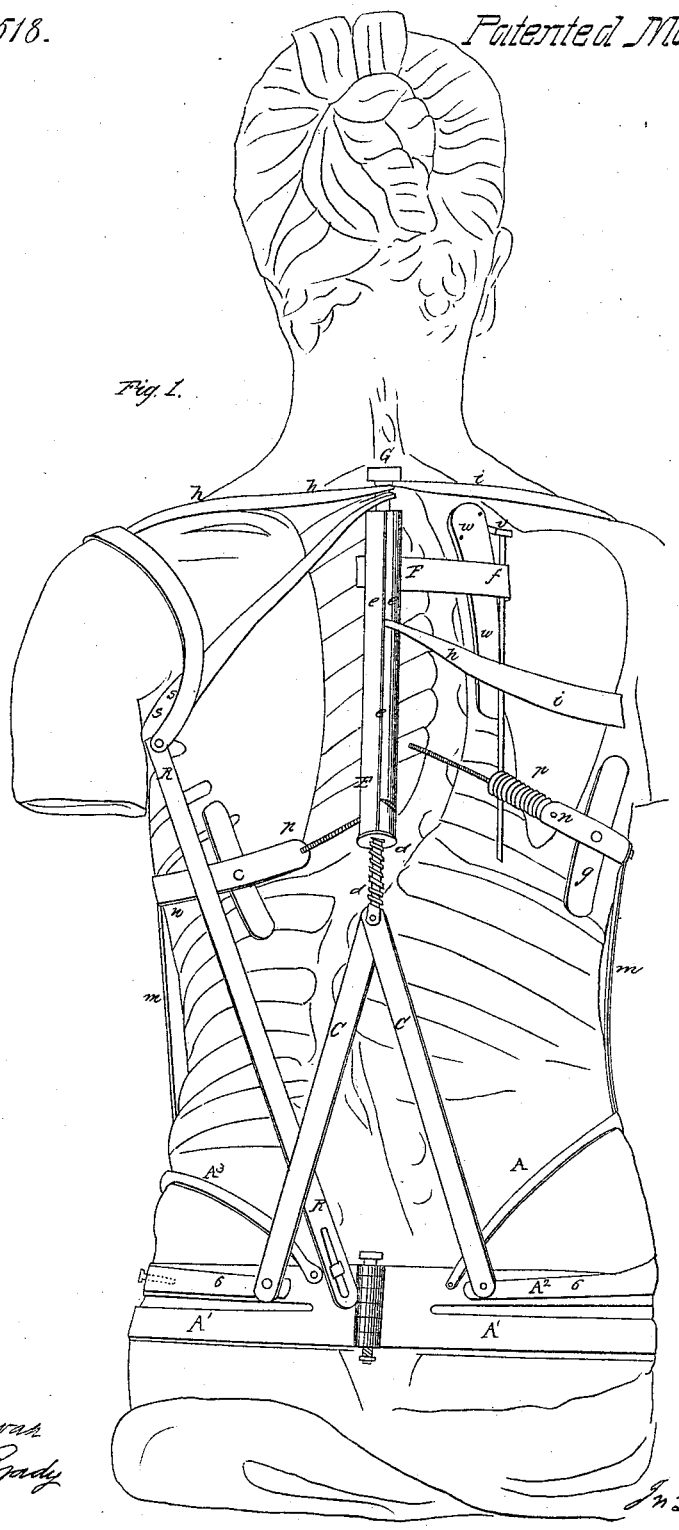
2 Sheets-Sheet 1.

J. L. Sullivan,

Truss.

No. 4,518. Patented May 16, 1846.

Fig. 1.



Witnesses

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D. F. Brady

Inventor,

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2 Sheets-Sheet 2.

J. L. Sullivan,

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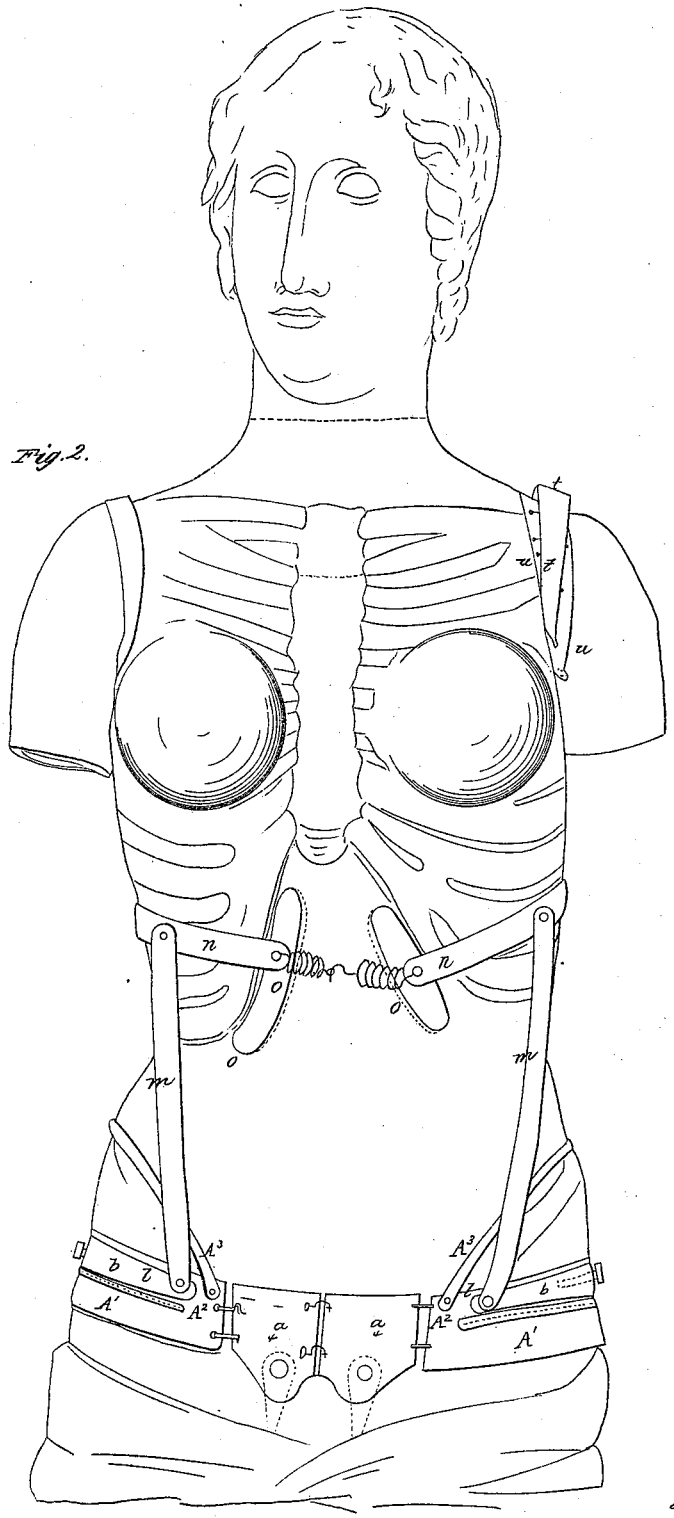
No. 4,518. Patented May 16, 1846.

Fig. 2.



Witnesses
Geo. Sullivan
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UNITED STATES PATENT OFFICE.

JOHN L. SULLIVAN, OF NEW YORK, N. Y.

SPINAL SUPPORTER.

Specification of Letters Patent No. 4,518, dated May 16, 1846; Antedated November 17, 1845.

To all whom it may concern:

Be it known that I, the subscriber, JOHN L. SULLIVAN, of the city, county, and State of New York, physician, have invented a new and useful Improvement in the Art of Surgery for the Treatment of Spinal Diseases, denominated the Spiral Relief Power, described as follows, viz.

The object of this invention is to combine the mechanic powers so as at once to lift and resist effectually the weight of the chest and upper extremities from and on the exterior of the pelvis, *i. e.*, that part of the human body constituted of the large and firm bones, which rest on the lower limbs, and from the middle one of which, the sacrum, the spinal column rises, in health held balanced by the muscles of equal force on every side.

This apparatus must fit the person who wears it, and therefore it is necessary or convenient to have a model, that may be cast in plaster, or made in any convenient way: Thereon an elastic vest may be fitted to receive onto it the parts of the mechanism, as permitting of convenient attachment thereto, in place; it opens before and covers the shoulders, and reaches as low as there is occasion to carry the apparatus; and when applied without the vest, the parts are the more cushioned.

The apparatus consists of several parts, and has a basis for the super structure of mechanic powers. Let the basis thereof be composed of a metallic band or bands, to surround and clasp the interior of the pelvis, and better to be made of three parts, A^1, A^2, A^3, Figure 1, as affording better hold, the upper one curved over the ilia, cushioned, to bear more perpendicularly; and all are cushioned or covered with soft leather; and two of them, A^1 and A^1, unite by a hinge over the sacrum, unless as springs unnecessary to hinge; and also unite forward with a broader belt to sustain the abdomen (Fig. 2, *a*) and which fasten and open with the front of the vest, at or near the center line thereof, and the bands constituting the belt, are exactly fitted before being tempered, in order to keep their shape; and all the other flat pieces of steel herein described, are also tempered.

The power subsequently described, is to be received downward upon the backward end of a horizontal lever on each side (as a person stands) exterior to the pelvic belt, a little curved to fit the sides, and for strength deeper in the middle than the extremities, and to permit of a slot-mortise of one or two inches in length to receive its fulcrum, which may be a screw pivot through the band A^2, secured by a nut, so as to vary the length of the forward part of the lever (*b*, *b*).

The two rear ends of the two levers receive their moving power by two flat bars (*c*, *c*) which descend from a vertical screw (*d d*) which screw is about one fourth of an inch in diameter made with three or four threads, for quick lifting, rising leftward, which should be in this case, and should be always opposite the curvature of the spine of the patient (for the reason of the pressure of the lever as herein subsequently explained) and is made about five inches long, or less, if the size of the person requires it; and it enters into a hollow cylinder windlass (E) having an internal screw, and its, diameter is about two fifths of an inch; and its length also about five inches long, or less for some persons; and this cylinder windlass has a small ridge thereon for the purpose of fastening cords thereto; and near the top thereof is made a mortise, or aperture for a flat bar, about two fifths of an inch up and down, and large enough to receive the lever (F) which lies flat to the back. And on the head of the cylinder there is a small knob (G) to receive and hold the ends of the left shoulder band (*h h*) and also one end of the right shoulder band (*i*) while the other end (*k*) after passing forward over, and then backward under the arm fastens to the ridge (Fig. 1, *e*, *e*, *e*).

From the forward ends of the horizontal lever over each side (Fig. 2 *l l*) there rise bars (Fig. 2 *m*) (seen adge wise at Fig. 1 *m*) which convey the power upward to the two chest belts (*n*, *n* in both figures). And the two front ends of the chest belt terminate forward in the two plates (*o o*) which have under them elastic cushions and between the plates there are two connecting flat spiral springs (*z z*) and the plates (*o o*) are shaped to apply their edges to the cartilages of the 6th, 7th, 8th and 9th ribs, as these united

join to the sternum (or breast bone). And the two rear ends thereof (*p p*) fasten to the ridge of the cylinder (*e e*) having a cushioned plate under and across it, and on either side, to spread its bearing to any projecting ribs in the case (as seen at *g g*) thus embracing the chest with a belt regulating the effective force of the windlass thereon by the comparative strength of the spiral springs and by a greater force in that of the curved side.

To sustain the left shoulder, let there be a brace (*r r*) shaped to fit and then tempered, or its equivalent support in several jointed pieces on the vest, rising from the pelvic belt or basis to sustain it from behind as with a cushioned crutch (*s s*) and then continued under the arm pit, small and round, and also over the shoulder, but flat, and connected with the other part (Fig. 2, *t t*) over the leather band which is to loop to it, whenever the leather shoulder band under it, is found to press too much on the muscles, *i. e.*, the band ties to the brace in front of the shoulder, in several places, and thus transfers the backward pressure to the pelvic band.

The lever F, through the mortise of the cylinder E is rolled at its ends to be kept from leaving it, and thereby also to receive a small bar (*v*) when charged with the reactive power in order to distribute it up and down, as by the plate (*w w*) under it, shaped to give the reacting pressure to the dorsal curvature, and sometimes to the lumbar, or to a posterior curvature when either exists alone, for which cases the screw may be (placed or) moved nearer to one shoulder blade than the other.

To operate with this combined apparatus of mechanic powers the patient sitting or standing, and the plate, *w* and the bar, *v*, not being in place, the right end of the lever, F, is brought outward by the hand, and carried over to the right shoulder blade turning the cylinder, E, half around on the raising screw; the lever is then passed to the right through the mortise, and the same movement is repeated, making one turn; and to be repeated until the requisite force is applied. In this one turn the cylinder windlass will have drawn back the right shoulder, taking off its dragging weight from its muscles connecting with the spine, and the ribs which articulate with the curvature; and will have raised the chest, by drawing on the two chest belts, themselves raised by the male screw in the hollow windlass, and horizontal levers, the cord of the one passing under the windlass, the other over it, thus drawing oppositely on the cartilages of the ribs, which generally articulate with the vertebræ of the curvature—that is to say, the force exerted by the windlass on the screw, communicated to the lateral levers, and rising braces and chest belt, raises the whole chest and upper extremities, while the whole reaction of the right extremity of the lever F, is made to press on the whole curvature, as soon as the cushioned plate is put under it conforming thereto; and the bar *v*, being replaced in the end of the lever, and its lower end fastened to the pelvic belt, it presses on the projecting angles of the ribs, so called, or other part of the back requiring it. And thus the force derived from the hand is impressed upon the combination, and produces salutary effects upon every part to relieve which the power is directed; and this force reacts constantly upon the curvature where the greatest curative effect is to be produced so far as depends on mechanic forces. Thus while the chest is lifted to make room for the reduction of the curvature, it is at the same time and by the same movement being reduced; or if the object be to relieve pressure on the surfaces of caries or ulcerations, the lifting is continual or persisting, as such cases require.

From the description aforesaid of the construction and operation of this machine it is plain, that the lever which works the windlass is the recipient of the force applied, and that the windlass and its internal screw, and the side levers upon which the screw is made to bear, and the chest which those levers are made to bear upward, and the fastenings by which the windlass is restrained from rising, and the cord and spring to tighten which the windlass draws to itself, constitutes a combined mechanical action from said recipient of the force, through and by said internal screw and said side levers to the chest belt, lifting this upward and through the windlass to the strap around the displaced shoulder drawing this backward and inward, and at the same time the resistance of the lifted chest, and drawn shoulder, react through these mechanical means to and upon the lever reciprocal of the force aforesaid; and the point in the curvature of the spine on which the power end of the recipient lever rests and bears, so that a constant action and reaction is working upon and against the curvature, and the chest, and the shoulder aforesaid, and all concurring to restore the parts displaced to their natural position.

What I claim as my invention in said machine, is—

The combination together of all the parts following, viz., the combination of the said windlass and its lever recipient of the force, the internal screw of said windlass, and the levers on which the said male screw bears; the combination of the said side levers themselves; the chest belt, the windlass and

its fastenings; and the belt and spring around the shoulder, and the mode of working the same together; the same being constructed substantially as aforesaid, whereby the curative force acting and reacting as aforesaid is applied substantially to cure the disease as aforesaid; by which I effect the combined action of reducing the curvature and at the same time the lifting of the chest to make room for the reduction thereof.

New York, April 14, 1846.

JN. L. SULLIVAN.

Witnesses:
GEORGE SULLIVAN,
D. HOBART.