Aug. 28, 1962 F. L. MIKESELL 3,050,746

PROTECTIVE PAD AND METHOD OF FORMING THE SAME

Filed April 28, 1961 2 Sheets-Sheet 1

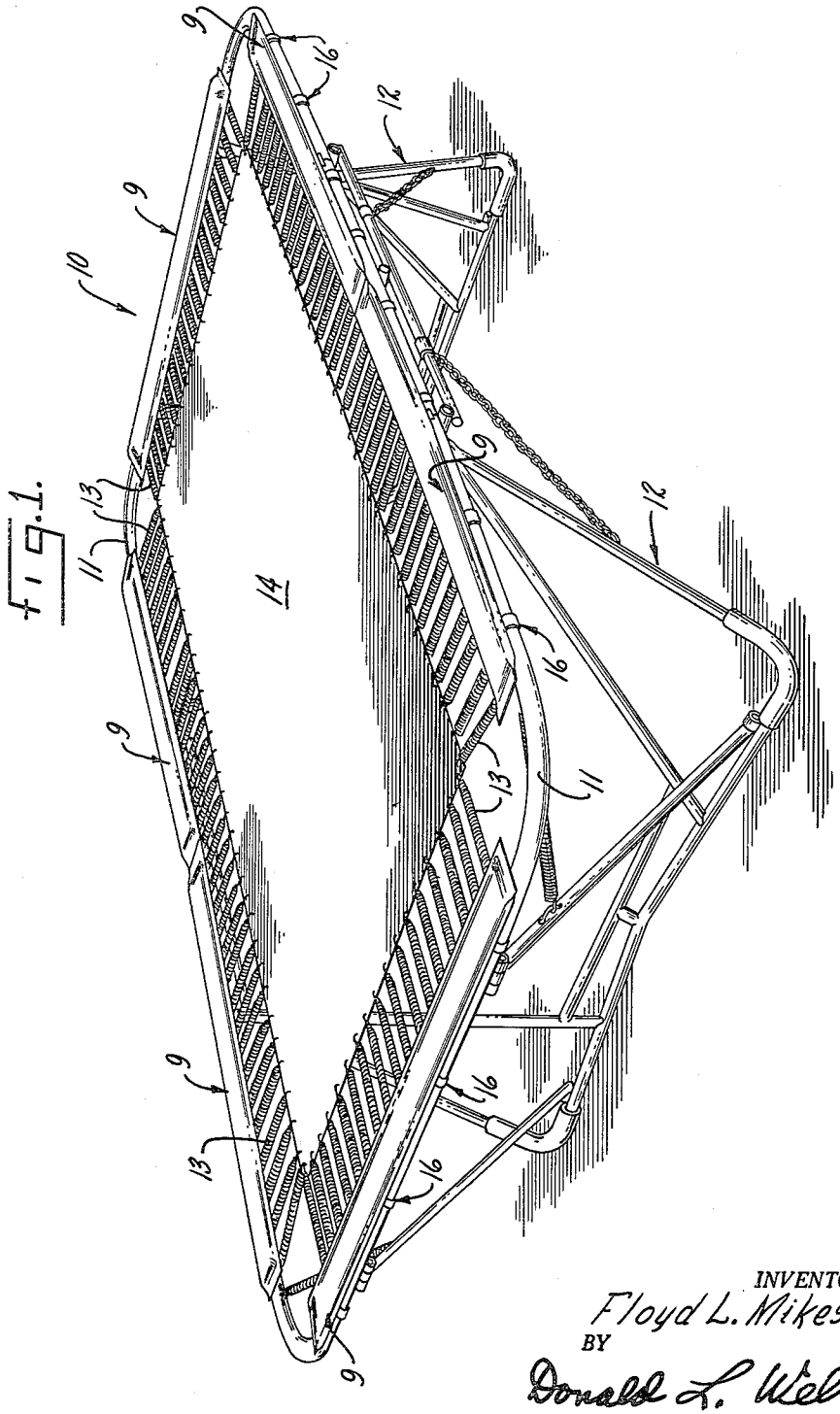

FIG. 1.

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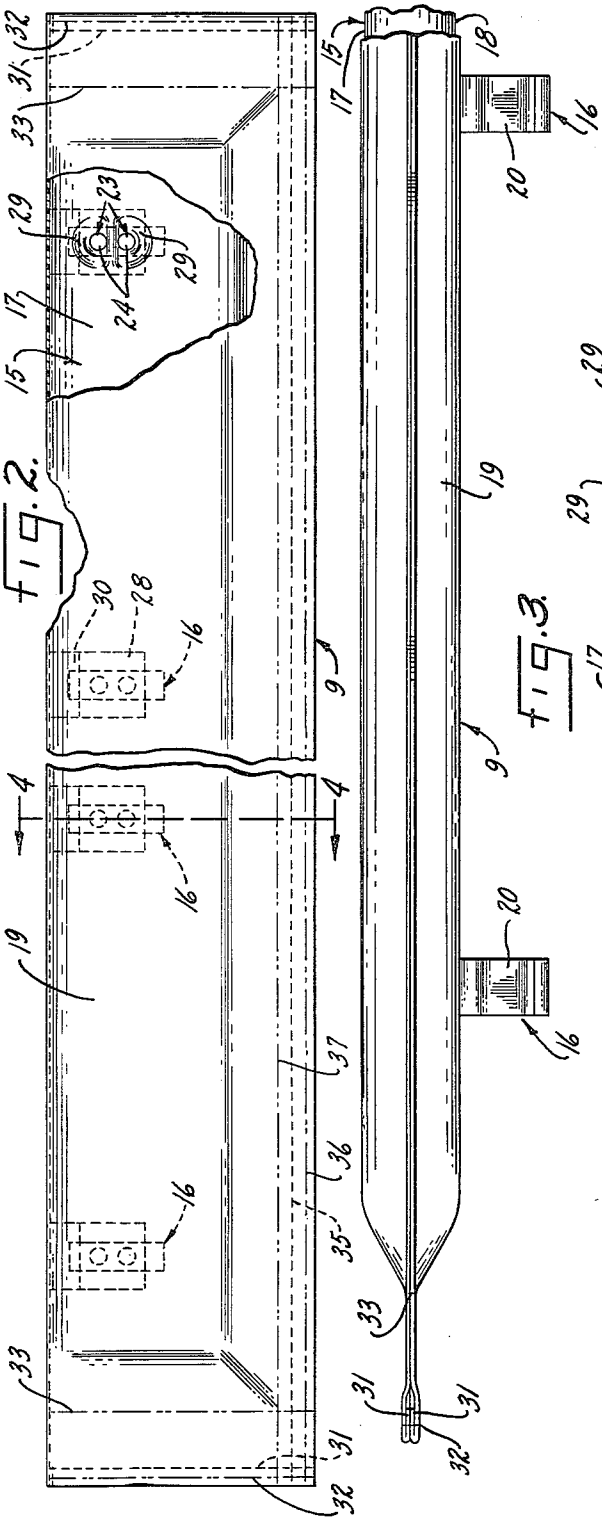

FIG. 2.

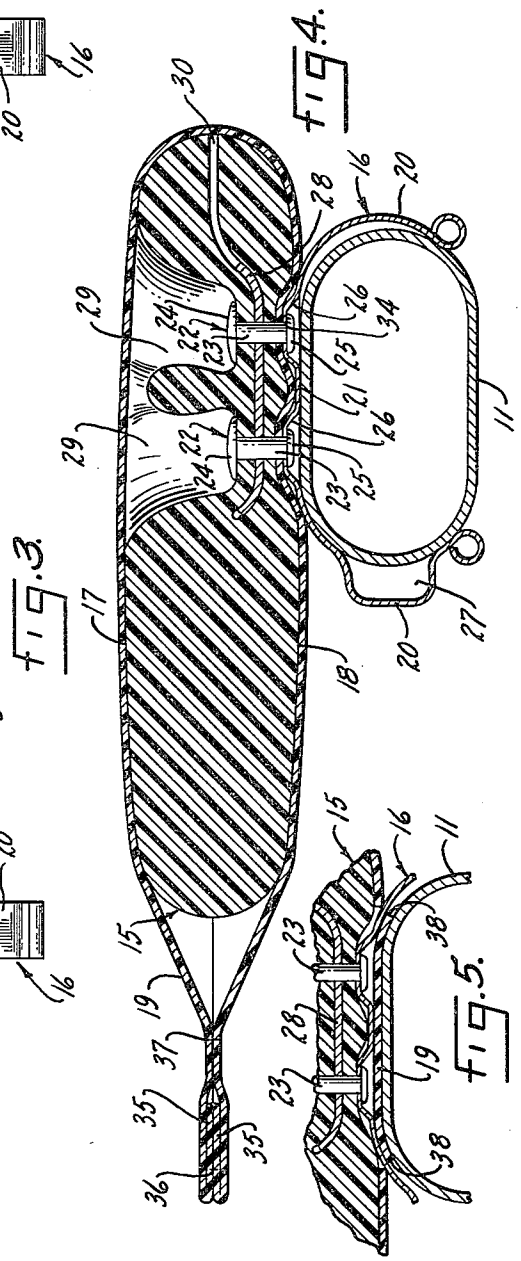

FIG. 4.

FIG. 3.

FIG. 5.

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PROTECTIVE PAD AND METHOD OF FORMING THE SAME

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6 Claims. (Cl. 5—317)

This invention relates generally to pads for covering hard surfaces and protecting persons from injury due to impact with such surfaces. More particularly, the invention relates to a pad adapted to protect a performer on gymnastic apparatus and including a body of yieldable or resilient material mounted on the apparatus through the medium of one or more brackets secured to the body.

The primary object of the present invention is to provide a protective pad of the above character in which the mounting bracket and resilient body are secured together in a novel manner to withstand the hard usage of repeated impacts of performers while insuring that no parts project beyond the exterior of the body to injure the performers.

Another object is to secure the mounting bracket to the body in a simple and inexpensive manner using a headed fastening element such as a rivet while avoiding projection of the rivet exteriorly of the body.

A more retailed object is to reinforce the resilient body by a strip of reinforcing material arranged in a novel manner with respect to the body to avoid tearing of the material by a headed fastener while insuring that the fastener is disposed within the exterior surface of the body.

The invention also resides in the novel manner of positioning the reinforcing material in the resilient body so as to achieve a desired reinforcing action easily and at low cost.

Other objects and advantages of the invention will become apparent from the following detailed description taken in conjunction with the accompanying drawings in which

FIG. 1 is a perspective view of gymnastic apparatus equipped with protective pads embodying the novel features of the present invention;

FIG. 2 is a plan view of a pad partially broken away and shown in section;

FIG. 3 is an enlarged fragmentary side elevational view of the pad;

FIG. 4 is an enlarged sectional view taken along the line 4—4 in FIG. 2 and showing the pad mounted on the frame of gymnastic apparatus; and

FIG. 5 is a fragmentary view similar to FIG. 4 and showing a modified construction.

Protective pads 9 made in accordance with the present invention are especially suited for covering exposed hard surfaces of gymnastic apparatus to avoid injury to performers resulting from impact with such surfaces. The gymnastic apparatus shown in the drawings (FIG. 1) is a rebound tumbling unit 10 having a rigid rectangular metal frame 11 supported in horizontal position on leg structures 12 located under the frame. Suspended within the frame by elongated resilient members such as coiled contractile springs 13 is a horizontal bed 14 which supports the performer and provides a landing surface as well as transfer to him the force of the springs to effect the desired rebound action. While the bed may be formed of interwoven strips of fabric sewn together as is well known in the art, it is shown in this instance as a multiple layer canvas sheet of nylon or other suitable fabric. The frame also may take various forms, that shown in the drawings being made of steel tubing of oval cross section (see FIG. 4) elongated horizontally to provide generally flat horizontal upper and lower surfaces.

The surface of the rebound tumbling unit 10 to be covered by one or more of the protective pads 9 is the upper horizontal surface of the frame 11, such surface being exposed and subject to impact by the performer should he land improperly. Where, as here, such surface is elongated, each protective pad similarly is elongated. Herein, there are six pads, one covering each end of the frame and two arranged end to end on each side of the frame.

In general, each protective pad 9 comprises a body 15 of yieldable or resilient material and one or more mounting brackets 16 secured to the body and adapted to fit releasably over parts of the frame 11 to be covered by the pad. In this instance, where the pad is elongated, the body similarly is elongated and preferably is of generally rectangular shape with flat exterior surfaces 17 and 18 facing in opposite directions and away from each other. There are four mounting brackets 16 spaced along the length of each pad and each is adapted to fit releasably over the top of the covered frame section. Preferably, a resilient material is utilized for the body, sponge rubber or polyethylene foam having been found especially suitable. It also has been found desirable to cover the exterior of the body with a sheet 19 of weather resistant fabric such as a knit cotton sheet covered with a vinyl plastic.

Herein, each mounting bracket 16 is formed of a flat strip of resilient metal bent to form an inverted U having spaced leg portions 20 which hook around the longitudinal sides edges of the frame. Connecting the legs is a generally flat intermediate portion 21 adapted to lie against the upper horizontal frame surface when the legs hook around the frame edges. Each bracket is secured to the resilient body by one or more headed fastening elements such as rivets 22 which are inexpensive and easy to manipulate. Herein, two rivets secure each mounting bracket to the resilient body and each rivet has a shank 23 with an enlarged head 24 at one end engaging the body. The shank extends through a hole 34 in the intermediate portion 21 of the bracket and the other end 25 of the rivet is upset against the underside of the intermediate portion 21 and fits in a recess 26 formed in such portion to enable the remainder of the portion to lie against the frame. To provide clearance to receive parts (not shown) welded to the inner edge of the frame for connection to the springs 13, one leg 20 of each bracket is recessed as indicated at 27.

In accordance with the present invention, the resilient body 15 is reinforced in a novel manner to avoid tearing by the rivets 22 while insuring that the rivets remain beneath the upper exterior surface 17 of the body to avoid contact by the performer. To these ends, the rivets are made shorter than the depth of the resilient body between the oppositely facing upper and lower surfaces 17 and 18 so that the body is compressed between the mounting bracket 16 and the enlarged head 24 on the end of each rivet opposite the bracket. Also, the resilient body is strengthened by a strip 28 of reinforcing material. This strip is located between the exterior surfaces 17 and 18 so that, during compression of the resilient body in securing the bracket to the body, a recess 29 is formed in the body for the head and the head is spaced from the upper surface of the body. While the reinforcing strip may be positioned between the exterior surfaces of the body during formation of the body, the construction is simplified and the cost is reduced by cutting a horizontal slit 30 in the body and inserting the strip edgewise into the slit after the body is formed.

The reinforcing strip 28 in this instance is a piece of a woven cotton or nylon sheet coated with a suitable resin which acts as a stiffener. With two or more rivets 22 as shown for each bracket 16, the reinforcing strip

not only prevents the heads 24 of the rivets from tearing through the resilient material, but also, divides the pressure exerted on the pad between the two rivets.

The cover sheet 19 is generally rectangular and is folded centrally along its length to enclose the resilient body 15. In a preferred construction shown in FIGS. 1 to 4, the lower layer of the cover is clamped between the mounting bracket 16 and the underside 18 of the resilient body 15 as an incident to securing the bracket to the body. In a modified construction shown in FIG. 5, the brackets are secured to the body first and then the legs 20 of the brackets are inserted through parallel slits 38 cut in the cover. In both instances, the cover is partially formed before the body is inserted. In such partial formation, the end portions 31 of the sheet are folded back and sewn to the sheet after which the sheet is folded in two along its length and the folded over end portions are sewn together across the width of the folded sheet as indicated at 32 adjacent the edges and also along lines 33 spaced inwardly from such edges. In this partially completed condition, the cover sheet is open along its length between the sewn ends to receive the resilient body.

In the formation of a protective pad as described above, a desired length of resilient material 15 is cut from an elongated roll of such material available commercially. Next, the slits 30 are cut in the resilient body at the places where mounting brackets 16 are desired, the slits in this instance paralleling and being spaced equal distances from the oppositely facing exterior sides 17 and 18 of the body and extending inwardly from one edge of the body approximately halfway across its width. The reinforcing strips 28 then are inserted edgewise into the slits as shown in FIG. 3.

Where, as in the preferred construction of FIG. 4, the cover 19 is secured to the resilient body 15 by the rivets 22, the slitted body with the reinforcing strips 28 in the slits 30 is inserted edgewise into the cover through the opening extending along the length of the cover between the sewn ends. Then, the flat connecting portion 21 of each mounting bracket is placed on a horizontal supporting surface of riveting apparatus well known in the art and the body with the cover thereon is placed over the flat portion of the bracket with the reinforcing strip and the bracket portion in registry. Finally, the upper half of the cover is pulled back to provide clearance for the riveting apparatus and the apparatus is actuated to drive the shanks 23 of the two rivets through the resilient body, the reinforcing strip, the lower half of the cover, and the mounting bracket holes 34 and to upset the lower ends 25 of the rivets thereby compressing the resilient body between the bracket and the enlarged heads 24 on the rivets. In this operation, due to the presence of the reinforcing strip 28, the enlarged heads on the rivets are permitted to sink into the resilient material, form the recesses 29 and space the heads from the upper surface 17 of the resilient body without tearing the body.

Once the riveting operation has been completed on all mounting brackets 16 to be secured to the resilient body 15, the longitudinal edge portions 35 of the cover are folded inwardly and back against the sheet and are sewn together as indicated at 36 in FIGS. 2 and 4. Then, the upper and lower halves of the cover 19 are sewed together longitudinally along a line 37 spaced inwardly from the folded edge portions.

In the modified construction of FIG. 5, where the cover 19 is assembled to the body 15 after the brackets 16 are riveted to the body, the body with the attached brackets is simply inserted between the cover halves and the legs 20 of the brackets are projected through the cover slits 38. Following this, the pad is completed as in the preferred construction by folding and sewing the longitudinal portions of the cover sheet.

It will be aparent that the reinforcing strip 28 strengthens the resilient material 15 to prevent the material from being torn by the rivets not only during the riveting operation, but also during impact of the pad 9 after it is mounted on the frame 11. Due to the location of the strip at a point spaced from the top surface 17 of the resilient body, and with the rivets of shorter length than the spacing between the top surface and the underside 18 of the body, the enlarged heads 24 of the rivets are spaced inwardly a substantial distance beneath the top of the body. Contact of the rivets by the performer thus is avoided. These advantageous results are achieved easily and at low cost by cutting the slits 30 in the resilient body and inserting the reinforcing strips 28 therein after the body is formed, this method of positioning the reinforcing strips making it possible to use commercially available resilient material.

While the invention is susceptible to various modifications and alternative constructions, I have illustrated in the drawings and described herein the preferred embodiment. It is to be understood, however, that I do not intend thereby to limit the invention by such disclosure but aim to cover all modifications and alternative constructions falling within the spirit and scope of the invention as expressed in the appended claims.

I claim:

1. A protective pad comprising in combination, a body of yieldable material having spaced first and second exterior surfaces facing in opposite directions and away from each other, said body having a slit disposed between and spaced from both of said surfaces, a flat strip of reinforcing material disposed in said slit, a mounting bracket having a generally flat portion extending along and adjacent said first one of said surfaces in registry with said strip, and two elongated headed fastening elements extending through said flat portion of said mounting bracket and having shorter lengths than the spacing between said surfaces, said strip and said body in a direction transversely of said exterior surfaces and at spaced points to secure such parts together with the body compressed between the mounting bracket and enlarged heads on the ends of the elements remote from the bracket, said heads being disposed within spaced recesses in said second surface resulting from compression of the body.

2. A protective pad comprising, in combination, a body of yieldable material having spaced first and second exterior surfaces facing in opposite directions and away from each other, said body having a slit disposed between and spaced from both of said surfaces, a flat strip of reinforcing material disposed in said slit, a mounting bracket having a generally flat portion extending along and adjacent said first one of said surfaces in registry with said strip, and at least one headed fastening element shorter than the spacing between said surfaces and extending through said flat portion of said mounting bracket, said strip and said body in a direction transversely of said exterior surfaces to secure such parts together with the body compressed between the mounting bracket and an enlarged head on the end of the element remote from the bracket, said head being disposed in a recess in said second surface resulting from compression of the body.

3. A protective pad comprising, in combination, a body of yieldable material having spaced first and second exterior surfaces facing in opposite directions and away from each other, said body having a slit disposed between and spaced from both of said surfaces, a flat strip of reinforcing material disposed in said slit, a mounting bracket having a generally flat portion extending along and adjacent said first one of said surfaces in registry with said strip, and two headed fastening elements extending through said flat portion of said mounting bracket, said strip and said body in a direction transversely of said exterior surfaces and at spaced points to secure such parts together with the body compressed between the mounting bracket and enlarged heads on the ends of the elements remote from the bracket, said heads

being disposed in spaced recesses in said second surface resulting from compression of the body.

4. A protective pad comprising, in combination, a body of yieldable material having spaced first and second exterior surfaces facing in opposite directions and away from each other, said body having a slit disposed between and spaced from both of said surfaces, a flat strip of reinforcing material disposed in said slit, a mounting bracket having a generally flat portion extending along and adjacent said first one of said surfaces in registry with said strip, and at least one headed fastening element extending through said flat portion of said mounting bracket, said strip and said body in a direction transversely of said exterior surfaces to secure such parts together with the body compressed between the mounting bracket and an enlarged head on the end of the element remote from the bracket, said head being disposed in a recess in said second surface resulting from compression of the body.

5. In a method of forming a protective pad having a mounting bracket with a generally flat portion secured against a first one of two spaced oppositely facing exterior surfaces on a body of yieldable material, the steps of cutting said body to form a slit disposed between and spaced from said two spaced exterior surfaces of the body, inserting a flat strip of reinforcing material in the slit, positioning said flat portion adjacent said first of said two oppositely facing surfaces and in registry with said

strip, projecting an elongated headed fastening element through said flat portion of said bracket, said strip and said body in a direction transversely of said surfaces to compress the body and the strip together between a head on the element and the bracket, and, simultaneously with such projection, forming a recess in the other surfaces of the body to receive the head.

6. In a method of forming a protective pad having a mounting bracket secured against a first one of two oppositely facing surfaces on the exterior of a body of yieldable material, the steps of positioning said bracket adjacent said first surface and in registry with a strip of reinforcing material disposed within the body in a position spaced from and between the surfaces, projecting an elongated headed fastening element through said flat portion of said bracket, said strip and said body in a direction transversely of said surfaces to compress the body and the strip together between a head on the element and the bracket, and, simultaneously with such projection, forming a recess in the other surfaces of the body to receive the head.

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