July 6, 1943. J. H. MASON 2,323,826

DIFFERENTIAL TRUSS PAD

Filed Oct. 17, 1940

Fig. 1.

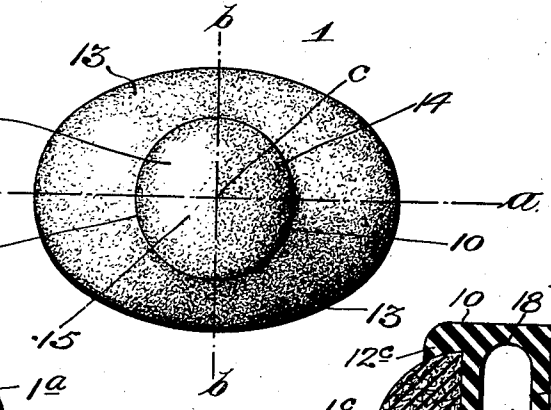


Fig. 5.

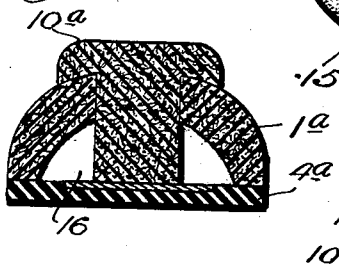


Fig. 7.

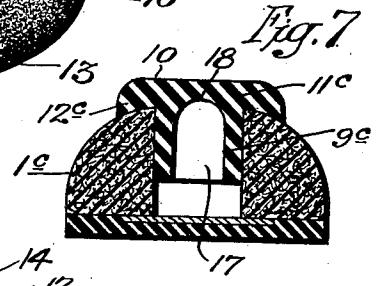


Fig. 2.

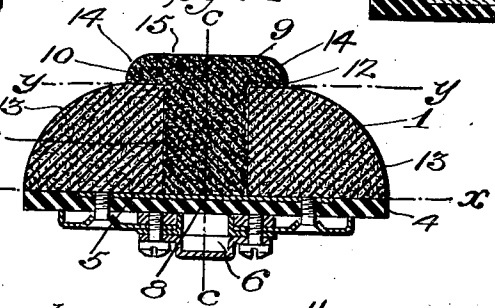


Fig. 6.

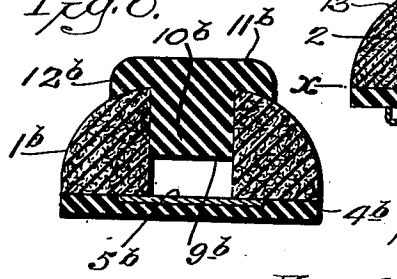


Fig. 8.

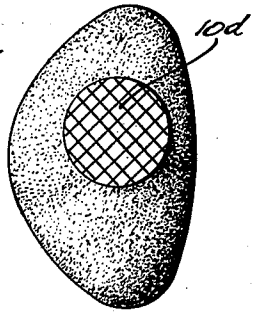


Fig. 4.

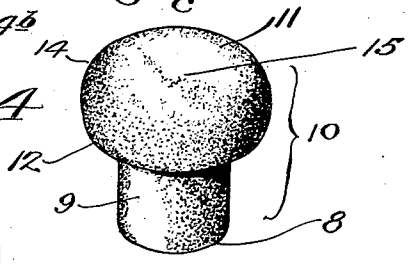


Fig. 9.

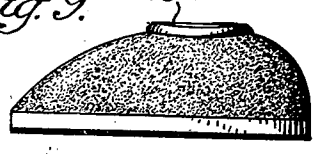
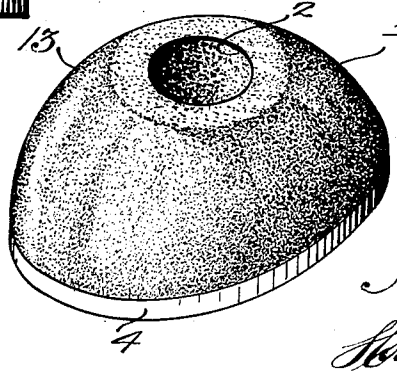


Fig. 3.



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DIFFERENTIAL TRUSS PAD

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Application October 17, 1940, Serial No. 361,622

3 Claims. (Cl. 128—117)

This invention relates to truss pads for the care of hernia, particularly in cases, for example, where the intestinal protrusion through a rupture of the muscles of the abdominal wall is of a relatively small area.

The object of the present invention is to provide a truss pad with a regional face adapted to apply differential pressures to local areas respectively of the abdomen, i. e., to the immediate area of the rupture and to the adjacent surrounding area, to return the protruding intestine to its normal position and to support the abdominal muscles around the rupture in order that the muscles may resist recurrence of the protrusion.

In some cases, it is desirable to apply a firm holding pressure directly over the area of the rupture and a relatively lighter pressure to the surrounding area. In other instances it may be desirable to apply the greater pressure to the surrounding area and the lighter pressure to the immediate area of the rupture. In either case the truss pad of the present invention is adapted to apply the correct degree of pressure to each area.

Another object of the invention is to provide a regional faced truss pad which will avoid or materially decrease discomfiture of the patient as commonly experienced when the area of the rupture is small and lies deep below the skin, causing the localized pressure over the rupture to place the surrounding skin under tension. According to the principles of the present invention, the marginal region of the face of the truss pad around the region of the localized high pressure, will exert a lighter pressure on the strained area of the skin to lessen the tension and thereby decrease the attending discomfiture.

Another object of the invention is to provide a regional faced truss pad which will apply a firm holding pressure to an annular area of the abdomen around the area of the rupture and a lighter pressure in the immediate region of the rupture to hold the abdominal muscles firmly against lateral separation while applying just sufficient pressure in the region of the rupture to maintain the intestine against protrusion between the muscles.

In the accompanying drawing:

Fig. 1 is a plan view of a truss pad constructed in accordance with the principles of the present invention;

Fig. 2 is a longitudinol sectional elevation taken on the line *a*—*a*, Fig. 1;

Fig. 3 is a perspective view of the main body portion of the pad;

Fig. 4 is a perspective view of the pressure localizing applicator;

Fig. 5 is a longitudinal sectional elevation of a modified form of truss pad constructed in accordance with the present invention;

Fig. 6 illustrates another modification of the invention;

Fig. 7 illustrates a modified form of pressure localizer; and

Figs. 8 and 9 are plan and side elevational views of still another form.

The pad shown in Figs. 1 and 2 of the drawing is constructed in accordance with the principles of the present invention, includes a main body portion 1, molded or otherwise formed of sponge rubber or other suitable material, which, for reasons hereinafter set forth, is of a firm but soft, highly resilient character.

In the case of Figs. 1, 2 and 3, the pad 1 is of elliptical shape in plan, semi-elliptical in side elevation, and substantially semi-circular in transverse cross-section, intermediate its opposite ends. The pad, however, as indicated in Figs. 8 and 9, may vary in general contour without departing from the spirit of the invention.

At the intersection of the longitudinal and transverse axes *a*—*a* and *b*—*b* respectively, of the semi-elliptical solid body 1 shown in Fig. 1, said body is provided with an opening 2 which extends from the plane *y*—*y* of the crown or top of the pad body 1 to the base plane *x*—*x* of said body 1.

Secured to the base surface 3 of the pad body 1, is a solid flexible plate 4, which may be composed of rubber or other suitable material. The plate 4 is recessed to receive a metal stiffening or foundation plate 5, between the pad body 1 and the back plate 4. The back plate 4 may be secured to the base surface 3 of the body 1, by any suitable means such as vulcanizing, cementing, etc.

The metal stiffening plate 5 provides support for any suitable means 6 by which the pad may be secured to a suitable or proper form of spring or elastic belt truss, as dictated by the physique of the patient and/or the location of the hernia.

The localized pressure applicator 10 (Fig. 4) is composed of any suitable resilient material, such as solid rubber or sponge rubber and includes a neck or shank 9 which fits into the opening 2 in the body 1. The upper end of the applicator 10 is provided with a mushroom head 11, which comprises an annular flange 12 adapted to over-

lie and rest on the top or crown surface of the body 1, around the opening 2.

Preferably the applicator 10 is secured to the body 1 in the opening 2 and under the flange 12, by a suitable flexible cement to prevent separation of the body 1 from the mushroom head 11.

As shown in Figs. 2 and 3, the body 1 has smooth rounded receding surfaces 13 from the marginal edges of the flange 12 of the applicator 10 to the marginal edges of the base plate 4; and the marginal edges of the mushroom head 11 are also rounded and recede toward the body 1 as indicated at 14.

In that form of the invention shown in Figs. 1 to 4, the applicator 10 is composed of firm resilient material and extends from the top plane y—y to the base plane x—x where the end 8 of the neck 9 rests on the stiffening plate 5, while the body 1 is composed of a relatively softer material. For example, sponge rubbers of different densities respectively, may be used to give the desired results.

The flat surface 15 of the applicator 10, directly in line with the cross-sectional area of the neck 9, is adapted to be placed against the area at which the intestinal protrusion had occurred and to hold the intestine in place against recurrence of the protrusion. The neck 9, being composed of the more solid material and extending completely through the body 1, of relatively softer material, to the rigid plate 5, localizes the greatest pressure directly in line with the neck 9.

The overhanging flange 12 of the mushroom head 11, in resting on the softer body 1 around the neck 9, applies a firm but slightly reduced pressure to the area of the flesh immediately surrounding the central localized high pressure area. The body 1, outside and surrounding the flange 12 applies a still lesser pressure to the flesh. Thus, while the necessary localization of the greatest pressure at the place required is maintained, the gradually decreasing differential pressure applied to the regions surrounding the region of greatest pressure relieves the strain on the skin in these surrounding areas, thus providing greater comfort for the patient.

Obviously, the cross-sectional shape of the neck of the applicator, the marginal shape of the mushroom head, and the marginal shape of the body may vary to suit the choice of the designer or to suit conditions of the patient, without departing from the spirit of the invention. For example, the pad may be definitely shape to provide lefts and rights to suit peculiar conditions. Figs. 8 and 9 illustrate a left side pad. A right side pad would obviously be made in reverse to the structure of Fig. 8.

It will be noted that the axis of the means 6, by which the pad is secured to the belt or spring for supporting the pad in place, is in alignment with the longitudinal axis of the neck 9 of the inserted applicator 10, whereby the pressure initially produced by the support embracing the wearer's body is applied to the pad in direct alignment with the axis of the pressure localizing insert 10.

In order to reduce the total weight of the pad, the body 1a (Fig. 5) may be provided with a cavity 16 of desired proportions on its under side, adjacent the base plate 4a and stiffening plate 5a. With the body 1a secured firmly to the base plate 4a completely around the marginal edges of the cavity 16, air trapped in said cavity will tend to act as a pneumatic cushion within the body 1a and permit the pad to adjust itself in a comfortable position against the patient. By increasing or decreasing the thickness of the wall of the body 1a, and thereby decreasing or increasing the volume of the cavity the degree of pressure exerted by the body 1a may be regulated to a nicety.

The impervious skin which forms on the surfaces of a molded sponge rubber body, by contact of the rubber with the walls of the mold, is retained on the wall 20 of the cavity 16, the surface 21 of the opening through which the neck 9a of the applicator 10a extends, and on the outer surface of the neck 9a and prevents the escape of air from the interior of the cavity 16. In some instances, this impervious skin is removed from the external surfaces of the truss pads, by buffing, as is well known in the art.

In that form of the invention shown in Fig. 6, the neck 9b is reduced in length and its lower end does not bear against the stiffening plate 5b. The portion of the resilient material, of which the body 1b is composed, which lies directly under the flange 12b, from said flange to the stiffening plate 5b or base plate 4b supports the mushroom head 11b with sufficient pressure to suffice in some cases, while the area of the body 1b lying outside the area of the flange 12b exerts a differential pressure against the skin around the central region occupied by the mushroom head 11b.

In that form of the invention shown in Fig. 7, the neck 9c of the mushroom head or applicator 11c is provided with an axial cavity 17, which forms a diaphragm 18 in the center of the pad, by which a relatively soft center of lower pressure potentiality is provided within an area of greater pressure exerted by the flange 12c, while the body 1c surrounding the flange 12c may be composed of still firmer material to exert the greatest pressure around the ring of the rupture.

In each instance the underside of the flange 12, 12a, 12b, or 12c, as the case may be, is preferably undercut, i. e., formed with the underside of the flange at an angle to the plane of the peripheral edge of the underside of the flange in order to insure firm contact between the peripheral edge of the underside of the flange and the crown face of the body surrounding the opening 2 against which the flange of the mushroom head bears.

From the foregoing it will be clear that, by making the bodies 1, 1a, 1b and 1c of resilient material of one density and the applicators 10, 10a, 10b and 10c of material of greater or lesser density than that of the body with which the applicator is associated a regional face of differential pressures is provided on the pad.

Preferably the pad bodies and the applicators are made of sponge rubber of differing densities, although it will be clear that other materials of corresponding densities having proportional pressure potentialities may be used without departing from the spirit of the invention, and if desired, as illustrated in Figs. 6 and 7, the applicators, for example, may be composed of solid rubber while the associated bodies are composed of sponge rubber or equivalent materials.

The applicator 10d, in Figs. 8 and 9, like the applicators of Figs. 6 and 9, is preferably of the solid rubber type and formed with a cross-lined face to prevent slipping of the pad relative to the skin. Obviously the applicators 10, 10a, 10b and 10c and/or the associated body elements 1, 1a, 1b and 1c may be similarly serrated or corrugated for the same purpose.

I claim:

1. A truss pad comprising a body portion com-

posed of inherently resiliently material of predetermined density, and an insert on one face of said pad composed of inherently resilient material of a relatively different density, said insert comprising a head portion protruding beyond said face of said body portion, a neck portion located in an opening formed in said body portion, and a flange encircling said neck and overlying said body portion in contact therewith around said opening.

2. A truss pad comprising a body portion composed of inherently resilient material of predetermined density, and an insert on one face of said pad composed of inherently resilient material of a relatively different density, said insert comprising a head portion protruding beyond said face of said body portion, a neck portion located in an opening formed in said body portion, and a flange encircling said neck and overlying said body portion in contact therewith around said opening, said neck portion having an axial cavity formed therein from one end toward said head and providing a diaphragm in said head within the confines of the peripheral edge of said flange.

3. A truss pad comprising a body portion composed of inherently resilient material provided with an opening extending below the normal contact face of said body portion, and a diaphragm of inherently resilient material extending across said opening at said contact face of said pad.

JAMES H. MASON.