M. M. MACDONALD.

Truss.

No. 204,060. Patented May 21, 1878.

Fig. 6.

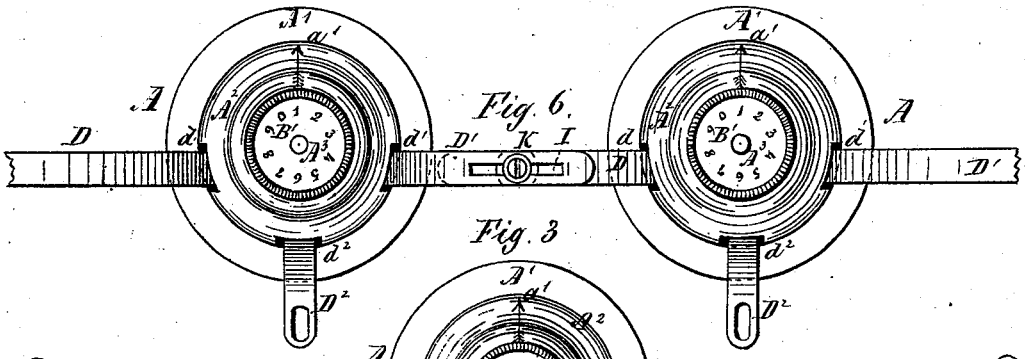


Fig. 3

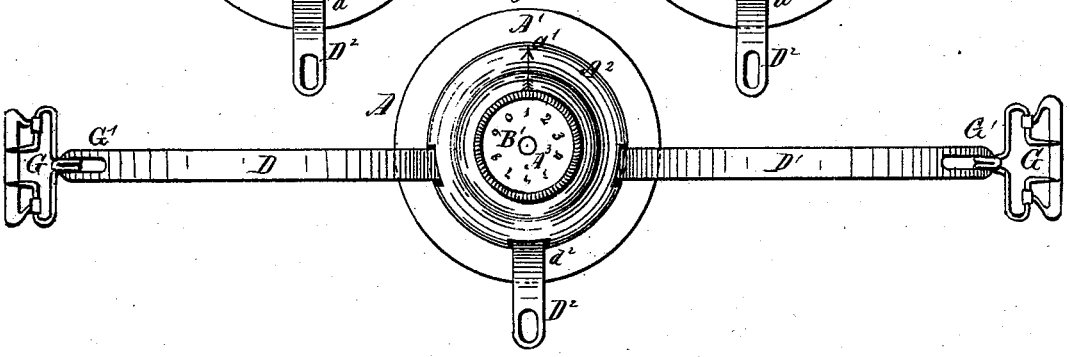


Fig. 2

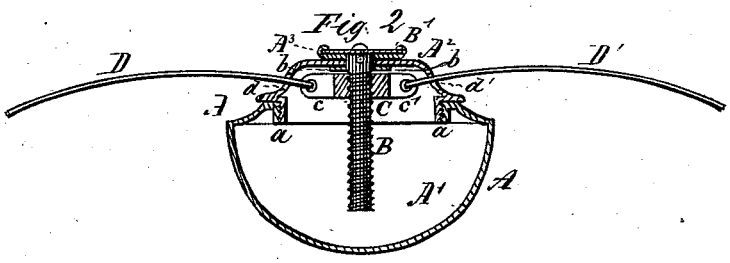


Fig. 1.

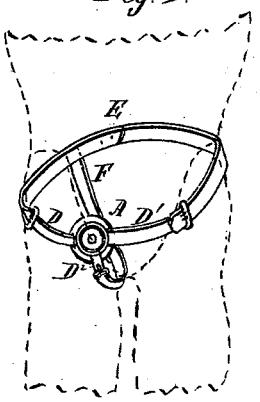


Fig. 4.

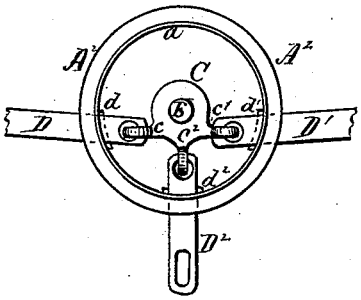
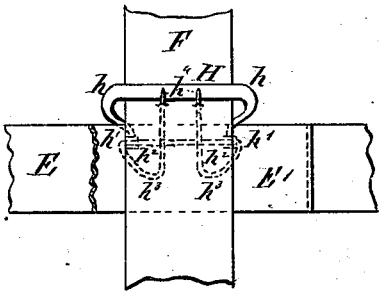
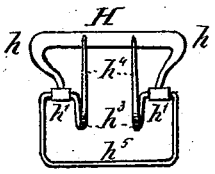


Fig. 5.





Witnesses
Henry Orth
W. A. Bliss

Inventor
Manville M. Macdonald
per W. A. Doubleday
atty

UNITED STATES PATENT OFFICE.

MANVILL M. MACDONALD, OF SYRACUSE, NEW YORK.

IMPROVEMENT IN TRUSSES.

Specification forming part of Letters Patent No. **204,060**, dated May 21, 1878; application filed February 26, 1878.

To all whom it may concern:

Be it known that I, MANVILL M. MACDONALD, of Syracuse, in the county of Onondaga and State of New York, have invented certain new and useful Improvements in Abdominal Trusses; and I do hereby declare that the following is a full, clear, and exact description thereof, which 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.

My invention relates to an improved truss or apparatus to be employed in cases of rupture for retaining the tumor or hernia.

It consists in constructing such trusses so that the pressure exerted by the pad upon the part affected with the rupture or hernia may be readily and instantly regulated, and that said pressure may be accurately indicated and recorded.

It consists, further, in constructing the apparatus that supports the pad so that the various bands, straps, or bandages may be readily adjusted relative to each other and to the girths of the parts of the body to which it may be applied.

It further consists in various other improvements, which will be hereinafter fully set forth.

Figure 1 represents my improved truss in perspective. Fig. 2 is a horizontal section of the pad and side levers. Fig. 3 is a front view of the pad and its lever-arms. Fig. 4 is an inside view of the cap part or front part of the pad and lever-arms detached. Fig. 5 shows the attachment of the thigh-strap, the parts being in an inverted position. Fig. 6 is a view of a double truss.

In the drawings, A represents the pressure-pad, which forms the essential feature of the apparatus to which my invention appertains. This pad may be constructed, partly or wholly, of the woods or shells that are often employed for the purpose, though I prefer to make it of silver or nickel plated metal.

The pad proper is composed of two pieces, A^1 and A^2. The back portion A^1 of the pad, or portion to be placed against the ruptured part, has a convex spherical surface, somewhat flattened, though it may be oval in form, or may be constructed of special shape to suit any given conformation of body at the part affected. The outer or front part A^2 is attached to the part A^1 by a screw-thread, as shown at *a*. The circular top A^3 of part A^2 is provided with a central aperture, through which a screw, B, is inserted, which traverses the body of the pad.

Screw B carries a disk or circular head, B′, outside of and resting upon the end A^1 of the pad. It is milled upon its edge to facilitate the rotation of the screw.

b represents an annular flange or collar around the screw, inside the pad, soldered, riveted, or otherwise fastened to the shank of the screw, whereby it (the screw) is prevented from being withdrawn from the pad. C is a nut engaging with screw B, which, as will be readily seen, can be moved to or from the outer side A^3 of the pad by rotating the milled head B to the right or to the left. *c* c^1 c^2 are eyes or loops attached to nut C, and reciprocating with it. *d* d^1 d^2 are slots or apertures in the wall of part A^2 of the pad, substantially corresponding in their positions to the eyes or loops *c* c^1 c^2. D D^1 are arms or levers passing through slots *d* d^1 and pivoted in eyes *c* c^1, respectively. By means of these arms or levers the pad is attached to the supporting-straps, which pass around the waist of the patient. Inasmuch as great strength and elasticity are required in these levers, they are preferably made of steel strips.

D^2 is another arm, somewhat shorter than arms D D^1, passing through slot d^2, and hinged or pivoted in eye c^2. To this arm is attached the thigh strap or band which holds the pad in the proper position vertically.

Each of the arms D D^1 D^2 is of less width than the slot through which it passes, in order to allow more or less flexibility of attachment with the pad.

With the trusses heretofore constructed it has been found very inconvenient and difficult to alter, at any time, the pressure exerted in retaining the hernia, such alteration being effected by removing the pads and substituting others of different thicknesses, or by lengthening or shortening the supporting-bands.

By my improved truss the pressure upon the tumor or hernia can be instantly adjusted

or modified without removing the pad or changing the length of the band, for it will be readily understood that, by a slight rotation of the screw-head B′, the nut C can be moved in or out, and with it the inner ends of arms D D^1 D^2, which will result in an opposite movement of the outer ends to a distance many times greater than that traveled by the inner ends. This slight movement of head B′ and nut C will greatly increase or diminish the leverage brought to bear upon the pad by the tension of the supporting-straps at the outer ends of arms D D^1 D^2. If the pressure is to be increased, the nut C is moved from the end A^3; if it is to be diminished, the nut is to be moved toward said end of the pad.

Again, in the trusses now usually employed the thigh strap or band that passes under the perinæum of the patient, owing to the method of attaching it the pad, largely neutralizes the horizontal pressure exerted upon the hernia by the body-strap; but in my improved construction the lever D^2, to which is fastened the thigh or perineal strap, is adjusted simultaneously with the levers D D^1, and thus a constant ratio between the forces exerted by the horizontal arms and the vertical arm is preserved.

The action of the perineal strap in this truss is confined to holding the pad in a proper vertical position, and does not interfere with the pressure exerted by the body-strap. Hence there will be little of that chafing so annoying to the wearer, and so largely incident to the ordinary trusses, wherein this strap is compelled to perform much of the work of restraining the hernia.

In order to accurately record and indicate the pressure at any time exerted by the pad, I construct it with an index, as shown in Fig. 3.

Upon a circle around the center of the milled head B′, and upon its outer face, are marked off equal arcs, indicated by figures, preferably from 0 to 9, both inclusive.

a′ represents an arrow or index-mark, of any suitable sort, upon the fixed part of the pad. This index-mark *a′* and the figures upon the disk B′ will enable the wearer to record the number of revolutions or fractions of a revolution imparted to screw B, and will indicate the degree of pressure exerted upon the pad.

The devices for supporting the pad consist of the body strap or band E and the thigh or perineal strap F, both composed of woven fabric, though leather or other suitable material may be employed in their construction. They may be attached to the lever-arms D D^1 D^2, either by buttons and button-holes, or, as shown, by hooked buckles G and eyes G′.

The truss in Fig. 1 is shown in the position in which it would be applied to a hernia upon the right side of the patient, in which case the perineal band or strap is fastened to the body-band at a point somewhat to the right of the center of the back, so as to keep the pad in the proper position in front. If the rupture be upon the left side, the strap F must be correspondingly attached to the left side of the body-strap E. The perineal-strap is secured to the body-strap by means of a buckle, H, which is hooked into a supplemental band, E′, sewed upon the back of band E, to avoid contact of the buckle with the body of the wearer. This supplemental band is of sufficient length to allow any necessary lateral adjustment upon either side of the body; and if the band F is to be attached upon the side opposite to that shown in Fig. 1, the body-band E may be reversed, so as to bring the band E′ to the desired position.

A very important feature of my improved truss lies in combining with the thigh-strap a pin-buckle or hook-buckle, H, of the construction shown. This buckle does not require to be sewed to either of the straps which are attached by its means. The thigh-strap may be taken up or let out without ripping off and resewing a buckle at every adjustment, as is the case with the truss-buckles now in use. Moreover, this buckle can be moved laterally to any desired position without ripping it from or stitching it to the body-band. It is constructed with a loop part, *h*, provided with eyes h^1 h^1. In these eyes is pivoted the tongue-piece, which at each end is bent backward, then inward or upward, and then forward, so as to form the hinge h^2, the loops h^3 h^3 back of hinge h^2, and the tongue h^4 h^4. The body-band E is held in the loops h^3 h^3, so that the strain upon the tongue shall be exerted back of the hinge h^2.

The end of the strap to be fastened is passed through loop *h* under tongue h^4, and the tongue is passed through it. In Fig. 1 the tongue-piece, before being inserted in the eyes h^1 h^1, is bent to form a loop, h^5, in the rear of tongue h^4 h^4. After buckling the thigh-strap its free end may be passed through this loop h^5, where it will be securely held.

It will be readily understood that an ordinary buckle for this purpose must be sewed to the one or the other of the straps to be fastened, which sewing is subject to the inconveniences cited above.

In Fig. 6 I have shown two of the above-described trusses combined to form a double truss for cases of double inguinal, femoral, or scrotal hernia. The two pads are joined together by means of the opposite arms D^1 D. These arms will, in most cases, need to be shorter than when a single pad is used. They slide upon each other, and are provided with slots, as shown at I, in which slots moves a set-screw, K, by which the arms can be rigidly clamped together after they have been adjusted to any distance apart.

Each pad is provided with the above-described pressure regulator and indicator, and the forces exerted by each can be accurately recorded and adjusted. With this double truss two thigh-straps, F F, are employed, similar in construction and attachment to that already explained.

What I claim is—

1. In combination with the hollow pad, the set-screw B, nut C, and arms D D^1, situated upon opposite sides of the screw and actuated by the nut, substantially as set forth.

2. The combination, with the pad and the thigh-strap, of the set-screw B, nut C, and arm D^2, for regulating the pressure of the thigh-strap, substantially as set forth.

3. The combination of the screw B and nut C with the arms D D^1, mounted loosely in the sides of the pad, to form a flexible attachment, substantially as set forth.

4. In combination with the screw B and nut C, the horizontal arms D D^1 and the vertical arm D^2, adapted to regulate simultaneously the pressures upon the pad of the body-strap and the thigh-strap, substantially as set forth.

5. In a truss, a pad provided with an index upon its outer face, rotating with the screw, for indicating the pressure exerted by the pad, substantially as set forth.

6. A truss-pad consisting of a semispherical shell and a cap-plate, these parts being united by means of screw-threads, substantially as set forth.

In testimony that I claim the foregoing as my own I affix my signature in presence of two witnesses.

MANVILL M. MACDONALD.

Witnesses:
CHAS. G. ROBINSON,
WM. R. MILLER.