April 28, 1964 H. B. WRIGHT 3,130,816

PNEUMATIC TRAMPOLINE

Filed Sept. 17, 1962 2 Sheets-Sheet 1

FIG. 1

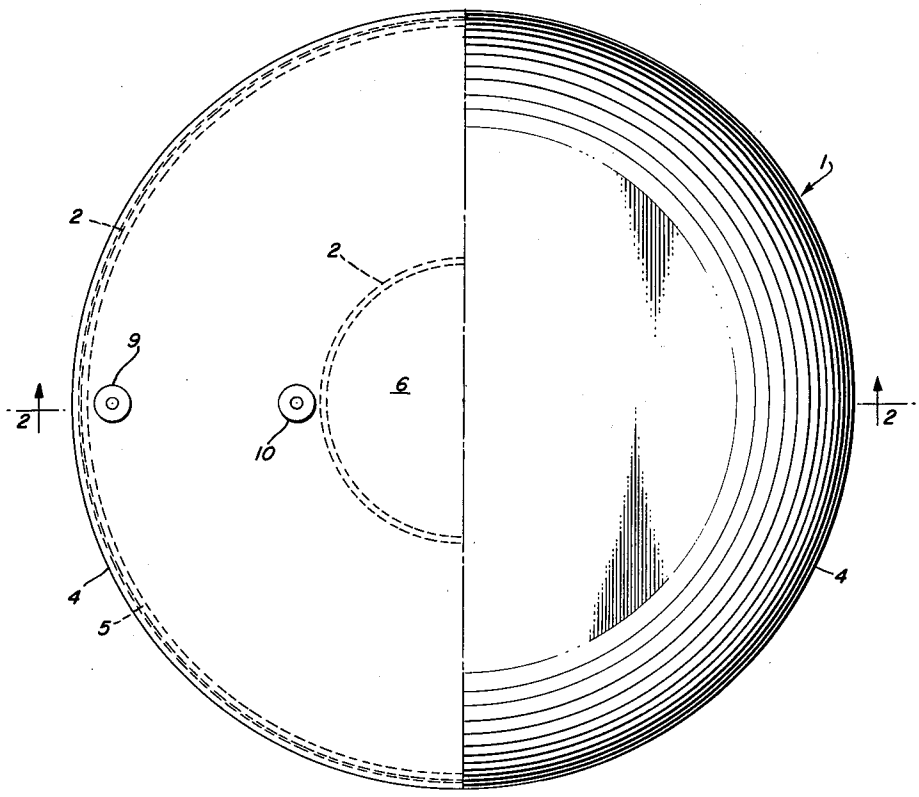
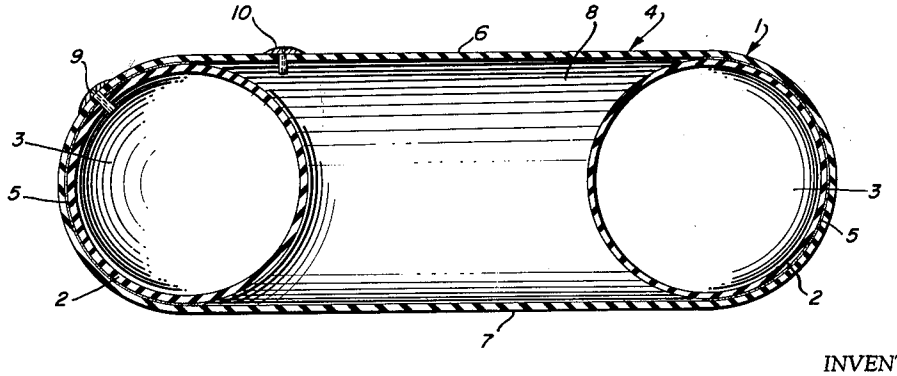


FIG. 2



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Filed Sept. 17, 1962 2 Sheets-Sheet 2

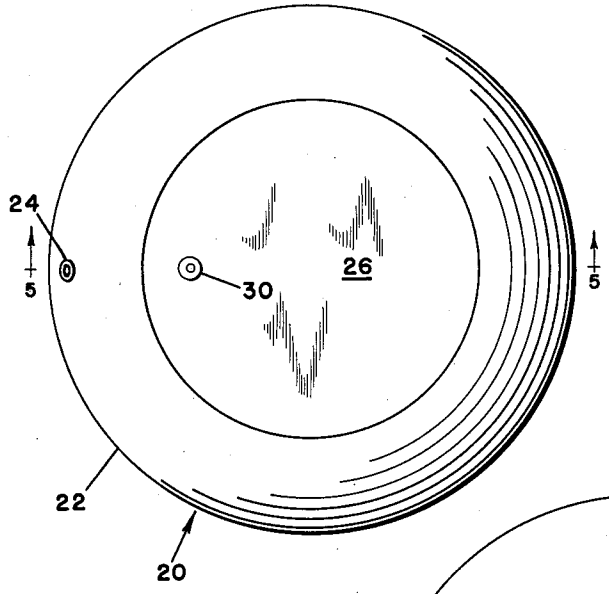


FIG. 3

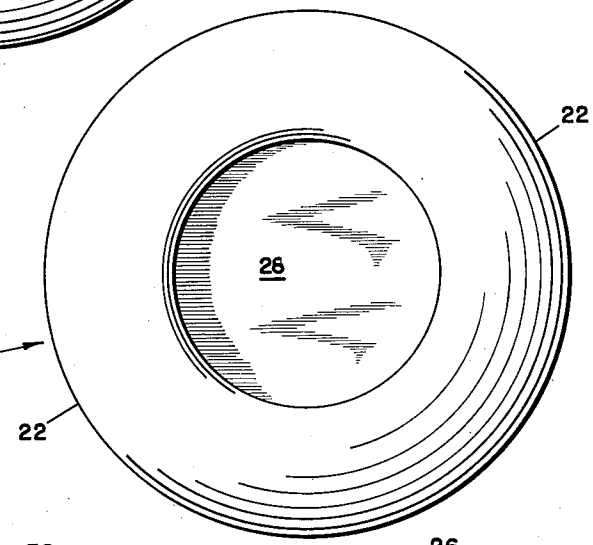


FIG. 4

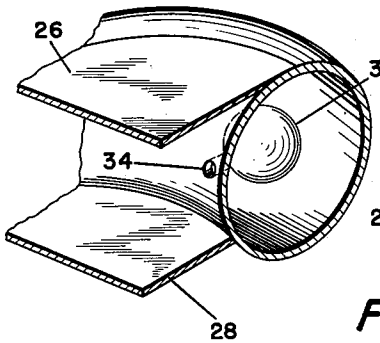


FIG. 6

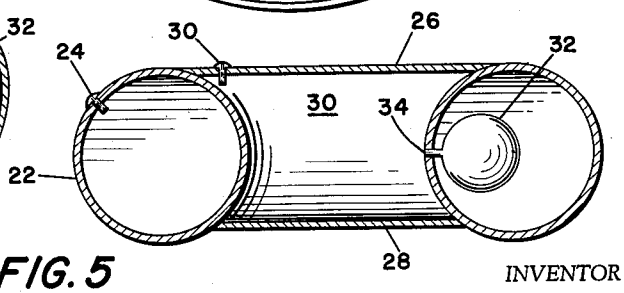


FIG. 5

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United States Patent Office 3,130,816 Patented Apr. 28, 1964

3,130,816

PNEUMATIC TRAMPOLINE

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Filed Sept. 17, 1962, Ser. No. 224,154
3 Claims. (Cl. 182—139)

This invention relates to trampolines, and more particularly to a pneumatic trampoline. This application is a continuation-in-part of my prior application Serial No. 56,287, filed September 15, 1960.

Trampolines have recently gained widespread popularity as recreational and exercising devices. Most of the trampolines in general use are located in commercial installations, where the user of the trampoline pays a charge for the use of the trampoline on a time basis. Furthermore, most trampolines available for public use including those in commercial establishments, are generally semi-permanent installations, in which the trampoline is mounted over an open pit which receives the trampoline during its movements.

It is an object of this invention to provide a trampoline which is particularly adapted to be sold to individuals and families for their own use without the necessity of any installation, although the trampoline of the invention is also suitable for use on a commercial basis if desired.

It is another object of the invention to provide a trampoline which is inexpensive to manufacture and can be sold at retail for a nominal price to permit ownership of a trampoline by individuals or families, thereby avoiding the expense incident to use of trampolines in commercial establishments.

It is still another object of the invention to provide a pneumatic type trampoline which is lightweight and portable and which can be easily inflated for use and deflated for transportation or storage.

It is a further object of this invention to provide a pneumatic type trampoline which has stability and which also has superior bouncing characteristics.

Still a further object of the invention is to provide a pneumatic type trampoline whose bouncing characteristics may be adjusted to suit the individual requirements of persons using the trampoline.

Still a further object of the invention in a modified embodiment is to provide a pneumatic type trampoline which is so constructed as to eliminate any tendency of the bottom wall of the "bouncing chamber" of the trampoline to bulge downwardly due to internal pressure on the bottom wall when the trampoline is in use.

Still another object of the invention is to provide in a modified embodiment a pneumatic trampoline which is so constructed as to substantially eliminate any tendency of the flexible or elastic jumping platform to bulge upwardly in the area surrounding the jumper's feet when the trampoline is in use.

Still a further object of the invention is to provide in a modified embodiment a pneumatic type trampoline including an auxiliary expansion chamber which serves as a pressure equalizing means which tends to prevent bulging of the jumping platform of the trampoline.

In achievement of these objectives, there is provided in accordance with an embodiment of this invention a pneumatic trampoline including an inner hollow tubular annulus member made of elastic material such as rubber, the annulus being similar to the inner tube used with a heavy-duty vehicle tire. The tubular annulus when inflated serves to stabilize the trampoline. The tubular annulus is enclosed in an envelope of elastic material similar to that which forms the annulus, the central portion of the upper wall of the elastic casing forming a platform on which the user jumps. The space within the hollow

interior of the tubular annulus defines a first pneumatic chamber having its own separate inlet valve which permits adjustment of the pneumatic pressure of the annulus to provide proper stability for the trampoline. The space bounded by the peripheral surface of the tubular annulus and the planar surfaces of the enclosing elastic casing define a second pneumatic chamber having its own inlet valve means to permit independent adjustment of the pressure inside the second chamber. The second pneumatic chamber is a "bouncing chamber" into which the elastic trampoline platform flexes when the trampoline is in use.

In a modified embodiment of the invention, the pneumatic trampoline is so constructed as to prevent any tendency of the bottom wall of the "bouncing chamber" of the trampoline to bulge downwardly when the trampoline is in use, and also to prevent any tendency of the flexible or elastic jumping platform itself to bulge upwardly in the area surrounding the feet of the jumper when the trampoline is in use. In the modified embodiment of the trampoline, the bottom wall of the second pneumatic chamber or "bouncing chamber" is formed of a material which is non-porous so as to seal the air inside the bouncing chamber, and having a high fiber content or otherwise formed of material of low flexibility so as to render the bottom wall of the bouncing chamber substantially inflexible under the pressures generated while the trampoline is in use. Furthermore, the bottom wall of the second or bouncing chamber is spaced a short distance above the lower surface of the outer tubular annulus of the trampoline so that if any slight flexing of the bottom wall does occur during the use of the trampoline, the flexing will not be sufficient to cause the bottom wall of the bouncing chamber to touch the ground or other supporting surface on which the trampoline is positioned, thereby avoiding any tendency of the lower surface of the inner chamber of the trampoline to bulge in such manner as to cause instability of the trampoline.

In order to overcome any tendency of the flexible jumping platform of the trampoline to bulge upwardly in the area surrounding the jumper's feet, an auxiliary expansion chamber is provided in the form of a balloon-like member which is positioned inside the outer annulus but in pneumatic communication with the interior of the second pneumatic or "bouncing" chamber in such manner that pressures developed during the use of the trampoline will cause air from the bouncing chamber to pass into the auxiliary expansion chamber to thereby equalize the air pressure in the bouncing chamber and prevent any tendency of the jumping platform to bulge during the use of the trampoline.

Further objects and advantages of the invention will become apparent from the following description taken in conjunction with the accompanying drawing in which—

FIG. 1 is a top plan view of a trampoline in accordance with the invention, while

FIG. 2 is a view in cross section along lines 2—2 of FIG. 1;

FIG. 3 is a top plan view of a modified pneumatic trampoline in accordance with the invention;

FIG. 4 is a bottom plan view of the modified trampoline of FIG. 3;

FIG. 5 is a view in transverse section along line 5—5 of FIG. 3; and

FIG. 6 is a perspective view, partially in section, illustrating the auxiliary expansion chamber of the modified embodiment of FIGS. 3–5.

Referring now to the drawing, the trampoline in accordance with the invention is generally indicated at 1, and includes a hollow tubular annulus member 2 made of rubber or other suitable elastic material. The hollow annulus 2 is similar to an inner tube used with the tire of

a large heavy-duty vehicle and may, for example, have a size of the order of magnitude of two feet in height, with the circle defined by the outer periphery of the annulus having a diameter of six feet.

The hollow interior of tubular annulus 2 defines a first pneumatic chamber 3. In the illustrated embodiment, annulus 2 is completely enclosed or enveloped in an elastic casing generally indicated at 4 of rubber sheeting or other elastic material similar to that of which annulus 2 is formed. The thickness of the sheet material forming elastic casing 4 is sufficiently thin to permit the casing to have great elasticity for the bouncing movement which occurs when the trampoline is in use, and yet having sufficient strength to resist rupture or tearing during use. The outer elastic casing 4 is suitably secured to the outer surface of tubular annulus 2 by any suitable means, such as by a suitable adhesive or cement indicated at 5.

Elastic casing 4 includes upper and lower normally planar walls 6 and 7, the central portion of upper wall 6 defining a jumping platform for the user of the trampoline, while the lower horizontal wall 7 rests upon the ground or other supporting surface upon which the trampoline is placed.

A second pneumatic chamber 8 is defined by the space between planar walls 6 and 7 of outer flexible casing 4 and the inner peripheral surface of annulus 2. The first pneumatic chamber 3 formed by the hollow interior of annulus 2, and the second pneumatic chamber 8 just described are completely sealed from and pneumatically independent of each other so that each of the chambers 3 and 8 can be maintained at a pneumatic pressure independent of that of the other chamber.

While in the preferred construction illustrated in the drawing, the annulus 2 is completely enveloped by and ensheathed in the outer elastic casing 4, it is within the scope of this invention merely to enclose the opposite axial open ends of annulus 2 by elastic sheeting, so as to provide a closed pneumatic chamber similar to chamber 8 shown in the drawing.

Annulus 2 is provided with a valve member 9 by means of which air may be introduced into or removed from the interior of annulus 2. A second valve member 10 extends through the upper wall of outer casing 4 and provides a means by which air or other gaseous fluid may be introduced into or removed from the interior of the second pneumatic chamber 8. Valves 9 and 10 may be of any suitable type, such as those conventionally used with the inner tubes of automotive vehicles. The valves 9 and 10 and the sealed relation of pneumatic chambers 3 and 8 with respect to each other permit the pneumatic pressures within the two pneumatic chambers 3 and 8 to be independently adjusted to the proper and desired values.

The annulus 2 serves as a stabilizing means for the trampoline, and to prepare the trampoline for use, air is admitted into the interior of annulus 2 through valve 9 until annulus 2 has become completely inflated at a pressure sufficient to provide adequate support and stabilization for the trampoline during use. Air is also admitted into the interior of the second pneumatic chamber 8 until the desired pneumatic pressure inside chamber 8 has been obtained. The pressure inside chamber 8 should be such as to provide the proper and desired bouncing action for the individual using the trampoline and would be less, for example, for a small child, than for a large child or adult. The pressure inside chamber 8 should be such as to prevent the upper wall or jumping platform 6 from touching the bottom wall 7 when the trampoline is in use.

When it is desired to transport the trampoline or to put it in storage, the air may be easily removed from the pneumatic chambers 3 and 8 by means of the valves 9 and 10 and the trampoline may then be easily folded up into a small compact shape. If it is only desired to move the trampoline a short distance and it is not desired to deflate it, the circular shape of the trampoline facilitates rolling the trampoline to a desired location.

In use, the central portion of upper wall 6 of elastic casing 4 serves as a jumping or bouncing platform, wall 6 flexing downwardly into the pneumatic chamber 8 as the trampoline is being used.

There is shown in FIGS. 3–6, inclusive, a modified embodiment of the trampoline which is generally similar in principle of operation to the embodiment of FIGS. 1 and 2 previously described, but additionally includes structural modifications which tend to prevent bulging of either the lower wall of the inner or "bouncing" chamber, and which also tend to prevent bulging of the flexible or elastic jumping platform in the area around the jumper's feet during use of the trampoline.

The modified pneumatic trampoline is generally indicated at 20 and includes a hollow tubular annulus member 22 made of rubber or other suitable elastic material, and similar to the annulus 2 of the embodiment of FIGS. 1 and 2 previously described. The hollow annulus 22 is similar to an inner tube used with the tire of a large heavy-duty vehicle and may, for example, have a size of the order of magnitude of two feet in height, with the circle defined by the outer periphery of the annulus having a diameter of six feet. The hollow annulus 22 is provided with a separate valve member 24 which permits adjustment of the pneumatic pressure inside the annulus 22. A jumping platform 26 is suitably secured to the upper surface of the annulus 22. The jumping platform 26 may be made of a flexible fabric material such as canvas suitably coated to prevent any leakage of air therethrough, or may be made of an elastic or rubber-like material. The jumping platform 26 may be secured to the upper surface of annulus 22 by any suitable means such as adhesive, vulcanizing, or the like, depending upon the material of which the platform 26 is formed. The jumping platform 26 completely covers the upper end of the hollow open space bounded by the upper end of the annulus 22.

A bottom wall member 28 is attached to the peripheral surface of annulus 22 adjacent the lower end of the annulus 22 in such a manner as to close the lower end of the bouncing chamber 30 beneath the jumping platform 26. The lower wall 28 is formed of a material which is substantially inelastic and which has substantially less flexibility than the material of jumping platform 26. Lower wall 28 is preferably formed of a material having a higher fiber content and coated or impregnated with a suitable material which seals the wall 28 to prevent leakage of air therethrough. While the jumping platform 26 may also be formed of a material having a fiber content, the lower wall 28 has a much higher fiber content than would be permissible in the jumping platform 26, and is much less flexible than the jumping platform 26.

Instead of being formed of a material of high fiber content, lower wall 28 may instead be formed of a suitable plastic material of low flexibility as compared to the flexibility of jumping platform 26.

The lower wall 28 is positioned above and suitably attached to the lowermost peripheral surface of the annulus 22 at a height sufficient to prevent any contact between the lower wall 28 and the supporting surface or floor on which the trampoline rests, in the event that any slight flexing of the lower wall 28 occurs during the use of the trampoline. However, the fiber content of material of wall 28 should be such as to substantially prevent any significant flexing of the wall 28 during the normal usage of the trampoline. The spacing of the wall 28 above the bottom peripheral surface of the annulus 22 may be of the order of magnitude of several inches, for example.

In order to eliminate any looseness or "play" in the lower wall 28 which might possibly provide surface area for expansion under the pressures generated while the

trampoline is in use, the area of wall **28** should be made such that it is just sufficient to span the lower end of the annulus **22** at the height at which wall **28** is attached to the surface of the annulus **22**, so as to maintain wall **28** substantially taut in horizontal plane under normal usage, and so that the wall **28** will not have any excess material which might tend to bulge out of a horizontal plane when the trampoline is in use.

The lower wall **28** may even be formed of a rigid material suitably attached in a leakproof manner to the lower periphery of annulus **22**, although use of a rigid material would lessen the foldability and compactness of the trampoline. In the event that rigid material is used for bottom wall **28**, the bottom wall **28** need not be positioned in vertically spaced relation to the supporting surface on which the trampoline rests as previously described, but may be positioned so as to rest substantially on the supporting surface on which the trampoline is positioned.

A valve **31** is positioned in the jumping platform **26** to permit independent control of the air pressure inside the inner or bouncing chamber **30**.

In accordance with a further feature of the construction of the modified embodiment, an auxiliary expansion chamber generally indicated at **32** is provided to provide pressure equalization inside the inner or "bouncing" chamber **30** to prevent any tendency of the jumping platform **26** to bulge in the area about the jumper's feet during the use of the trampoline. The auxiliary expansion chamber **32** in the illustrated embodiment is an inflatable balloon-like member located in the hollow interior of annulus **22**. Auxiliary expansion chamber **32** includes a neck portion **34** which extends through an opening in the inner peripheral surface of annulus **22** in such manner as to place the interior of the auxiliary expansion chamber **32** in penumatic communication with the interior of the inner or bouncing chamber **30**. Thus, when the jumper jumps on the jumping platform **26**, the increased air pressure in the bouncing chamber **30** causes air to pass into the auxiliary expansion chamber **32** to further inflate the auxiliary expansion chamber **32**. This use of the auxiliary expansion chamber **32** thereby tends to equalize the pressure inside the bouncing chamber **30** and prevents any bulging of the jumping platform **26** in the area about the feet of the user. Furthermore, the relatively high fiber content or other relatively inflexible material of the bottom wall **28** of the bouncing chamber **30**, plus the fact that the wall **28** is spaced above the supporting surface on which the trampoline rests, and also the fact that the wall **28** has a surface area just sufficient to span the lower open end of the bouncing chamber **30** without any looseness of "play," all tend to prevent any tendency of the bottom wall **28** to bulge downwardly due to internal pressure within chamber **30** when the trampoline is in use. By providing a construction which prevents bulging of the lower wall of the trampoline during use, the stability of the trampoline is greatly improved.

It can be seen from the foregoing that the trampolines hereinbefore described have many advantages and are ideally suited for ownership by individuals or families, thereby avoiding the expense of patronizing commercial trampoline establishments. The constructrion of the trampolines provide stability and also provide an excellent bouncing characteristic, particularly in the modified embodiment of FIGS. 3–6. Furthermore, the provision of the independent outer and inner pneumatic chambers with their separate inlet valves permits independent adjustment of the pneumatic pressures to obtain proper stabilizing action of the stabilizing annulus and to obtain proper pressure of the inner or bouncing chamber to suit the individual bouncing requirements of various users of the trampoline. The trampoline may also be easily stored and moved about and can be manufactured inexpensively and sold at retail at a moderate price.

Furthermore, the construction of the modified embodiment of FIGS. 3–6 prevents any tendency of the lower wall of the bouncing chamber to bulge against the floor or other supporting surface when the trampoline is in use, thereby further insuring the stability of the trampoline. Furthermore, the use of the auxiliary expansion chamber tends to equalize the pressure inside the bouncing chamber while the trampoline is in use, thereby minimizing any tendency of the jumping platform to bulge in the area surrounding the jumper's feet. Also, while the lower wall **28** is formed of a material which resists any tendency of wall **28** to bulge while the trampoline is in use, nevertheless the trampoline including the wall **28** may still be folded easily for storage and transportation purposes.

While there has been shown and described a particular embodiment of the invention, it will be obvious to those skilled in the art that various changes and modifications may be made therein without departing from the invention and, therefore, it is aimed to cover all such changes and modifications as fall within the true spirit and scope of the invention.

What I claim as my invention is:

1. A pneumatic trampoline comprising an inflatable tubular member extending around the periphery of said trampoline to define a first pneumatic chamber adapted to be filled with pneumatic fluid, said trampoline including a hollow region lying laterally inwardly of and bounded by said tubular member, an upper closure member formed of flexible material connected to said tubular member and covering the upper end of said hollow region to form a jumping platform for said trampoline, a lower closure member formed of material of substantially less flexibility than said upper closure member and joined to said tubular member adjacent the lower peripheral surface of said tubular member to form a lower closure for said hollow region, said hollow region when closed by said upper and lower closure members defining a second pneumatic chamber adapted to be filled with pneumatic fluid, and an inflatable auxiliary expansion chamber positioned in said first pneumatic chamber in pneumatically sealed relation to said first pneumatic chamber and in fluid communication with said second pneumatic chamber.

2. A pneumatic trampoline comprising an inflatable tubular member extending around the periphery of said trampoline to define a first pneumatic chamber adapted to be filled with pneumatic fluid, said trampoline including a hollow region lying laterally inwardly of and bounded by said tubular member, an upper closure member formed of flexible material connected to said tubular member and covering the upper end of said hollow region to form a jumping platform for said trampoline, a lower closure member joined to said tubular member adjacent the lower peripheral surface of said tubular member to form a lower closure for said hollow region, said hollow region when closed by said upper and lower closure members defining a second pneumatic chamber adapted to be filled with pneumatic fluid, and an inflatable auxiliary expansion chamber positioned in said first pneumatic chamber in pneumatically sealed relation to said first pneumatic chamber and in fluid communication with said second pneumatic chamber.

3. A pneumatic trampoline comprising an inflatable tubular member extending around the periphery of said trampoline to define a first pneumatic chamber adapted to be filled with pneumatic fluid, said trampoline including a hollow region lying laterally inwardly of and bounded by said tubular member, an upper closure member formed of flexible material connected to said tubular member and covering the upper end of said hollow region to form a jumping platform for said trampoline, a lower closure member joined to said tubular member adjacent the lower peripheral surface of said tubular member to form a lower closure for said hollow region, said hollow region when

closed by said upper and lower closure members defining a second pneumatic chamber adapted to be filled with pneumatic fluid, said first and second pneumatic chambers being sealed from each other to prevent fluid passage therebetween, separate pneumatic fluid inlet valve means for each of said chambers, and an inflatable auxiliary expansion chamber positioned in said first pneumatic chamber in pneumatically sealed relation to said first pneumatic chamber and in fluid communication with said second pneumatic chamber.

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