

(No Model.)

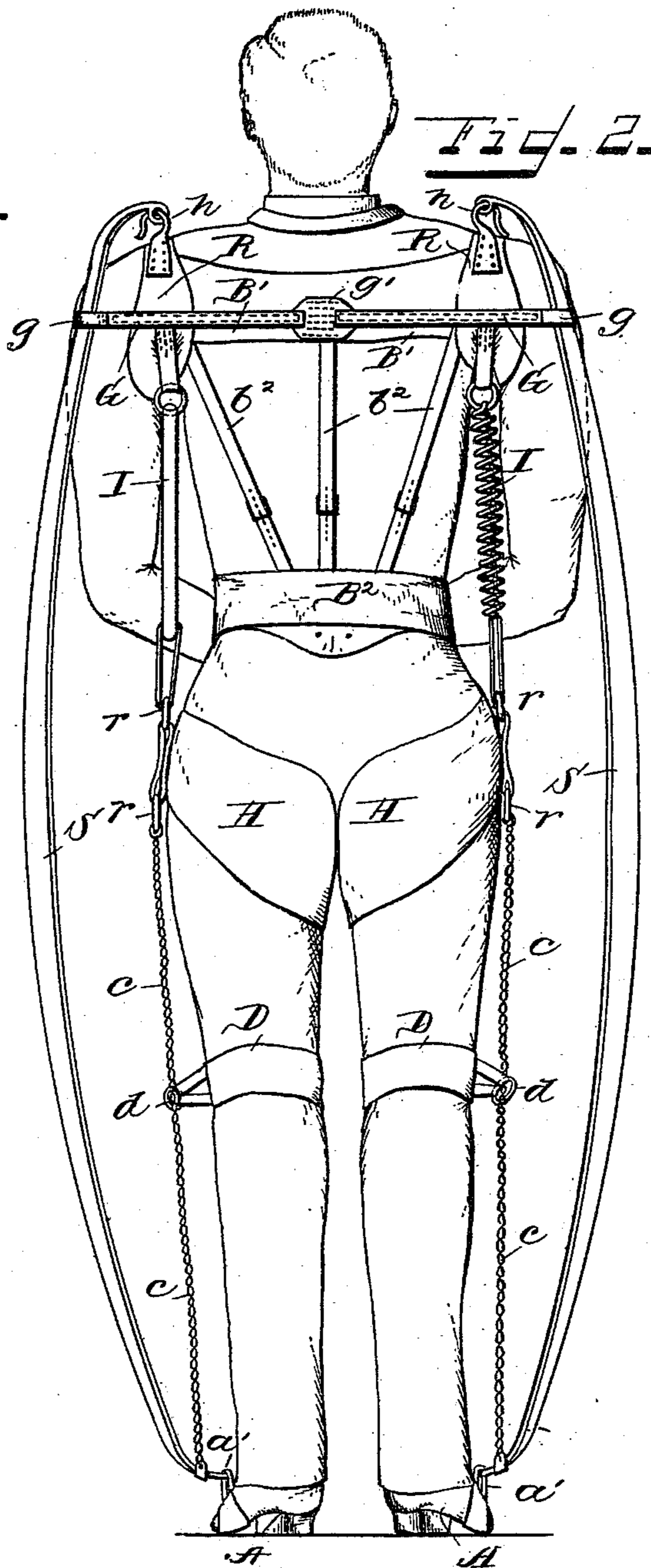
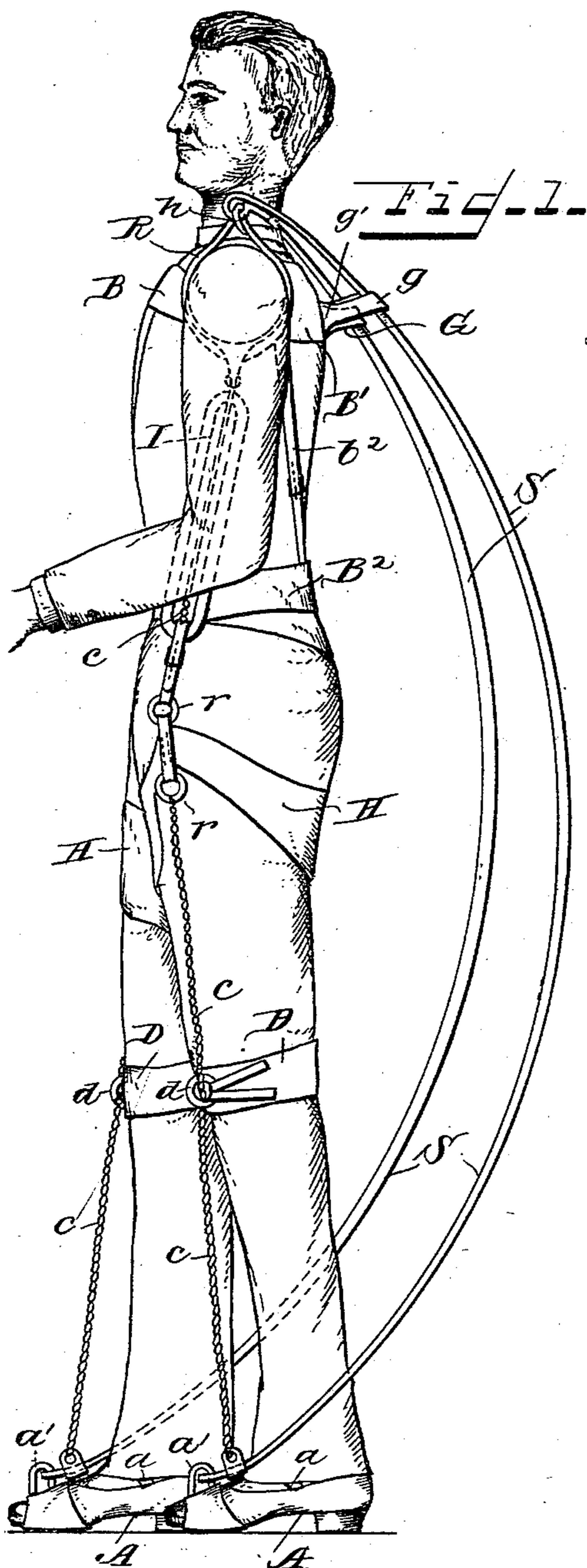
2 Sheets—Sheet 1.

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APPARATUS FOR FACILITATING WALKING, RUNNING, AND JUMPING.

No. 420,178.

Patented Jan. 28, 1890.



Witnesses.

J. Thomson Cross.
A. W. Weaver.

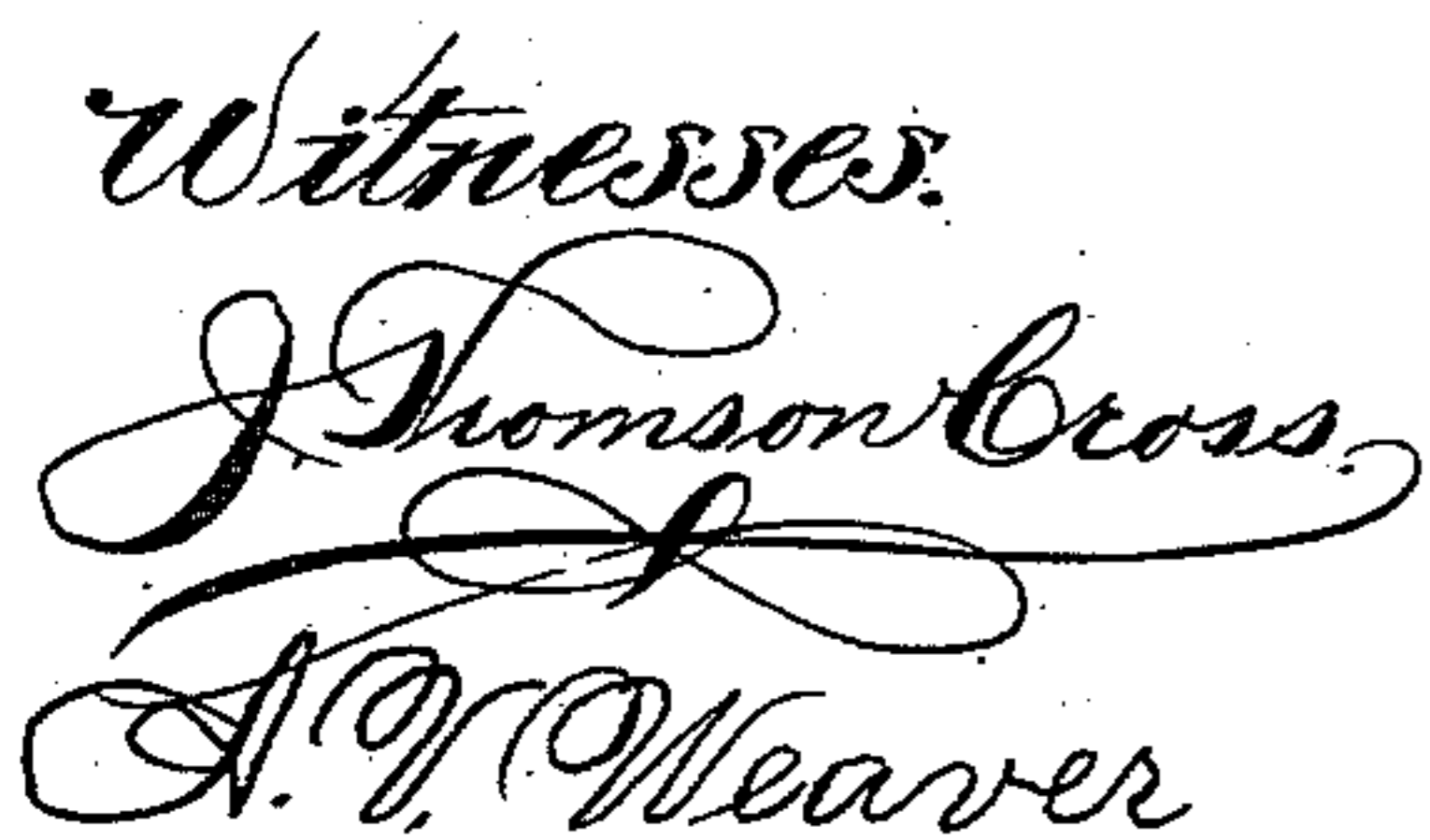
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2 Sheets—Sheet 2.

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JA Inventor
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UNITED STATES PATENT OFFICE.

NICHOLAS YAGN, OF ST. PETERSBURG, RUSSIA.

APPARATUS FOR FACILITATING WALKING, RUNNING, AND JUMPING.

SPECIFICATION forming part of Letters Patent No. 420,178, dated January 28, 1890.

Application filed June 13, 1889. Serial No. 314,142. (No model.)

To all whom it may concern:

Be it known that I, NICHOLAS YAGN, a subject of the Emperor of Russia, and residing at St. Petersburg, Russia, have invented certain new and useful Improvements in Apparatus for Facilitating Walking, Running, and Jumping; 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, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

Referring to the drawings, Figures 1 and 2 are side and rear elevations, respectively, of the apparatus, showing its application. Fig. 3 is a side elevation showing the devices in the position they assume when the body and legs are bent as in the act of leaping. Fig. 4 is a top plan view of the apparatus. Fig. 5 is a like view of one of the shoes or overshoes to which one end of the spring is connected. Fig. 6 is a side elevation thereof, a part of one of the springs being shown only in said Figs. 5 and 6; and Fig. 7 is a longitudinal vertical section of a portion of such shoe.

The invention relates to an apparatus for facilitating walking and running or jumping, and is an improvement on the apparatus shown and described in my application for patent filed December 21, 1888, Serial No. 294,277. In the apparatus shown in said application the *vis viva* of the dead-weight of the human body or trunk in walking, jumping, or running is taken up and multiplied by springs so arranged that the power thereof will be exerted at the seat or upper extremity of the legs to assist the muscles in their efforts in straightening or lifting the body or trunk. Although excellent results are thus obtained, yet I find that the power stored up by the springs may be still more effectually utilized by applying the same at a point near the upper extremity of the body—as, for instance, under the arms—for lifting or assisting in lifting the body, the power under normal conditions being applied at points on opposite sides of the center of gravity and on lines parallel therewith. Of course an arrangement of springs and telescopic standards modified to conform to their application in

principle of operation substantially like those shown and described in my said application may be employed. There would, however, be a disadvantage in that the apparatus would on the one hand become heavy, owing to the increased length of standards and springs, and on the other hand would more or less impede the free movements of the body. To avoid such disadvantages I have devised the apparatus herein shown, in which the medium for storing and multiplying power to overcome the inertia of the body and lift it, or assist in lifting it, after a flexure of the legs consists in bow-springs, the ends of which are connected with the opposite extremities of the body; and the invention consists, essentially, in the use of bow-springs whose ends are connected to the opposite extremities of the body as a means for storing and multiplying the power exerted by or resulting from the weight of the trunk or body when the legs are flexed or bent, as hereinafter fully described, and set forth in the claims.

The invention further consists in certain details of construction and combinations of parts or elements, substantially as hereinafter fully described and claimed.

The apparatus is composed of three principal parts—a harness for the upper part of the body, a pair of shoes or overshoes for the feet, and two bow-springs, preferably of flat steel blades, made to taper from their center to the extremities, one end of said springs being connected with the shoes or overshoes and the other with the harness.

The harness consists of two leather bands or straps B and B', the ends of which are secured to two rings R R, preferably of some rigid material—such as wood or metal covered with leather and padded interiorly and fitting the armpits—though said rings may be made wholly of leather or other suitable flexible material. Each ring R is provided with a hook h, projecting above the shoulder, to which hook is hooked one end of a bow-spring S; or said rings may be provided with a screw-bolt b, the end of the spring being held on the bolt by means of a nut n, as shown in Fig. 3, or such a nut and a jam-nut.

The harness is further composed of a waist-belt B², connected at the back by two or more straps or braces b² to the back-band B'.

and said belt may also be connected with the breast-band B by straps, though this is not absolutely necessary. I preferably employ three straps or suspenders b^2 for connecting the waist-belt B² with the back-band B', one of said straps connecting said band and belt at their centers or on a line with the spinal column, while the other two straps are secured to the belt on opposite sides of the center strap and to a flap of the arm-rings R. The breast-band B and belt, as well as the brace-straps b^2 , are provided with buckles for adjustment, as will be readily understood.

A indicates the shoe or overshoe, that is secured to the foot by buckled straps a , and to which is secured the other end of the bow-springs S in any convenient manner. For example, in Figs. 1, 2, and 3 I have shown the shoe provided at the toe with a staple a' , to which the ends of the springs are hooked; but in running or jumping there is danger of the spring ends becoming unhooked, to avoid which I prefer the arrangement shown in Fig. 6, the shoe being provided with a forwardly-bent screw-bolt a^2 , and the springs with an eye that is hooked over said bolt and held against unhooking by a nut a^3 , or such a nut and a jam-nut.

In practice the shoes are preferably provided with a spring-sole A', Fig. 7, thereby giving more elasticity to the step and assisting in the lifting of the legs and body either in walking or jumping. This elastic sole may be of any desired construction, and is preferably made of sheet metal.

In order to prevent the springs S from spreading laterally, I provide suitable stays G, which may consist of leather straps, or the stays may, as shown, consist of rigid stay-bars, preferably wooden bars covered with leather and connected with the back-band B' and the springs by a flexible or hinge joint, as shown at g' and g , respectively.

It is obvious that after each step or jump, as the trunk or body is descending or is lowered by the flexure of the legs and back, the springs S will be correspondingly bent, and the extent of this will of course depend upon their elasticity. As soon, however, as the downward motion of the body ceases the tendency of the springs is to spring back into their normal position, thereby lifting or assisting in lifting the body into its normal position also, and relieving the muscles of the greater part, if not of all, the strain thereon, so that the upward impulse given to the body has the tendency to compel the person to take another step or leap.

In order that the sudden and rapid distention of the springs may not produce an injurious strain on the body in leaping—that is to say, during the brief period of time during which the entire body is off the ground and at an angle thereto and more or less stretched out—I connect the arm-rings R R with the lower extremities of the springs S by means of cords or chains c . These cords

or chains may be connected, as shown, to rings r , connected to thigh straps or loops H, similar to those used for gymnastic exercises, the bands being further connected with the arm-rings R R by means of metal or rubber springs I I, so that a portion of the power exerted by the bow-springs S S is transmitted to the thigh-straps by a yielding connection, thus relieving the shoulders from undue strain. This arrangement has the further advantage of equalizing the strain of the springs S S, inasmuch as one of the said springs may be compressed more than the other by a greater depression or lowering of one of the shoulders, so that such spring will exert a correspondingly-increased lifting power, which, however, is counteracted by the elasticity of the springs I, which are flexibly connected with the arm-rings and thigh-band, so that such greater tension in one spring will be taken up by the corresponding spring I.

D D are knee-straps provided with rings d , through which the chains c pass to prevent their becoming tangled.

Having described my invention, what I claim is—

1. In an apparatus of the class described, a spring-support for the body, consisting of two bow-springs, in combination with means for connecting the ends of the springs to the feet and shoulders of the body, for the purpose set forth.

2. In an apparatus of the class described, a spring-support for the body, comprising two bow-springs having their opposite extremes connected to like extremes of the body, in combination with stays or braces connecting the two springs and preventing undue lateral spreading, as described.

3. In an apparatus of the class described, a spring-support for the body, comprising two bow-springs having their opposite extremes respectively connected with the like extremes of the body, in combination with means for counteracting the sudden distention of the springs, consisting of a flexible connection—such as a cord or chain—for connecting the opposite extremes of the springs, as described.

4. In an apparatus of the class described, a spring-support for the body, comprising two bow-springs having their opposite extremes respectively connected with the like extremes of the body, in combination with means for counteracting the sudden distention of the springs and for transferring a portion of the power exerted thereby to the lower part of the body, consisting of thigh-bands connected with the upper extremes of the bow-springs, as described.

5. In an apparatus of the class described, a spring-support for the body, comprising two bow-springs having their opposite extremes respectively connected to the like extremes of the body, in combination with means for counteracting the sudden distention of the spring-supports and transferring a portion of the

power exerted thereby to the lower part of the body, consisting of thigh-bands, a flexible connection—such as a cord or chain—between the thigh-bands and one end of the bow-springs, and an elastic connection—such as
5 springs—connecting said bands with the upper extremes of the bow-springs, as described.

6. In an apparatus of the class described, a
10 spring-support for the body, comprising two bow-springs, in combination with arm-rings and shoes to which the opposite extremes of the springs are respectively connected, substantially as and for the purposes specified.

7. In an apparatus of the class described, a
15 spring-support for the body, comprising two bow-springs, arm-rings and shoes to which the opposite extremes of the springs are respectively connected, and an intermediate flexible or spring connection between said
20 arm-rings and the lower extremes of the springs, substantially as and for the purposes specified.

8. In an apparatus of the class described, a
25 spring-support comprising two bow-springs and arm-rings and shoes to which the opposite extremes of the springs are respectively connected, in combination with an intermediate flexible or spring connection consisting of springs connected to the arm-rings
30 and cords or chains connecting said springs with the lower extremes of the bow-springs, substantially as and for the purposes specified.

9. In an apparatus of the class described, a
35 spring-support for the body, comprising two bow-springs having their opposite extremes connected with the like extremes of the body, in combination with means for counteracting

the shock of a sudden extension of the springs, consisting of cords or chains for connecting the extremes of the springs together, 40 and means for preventing the chains from becoming tangled, consisting of knee-straps provided with guide-loops through which the chains pass, as described.

10. In an apparatus of the class described, 45 the herein-described harness, consisting of breast and back bands, arm-rings R R connected to said bands, a waist-belt, braces connecting said belt with the back-band, and shoes or overshoes, in combination with bow-
50 springs S, pivotally connected with the arm-rings and shoes, substantially as and for the purposes specified.

11. The combination, with the bow-spring having an eye at its lower end and the shoe, 55 of the means for connecting said spring and shoe, consisting of a bent screw-threaded bolt *a*, adapted to be passed through said eye, and a nut *a*³ on said bolt, to prevent disengagement of the parts. 60

12. The combination, with the bow-spring perforated at its upper end and the arm-ring, of the means for connecting said spring and arm-ring, consisting of the straight screw-threaded bolt *b*, adapted to be passed through 65 said perforation, and the nut *n* on said bolt, to prevent disengagement of the parts.

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

NICHOLAS YAGN.

Witnesses:

N. TSCHÉVALOFF,
F. KAUPÉ.