greater or less leverage is obtained upon the wings for their operation about the piece *a*, serving as a fulcrum. To disengage the wing, it is only necessary for the operator to release his grasp upon piece *d*, whereupon his elbow can be lifted from the cup *e*, and the wing is entirely detached except at the one point *k*, the operator's arm and hand now being free to loosen that connection. Thus while an absolutely secure attachment of the wing to the body is obtained absolutely no bands, lacings, straps, buckles, and the like are used to connect the wings to the body, the arm is left unrestricted by such securing agencies, is permitted the greatest freedom of movement independent of the movement of the wing, and the wing itself is under the perfect control of the operator, whose power can be applied to the best advantage in the operation of the wings.

The whole frame and the wings are attached to the body of the wearer by means of the following arrangement: The universal joints *k k* are fixed to shoulder-straps *s s* of the back piece or part *r*, which carries at its lower end a bow or hook *i* for the reception of a belt *t*, of strong material, adapted to encircle the waist of the wearer. This belt has eyes at the front which are connected to the front parts of the shoulder-straps *s s* by

means of straps *m m*, which are adjustable in length by any suitable means. The parts of the wing-frame carrying the universal joints are connected by means of a stay-bar *u* provided with a curved portion for the neck of the wearer, which arrangement renders the whole frame very stiff.

It is necessary that the canvas or other material of which the wings are made closes onto the back of the wearer from the neck portion down to the heels. This is effected in the present case by providing the edges of the wings with stiffening-strips *n*, which may be held to the body at the waist by the belt *t* or a separate belt and at the knees, below or above the same, by means of garter-like strips *o o*. The lower ends of the stiffening-strips are attached to the rear part of the foot in any suitable manner. In order to enable the material of which the wings are made to follow movements of the body, elastic inlets or strips *p p* are arranged at the bottom of the wings between the heel attachment and the end of the strip or at the top between the eyes *q q* for holding the upper ends of the stiffening-strips and the upper ends of the latter, as will be readily understood. If desired, elastic inlets may also be provided for the strips at the central portions of the body, as will be readily understood.

From the above description it will be seen that the whole apparatus may be readily put on and taken off by the wearer without aid from any other persons.

Having thus particularly described the nature of my invention and in what manner the same is to be performed, what I desire to secure by Letters Patent of the United States is—

1. In a device of the character described, means for attaching the same to the operator, comprising a frame connected with the wing and having two sides joined at an angle to each other, an elbow-receiving cup arranged in the angle between the two sides, a third piece joining the two sides to complete the frame and serve as a handhold, and means for securing one side of the frame to the body of the operator.

2. In a device of the character described, means for attaching the same to the operator, comprising a frame connected with the wing and having two sides joined at an angle to each other and corresponding to the upper and fore arm of the operator in a bent position, an elbow-receiving cup arranged in the angle between the two sides, a curved piece joining the two sides to complete the frame and serve as a handhold, and means for securing the upper-arm side of the frame to the body of the operator.

3. In a device of the character described, means for attaching the same to the operator, comprising a frame connected with the

wing and having two sides joined at an acute angle to each other and corresponding to the upper and fore arm of the operator in a bent position, an elbow-receiving cup arranged in the angle between the two sides, a third piece curved about the elbow-receiving cup as a center and joining the two sides to complete the frame and serve as a handhold, and means for securing the upper-arm side of the frame to the body of the operator.

4. In a device of the character described, means for attaching the same to the operator, comprising a frame connected with the wing and having two sides joined at an acute angle and corresponding to the upper and fore arm of the operator in bent position, an upholstered elbow-receiving cup arranged in the angle between the two sides, a third piece curved about the elbow-receiving cup as a center and joining the two sides near their extremity to complete the frame and serve as a handhold, and a universal connection between the extremity of the upper-arm side of the frame and the shoulder of the operator.

5. In a device of the character described, means for attaching the wing-frame to the body comprising a back piece *r* having shoulder-straps to which the arms carrying the universal joints *k* are attached, a waist-belt and means for suspending the same in the back piece, and front straps extending from the front of the shoulder-straps to the belt and means for adjusting the length of said front straps.

6. In a device of the character described, means for attaching the edges of the wings along the body of the wearer consisting of a stiffening-strip attached to the edge of the wing material, a belt to hold the same to the waist of the wearer and garter-like straps to attach the said strip at the back of the knee part of the legs and means for securing the upper ends to the back piece *r* and the lower ends to the rear part of the feet of the wearer.

7. In a device of the character described, means for attaching the edges of the wings to the rear of the wearer comprising the back piece *r*, stiffening-strips attached to the edges of the wings, means for attaching the tops of the said stiffening-pieces to the back piece and the bottoms to the rear of the heels, a waistband attachment for the central parts and garter-like attachment at the knee portions of the legs and elastic inlets arranged intermediate of the attachments substantially as described.

In testimony whereof I hereunto affix my signature in the presence of two witnesses.

ADOLF BRANDL.

Witnesses:

ULYSSES J. BYWATER,
LOUIS F. MUELLER.