May 21, 1968 R. M. FENNER ET AL 3,384,368

GYMNASTIC HORIZONTAL BARS

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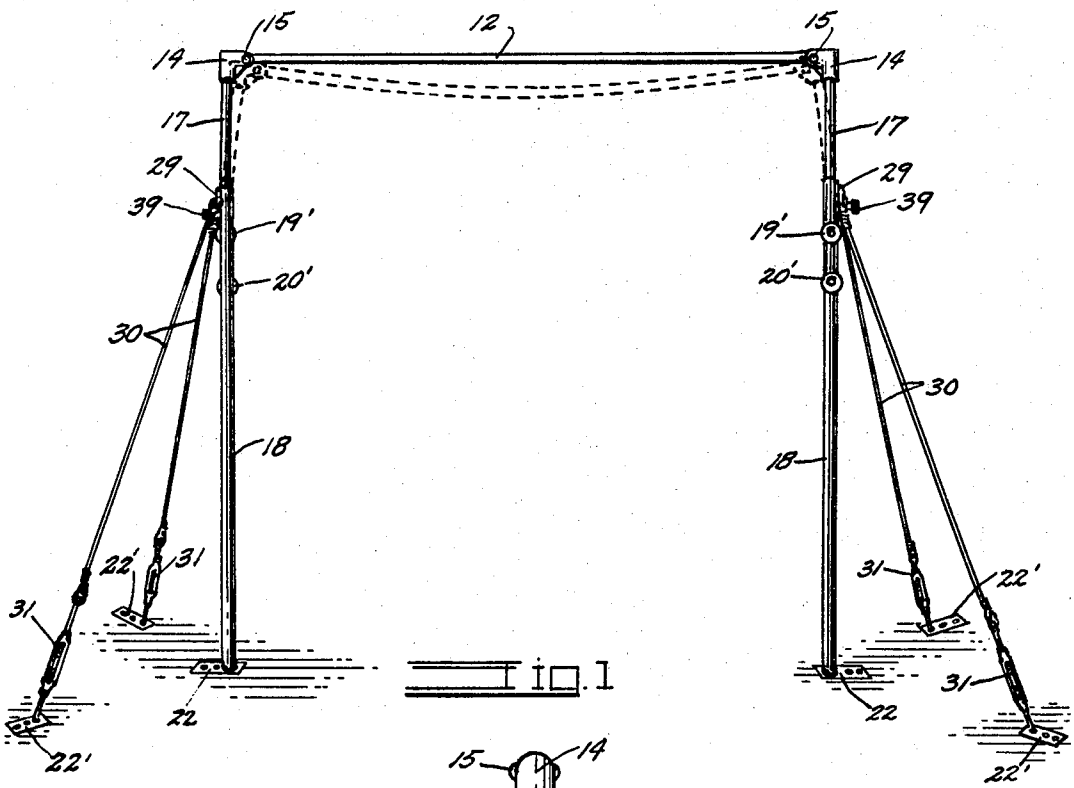


Fig. 1

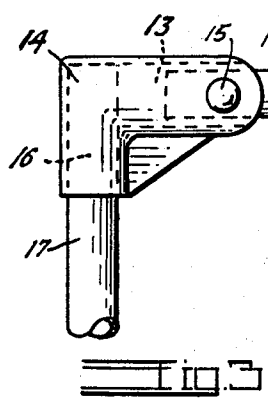


Fig. 3

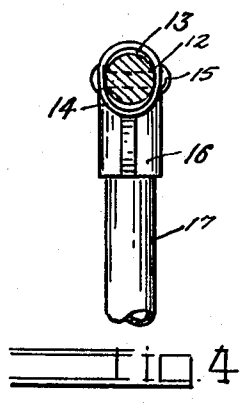


Fig. 4

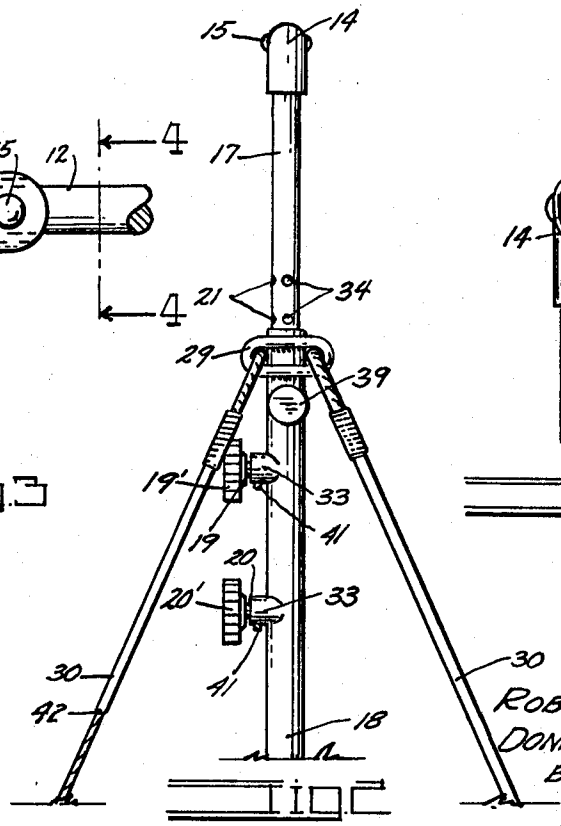


Fig. 2

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GYMNASTIC HORIZONTAL BARS

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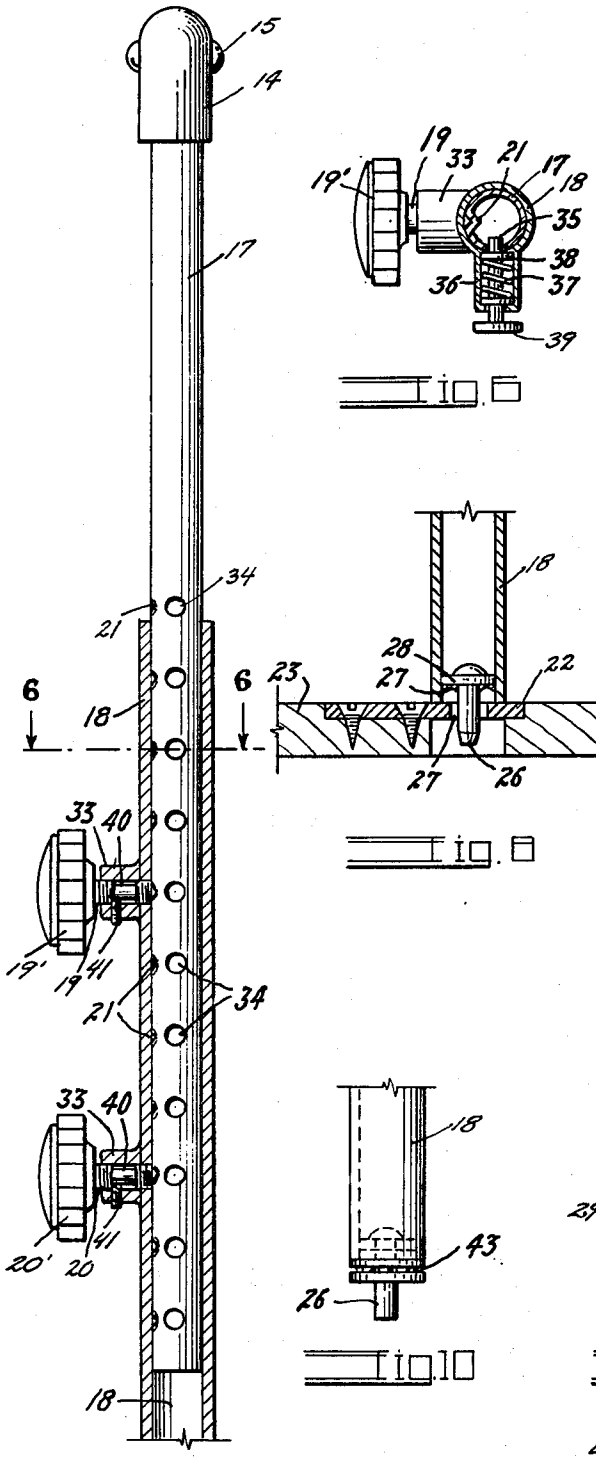


Fig. 5

Fig. 6

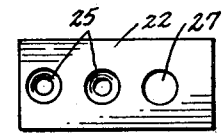


Fig. 7

Fig. 8

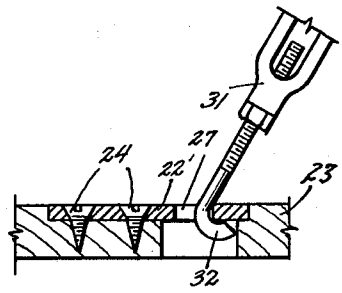


Fig. 9

Fig. 10

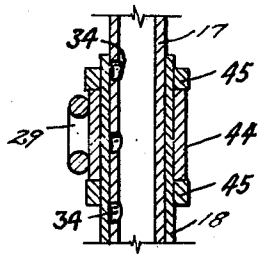


Fig. 11

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GYMNASTIC HORIZONTAL BARS

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Filed May 13, 1966, Ser. No. 549,932
10 Claims. (Cl. 272—62)

This invention relates to a gymnastic horizontal bar structure more particularly for use in gymnasiums and upon theatrical stages. The usual horizontal bar of this type employs two uprights with the bar fixedly secured at its extremities to the upper extremities of the uprights. The upper extremities of the uprights are rigidly braced from the floor by means of taut cables so that they resist being drawn toward each other under the flexure of the performing bar. This results in a sluggish, stiff bar action which is very objectionable to accomplished gymnasts.

The principal object of this invention is to provide resilient supporting elements, to support the extremities of the performing bar above the fixedly-braced upper extremities of the uprights, which will resiliently flex toward each other in consequence of bending moments applied to the performing bar by an active gymnast to provide a "snappy" return action and an improved performance regardless of the rigidity of the uprights.

Another object is to still further increase the responsive action of the performing bar by eliminating the usual fixed mounting between the bar and the uprights and to substitute a free pivotal action therebetween so that, when the bar bends and shortens under flexure, the resilient supporting elements will be freely and flexibly drawn toward each other without interference from the rigid mast mounting.

A further object is to provide a horizontal gymnastic bar which can be quickly and easily adjusted for height without it being necessary to dismantel or adjust the cable bracings of the uprights and without protrusion of any supporting means above the performing bar.

A still further object is to so construct the height-adjusting means that the possibility of accidental collapse will be eliminated.

Other objects and advantages reside in the detail construction of the invention, which is designed for simplicity, economy, and efficiency. These will become more apparent from the following description.

In the following detailed description of the invention, reference is made to the accompanying drawing which forms a part hereof. Like numerals refer to like parts in all views of the drawing and throughout the description.

In the drawing:

FIG. 1 is a perspective view of the improved gymnastic horizontal bar structure ready for use;

FIG. 2 is an enlarged, fragmentary, side, elevational view of the upper portion of the structure of FIG. 1;

FIG. 3 is a similarly enlarged, fragmentary front elevational view of a portion of FIG. 1;

FIG. 4 is a fragmentary cross section taken on the line 4—4, FIG. 3;

FIG. 5 is a still further enlarged fragmentary side elevational view, similar to FIG. 2, with the lower portion thereof shown in vertical, axial cross section;

FIG. 6 is a slightly enlarged, cross section, looking downwardly on the line 6—6, FIG. 5;

FIG. 7 is a detail top view of a floor plate as used herein;

FIG. 8 is a longitudinal section of an installed floor plate, showing a tubular supporting mast element in place thereon;

FIG. 9 is a view similar to FIG. 8 showing a turnbuckle hook applied to the floor plate;

FIG. 10 is a fragmentary side view of the lower extremity of the supporting mast illustrating how a thrust bearing may be applied thereto; and

FIG. 11 is a fragmentary, vertical section of a portion of the supporting mast showing an alternate brace cable attachment.

The performing bar of this horizontal bar structure comprises a solid resilient, metallic, tubular bar **12**, each extremity of which is tiltably mounted, in a horizontal socket **13** in an elbow fitting **14**, upon a pivot element, such as a laterally extending pivot rivet **15**. The horizontal sockets **13** are oval in cross section with their long axes vertical, as shown in FIG. 4, to provide clearance for limited vertical pivotal movement of the bar **12** about the axes of the pivot rivets **15**.

Each elbow fitting **14** is provided with an integral, downwardly-directed, socket **16** which is permanently mounted, such as by welding, over the upper extremity of a flexible extension tube **17**. Each extension tube **17** extends downwardly into telescopic engagement with a tubular supporting mast **18** and each extension tube can be locked at any desired degree of extension from its respective mast by means of two vertically-spaced locking screws **19** and **20** provided with suitable hand-grip heads **19'** and **20'**, respectively. The screws **19** and **20** are threaded through fixed screw collars **33** on the wall of the mast and are provided with conventional cupped points which extend through the wall of the mast into wedging engagement with suitably spaced key depressions **21** in the outer sides of the extension tubes **17**.

Each mast rests upon a floor plate **22** which is preferably imbedded in the floor, indicated at **23**, and secured in place by means of suitable screws **24** extending downwardly through countersunk screw holes **25** in the plates. The masts are properly positioned on, and are retained in position on, their respective floor plates by means of retaining pins **26** which extend concentrically downward from the masts into pin-receiving openings **27** in the floor plates **22**. The retaining pins are welded to, and extend downwardly from circular washers **28** which are in turn welded in the lower extremities of the masts, as shown in FIG. 8.

An elongated chain link **29** is welded horizontally across the outside face of each mast adjacent the upper extremity thereof to form two cable loops from each of which a mast brace cable **30** extends downwardly to the upper threaded element of a conventional turnbuckle **31**. The lower threaded element of each turnbuckle **31** is formed with a hooked extremity **32**.

Two additional floor plates **22'**, similar to the floor plate **22**, are mounted in the floor adjacent each mast. The hooked extremities **32** of the turnbuckles **31** are extended through the receiving openings **27** of the additional floor plates **22'** and are hooked beneath the plates, as shown in FIG. 9. The additional floor plates **22'** are so positioned relative to their respective masts that when the brace cables **30** are stressed by the turnbuckles, they will prevent the upper extremities of the two masts from moving laterally or toward each other and will also tensionally and longitudinally stress the performing bar **12**.

The flexible extension tubes **17** and the performing bar **12** are formed from relatively heavy resilient tempered steel so that they may be subjected to bending without deformation. When a performer swings downwardly on the bar, the latter will resiliently flex downwardly and shorten the normal distance between the pivot rivets **15** so as to freely and resiliently pull the upper extremities of the extension tubes **17** through each other, as shown in broken line in FIG. 1. When the performer swings upwardly, the bar will forceably and resiliently move upwardly due to the inherent resiliency of both the bar

12 and the tubes 17, to assist the upward swing and add life and zest to the performance.

When a gymnast swings rapidly in a complete circle about the performing bar, the medial portion of the bar follows a circular path about the normal axis of the bar. This causes the extremities of the bar to slightly rotate the masts back and forth about their vertical axis with the pins 26 rotating in the openings 27 of the floor plates and with the cables 30 moving alternately inward and outward at the link 29.

If it is desired to reduce frictional resistance to the rotative mast movement, an antifriction thrust bearing 43 may be positioned on the lower extremity of each mast, as shown in FIG. 10, to support the load from the floor plate and the cable link 29 may be mounted on a mast sleeve 44 rotatably surrounding the mast between retaining rings 45, as shown in FIG. 11, so that the masts may freely rotate to increase the rebound action of the performing bar.

Since horizontal bars are subjected to relatively heavy vibrating shocks, two of the knobbed locking screws are employed on each mast for engaging the depressions 21 to provide a safety feature. Thus, should one of the screws become loosened, the other screw of the pair will retain the extension tube in place until the loose screw can be retightened.

As an additional safety feature, each extension tube 17 is provided with a longitudinal series of spaced-apart latch holes 34 which horizontally align with, and which are positioned at 90° from, the key depressions 21. A latch plunger 35 is mounted in a latch spring cylinder 36 which is fixedly mounted on the outside and adjacent the top of each mast. A compression spring 37 in the cylinder acts against a piston 38 on the latch plunger to urge the extremity of the latter through the wall of the mast 18 and against the extension tube 17 so that it will enter one of the latch holes 34 to prevent the extension tube from dropping should both screws 19 and 20 become loosened. The latch plunger 35 is provided with a finger-grip head 39 which enables it to be withdrawn so that the extension tubes 17 may be vertically adjusted to the desired height. When the desired height is reached, the plungers are released into their aligned latch holes 34 to maintain the key depressions 21 in exact alignment with the locking screws 19 and 20 enabling the latter to be accurately tightened into their respective depressions 21.

To prevent the screws 19 and 20 from becoming completely unscrewed and lost, limiting set screws 41 are threaded into the screw collars 33 and the midportions of the screws are preferably medially reduced in diameter, as shown at 40, to receive the points of the limiting set screws 41 so as to limit the inward and outward travel of the locking screws.

As an additional safety feature, it is preferred to cover the brace cables 30 with flexible plastic tubing as indicated at 42 in FIG. 2. This not only prevents accidental injury to the gymnast but enhances the appearance of the entire assembly.

While a specific form of the invention has been described and illustrated herein, it is to be understood that the same may be varied within the scope of the appended claims, without departing from the spirit of the invention.

Having thus described the invention what is claimed and desired to be secured by Letters Patent is:

1. A gymnastic horizontal bar structure comprising:
   (a) two upright tubular masts;
   (b) a flexible extension tube mounted in and projecting upwardly from each of said masts, said tubes being free to flex laterally relative to the axes of said masts;
   (c) an elbow fitting provided with a horizontal bar socket fixedly mounted on the upper extremity of each extension tube;
   (d) a performing bar extending from the bar socket of one elbow fitting into the bar socket of the other elbow fitting;
   (e) means for preventing withdrawal of said performing bar from the bar sockets of said elbow fittings; and
   (f) brace means attached to and extending downwardly and outwardly from adjacent the upper extremities of said fasts and acting to resist lateral movement of the upper extremities of said masts, the upwardly projecting extremities of said extension tubes being free to flex laterally relative to the fixed upper extremities of said masts.

2. A gymnastic horizontal bar structure as described in claim 1 in which the means for preventing withdrawal comprises a pivot element extending horizontally and laterally through the horizontal bar socket of each elbow fitting upon which the extremities of said performing bar are pivotally mounted so that they may rotate in a vertical plane.

3. A gymnastic horizontal bar structure as described in claim 1 in which the extension tubes are vertically slidable in said tubular masts and having means for locking the extension tubes at any desired vertical extension from said masts.

4. A gymnastic horizontal bar structure as described in claim 3 in which the means for locking comprises:
   (a) longitudinally-spaced key depressions formed in said extension tubes;
   (b) diametrically-extending locking screws threaded into said masts and positioned to engage said depressions to resist vertical movement of said extension tubes; and
   (c) a spring loaded latch plunger carried by each mast and positioned to engage latch holes in the adjacent extension tube when said depressions are aligned with said locking screws.

5. A gymnastic horizontal bar structure as described in claim 4 having means for preventing said locking screws from being completely unscrewed from said masts.

6. A gymnastic horizontal bar structure as described in claim 3 having:
   (a) a floor plate positioned below each mast and provided with a pin receiving opening; and
   (b) a pin axially affixed to and extending downwardly from each mast into the pin receiving opening of one of said floor plates to prevent lateral movement of said masts.

7. A gymnastic horizontal bar structure as described in claim 6 in which the brace means comprises:
   (a) flexible cables terminating at their lower extremities in turnbuckles; and
   (b) a hooked element extending downwardly from each turnbuckle into hooked engagement with the pin receiving opening of one of said floor plates.

8. A gymnastic horizontal bar structure as described in claim 7 having a protective flexible tubing surrounding each of said cables between its upper and lower extremities to prevent injurious accidental contact with said cables.

9. A gymnastic horizontal bar structure as described in claim 1 in which the masts are rotatably mounted at their lower extremities so that they may rotate about vertical longitudinaly axes in consequence of flexing of said performing bar.

10. A gymnastic horizontal bar structure comprising:
   (a) two spaced-apart floor plates;
   (b) a mast arising vertically from each of said floor plates;
   (c) a performing bar extending between the upper extremities of said masts; and
   (d) thrust bearing means positioned between each of said masts and its respective floor plate and axially pivoting said masts thereon so that it may rotate

about its vertical axis in consequence of flexure of said performing bar;

(e) a mast sleeve rotatably mounted on each mast adjacent its upper extremity; and

(f) brace cables extending from each mast sleeve to a fixed connection for maintaining said masts in vertical position, said masts being free to rotate in their respective mast sleeves without interference from said cables.

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