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N. K. MORRISON  
FLOATING CONTOUR CUSHION

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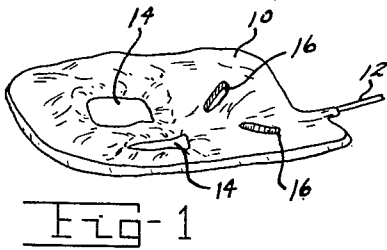


Fig-1

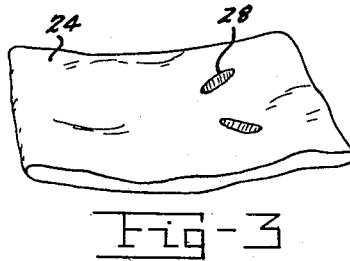


Fig-3

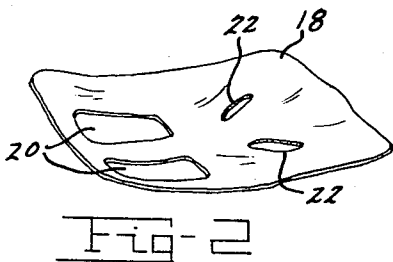


Fig-2

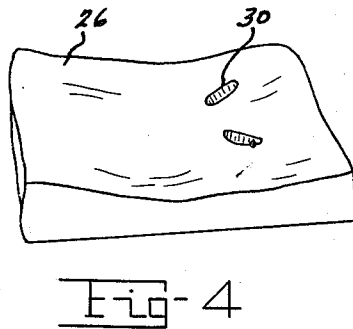


Fig-4

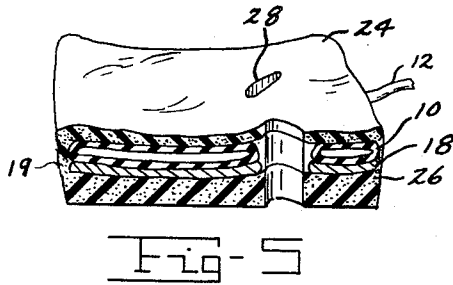


Fig-5

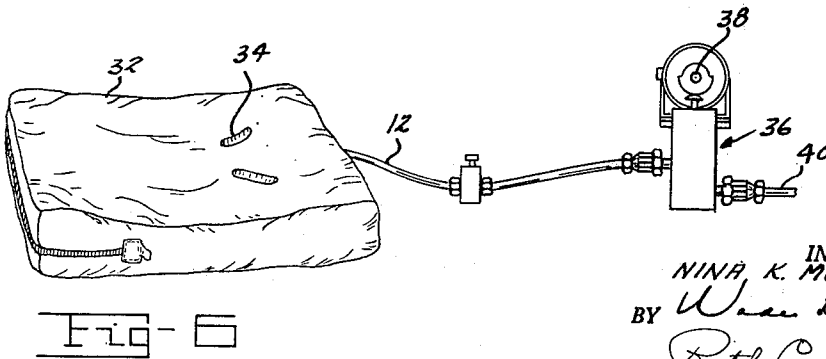


Fig-6

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2,819,712

**FLOATING CONTOUR CUSHION**

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4 Claims. (Cl. 128—33)

(Granted under Title 35, U. S. Code (1952), sec. 266)

The invention described herein may be manufactured and used by or for the United States Government for governmental purposes without payment to me of any royalty thereon.

This invention relates to a floating contour cushion and more particularly to improvements in cushions designed for preventing fatigue caused by maintaining an unrelieved sitting posture for long continued periods of time.

A great deal of research has been done on this problem. It has been found that the major portion of torso weight of a seated person is supported by the ischial tuberosities and the area immediately surrounding them. The concentration of weight in this area, with accompanying pressure on nerves, and blood vessels, impedes circulation and augments the fatigue factor.

The present invention is closely related to an application for U. S. Letters Patent Serial Number 432,065 for Dynamic, Inflatable Pneumatic Cushion filed May 24, 1952. Experimentation and experience have shown that the pilot will experience less fatigue during extended periods of continued sitting, if his body weight is supported by a rigid seat in preference to a cushion of consistently soft material such as foam rubber.

In the above noted application, a rigid seat is supplied, together with an inflatable cushion, for intermittently raising the pilot's weight from the rigid seat.

The object of the present invention is the provision of a device for preventing fatigue when an unrelieved sitting posture must be maintained for long extended periods of time, such as is experienced by airplane pilots.

A further object of the invention is the provision of a cushion which has, in addition to the advantages of the above noted application, a rigid seating element which is not rigidly supported, but is floatingly suspended.

A further object of the invention is the provision of a cushion which is adaptable to the variable pan and back angles of various kinds of seats, particularly the varying seating conditions available in aircraft, and one which also provides unchanged support, even when changes in body position occur.

A further object of the invention is the provision of a device which combines the advantages of a contoured rigid form supporting surface, a completely soft cushion support and lastly the advantages of a cyclically inflatable cushion which intermittently lifts the pilot's weight from the rigid surface.

A further object of the invention is the provision of a cushion device wherein the region of the ischial tuberosities, the area normally supporting the greater portion of the body weight of the seated incumbent, is relieved at all times from such support.

Other advantages will appear as the description proceeds.

In the drawings,

Figure 1 is a perspective view of an inflatable bladder;

Fig. 2 is a perspective view of a contoured plate; Figs. 3 and 4 are individual perspective views of top and bottom layers, respectively;

Fig. 5 is a sectional perspective view of the cushion assembled, showing the arrangement and the relation of the respective elements;

Fig. 6 is a perspective view of the completed cushion, assembled and inserted within a jacket cover, and also showing the connection of the device to the intermittent pressure source.

Referring more in detail to the drawing, an inflatable bladder 10 is provided with a pressure conduit 12, which leads to a source of pressure supply not shown. The inflatable bladder 10 is made of natural rubber or comparable material which can withstand pressures up to 10 p. s. i. It is provided with four openings extending completely therethrough. The larger openings 14 are so placed that they coincide with the position of the ischial tuberosities of the occupant seated on the cushion and are so fabricated that a tapered cross section is produced around them. Smaller, oblique openings 16 are placed forwardly and are for the purpose of accommodating parachute fastenings. A rigid seat element or plate 18 is shown per se in Fig. 2. This plate may be made from any rigid material which proves suitable for the purpose such as wood, light weight metal, fiber glass or a suitable plastic. The plate 18 may be contoured. It is provided with a pair of openings 20 which coincide in assembled position with the openings 14 of the bladder 10. A pair of oblique forwardly placed openings 22 are provided which coincide with the openings 16 of the bladder 10 and are for the same purpose, that is, for accommodating the leg strap fastenings of a parachute harness.

The upper and lower layers of the cushion are designated as 24 and 26, respectively. Figs. 3 and 4 show these pads separately. Each of these pads is provided with oblique, forwardly placed openings 28 and 30, respectively. These openings coincide, when the cushion is in assembled condition, with the openings 22 of the seat element 18, and openings 16 of the bladder 10, so that in the completely assembled condition of the cushion a pair of unimpeded openings extend completely through the cushion for accommodating the leg straps of a parachute harness.

The upper layer or pad comprises a comparatively thin sheet of foam rubber or other soft cushioning or elastomeric material, which may or may not be contoured. The lower pad 26 comprises a comparatively thick section of the same material and may be contoured to experimentally determined proportions. The bladder may be bonded to the plate by any suitable means, and the two laid between the layers of foam rubber. The layers of foam rubber are then bonded over the edges of the plate and bladder as shown at 19.

Fig. 5 shows the elements of the cushion assembled. The contoured pad 26 lies at the bottom, with the plate 18, the bladder 10 and the upper pad 24 superimposed on top of it in the order named.

The assembled portions of the cushion are then inserted within a cushion cover 32 which is provided with oblique rearwardly placed openings 34 coinciding with the parachute strap openings of the other elements. The conduit 12 is connected to a valve mechanism generally indicated at 36. This valve mechanism is shown and described in detail in the above noted copending application. It is provided with a cyclic device generally herein indicated at 38 for intermittently opening and closing the valve 36. In the operation of the device, the bladder 10 is intermittently inflated and deflated by means of this cyclically operated valve device. The conduit 40 leads to a pressure supply not shown.

It will thus be seen that the weight of the pilot's body

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is intermittently raised from its intimate contact with the rigid plate 18 so that alternatively the pilot's body rests solidly upon the plate 18 and alternatively rests upon the inflated air cushion. It will now also be apparent that the ischial tuberosities, which, in ordinary seating, bear the larger proportion of the pilot's weight are now completely relieved from this weight at all times, and the fatigue due to pressure and impeded blood circulation in this region is relieved at all times. It will also be seen that the pilot has the advantage of a rigid seat and at the same time the advantage of a floating seat which changes position with his change of body position, and maintains a uniform and undisturbed distribution of his weight, even though his own body may undergo change in position. This effect is due to the fact that the plate 18 is completely freed and floating between the foam rubber layers 24 and 26 and has no rigid attachment or support.

For purposes of exemplification particular embodiments of the invention have been shown and described according to the best present understanding thereof. However, it will be apparent that many changes and modifications in the arrangement and construction of the parts thereof may be resorted to without departing from the true spirit and scope of the invention.

I claim:

1. A cushion comprising a top section and a contoured lower section, both of comparatively soft elastomeric material such as foam rubber, a rigid contoured plate and a superimposed inflatable bladder bonded together and positioned between the top section and the lower section, the edges of the top and lower section being bonded together around the edges of said plate and bladder, a pair of openings in said rigid plate located to lie beneath the region of the ischial tuberosities of the seated incumbent of the cushion, a pair of openings through said inflatable bladder and located coincident to the openings in said rigid plate, a pressure conduit connected to said bladder to provide for intermittent inflating and deflating said bladder, a cover for said cushion, a pair of openings located in the forward region of each element of said cushion, including said cover, and located coincidentally for the purpose of accommodating the straps of a parachute harness.

2. A cushion comprising a top section and a lower section of comparatively soft elastomeric material such as foam rubber, a rigid contoured plate and a superimposed

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inflatable bladder positioned between the top section and the lower section, said rigid plate floating between said top section and said lower section and being supported solely thereby, a pair of openings in said rigid plate located to lie beneath the region of the ischial tuberosities of the seated incumbent, a pair of openings through said inflatable bladder and located coincident to the openings in said rigid plate, a pressure conduit connected to said bladder for intermittent inflating and deflating of said bladder, said top section and said lower section presenting an uninterrupted surface above and below the openings in said contoured plate and said inflation bladder which accommodate the ischial tuberosities.

3. A cushion construction for the relief of fatigue comprising a rigid section having a contoured seating surface for supporting a seated occupant, a pair of apertures in said seating surface, located to lie directly beneath the region of the ischial tuberosities of the seated occupant, an inflatable bladder positioned on said contoured seating surface having a pair of spaced apertures therein located coincident with the above noted apertures in said rigid section, means for cyclically inflating and deflating said bladder, said bladder when inflated lifting the weight of the body of the seated occupant out of supporting contact with said seating surface.

4. A cushion construction for the relief of fatigue comprising a rigid section having a contoured seating surface for supporting a seated occupant said rigid section lying between sections of elastomeric material and supported solely thereby, a pair of apertures in said seating surface, located to lie directly beneath the region of the ischial tuberosities of a seated occupant, an inflatable bladder positioned on said contoured seating surface having a pair of spaced apertures therein located coincident with the above noted apertures in said rigid section, means for cyclically inflating and deflating the bladder, said bladder when inflated lifting the weight of the body of the seated occupant out of supporting contact with said seating surface.

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