United States Patent

[11] **3,614,099**

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[54] **RETRACTABLE OVERHEAD BASKETBALL BACKBOARD SUPPORT STRUCTURE**
4 Claims, 8 Drawing Figs.

[52] **U.S. Cl.** ..... **273/1.5 R,** 248/326
[51] **Int. Cl.** **A63b 63/04**
[50] **Field of Search** 273/1.5; 248/326

[56] **References Cited**

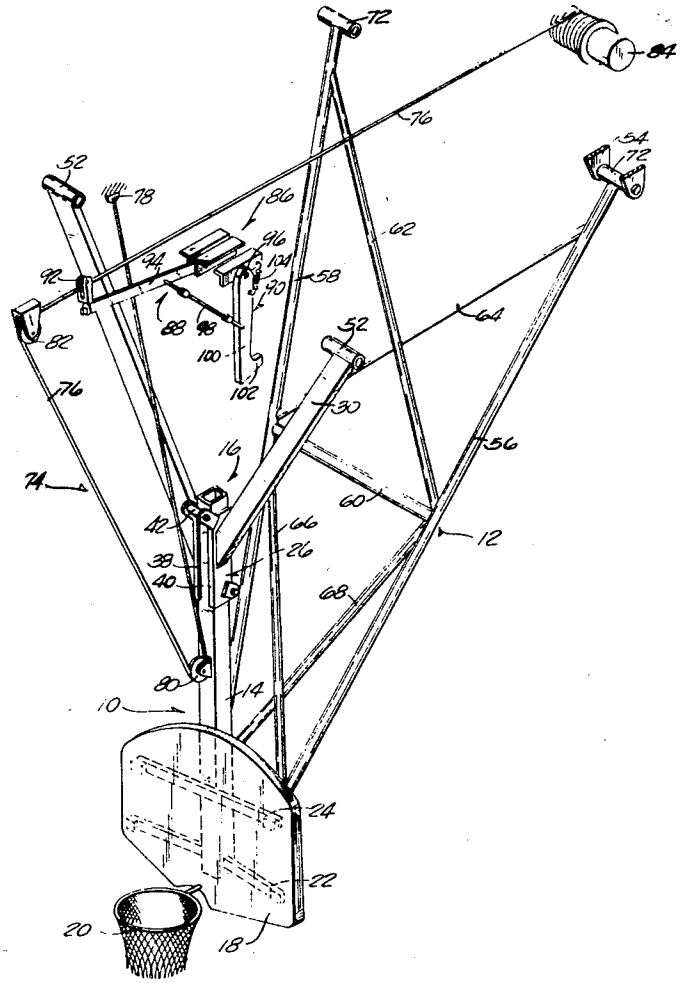
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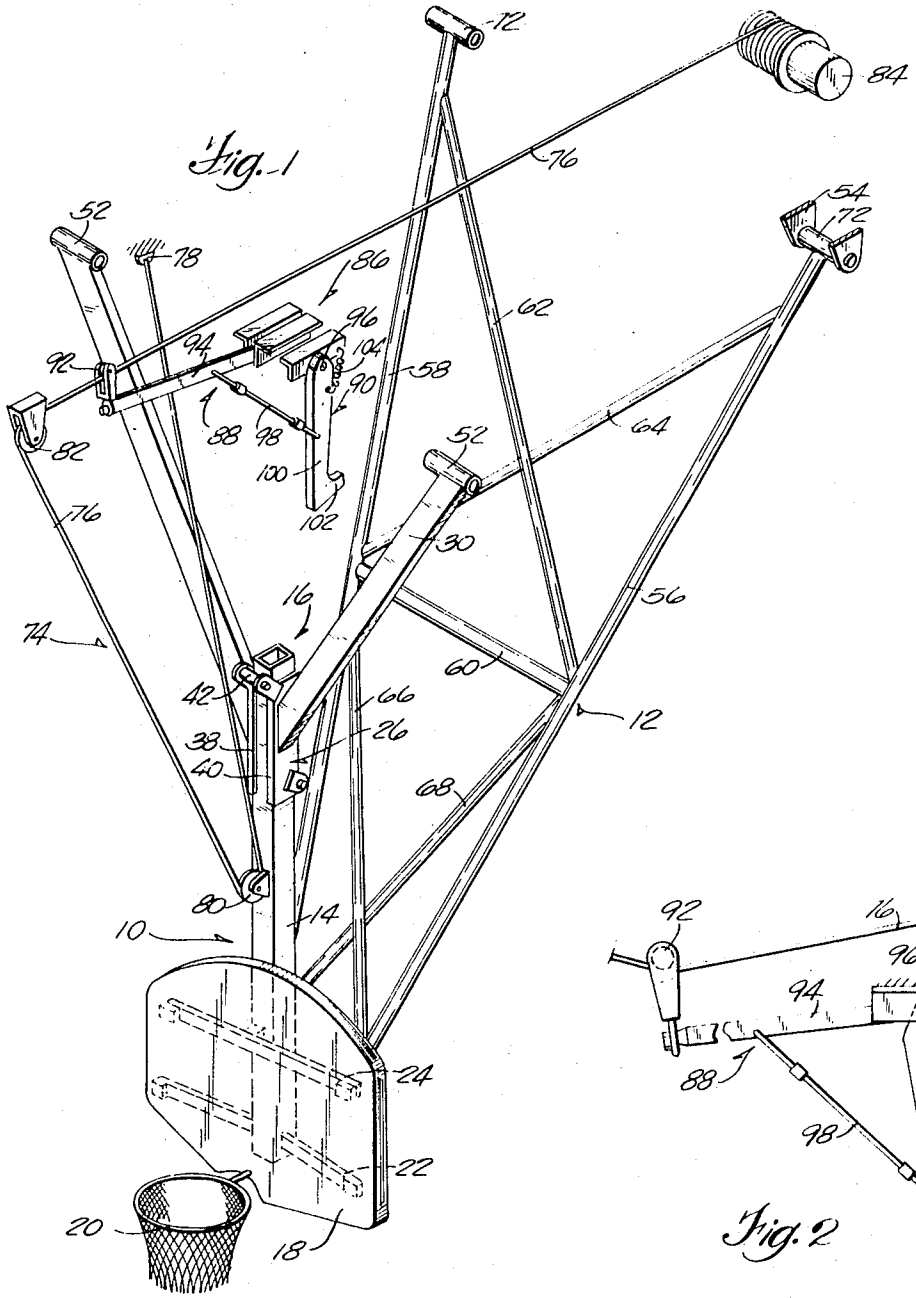
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ABSTRACT: A retractable basketball backboard support structure supported from an overhead ceiling support structure including a front support assembly having a lower unitary post member on which the backboard is mounted. The lower post member is telescopically engaged with the collar of an upper yoke assembly having antifriction rollers which assembly is pivotally connected to the overhead support structure. A rear support assembly is pivotally connected at its upper end to the overhead support structure and pivotally connected at its lower end to the lower portion of the post member on which the backboard is mounted. A hoist means is provided to raise and lower the backboard support structure between playing and storage positions, and the present invention contemplates both a forward fold and a backward fold arrangement. In the forward fold embodiment, the rear support assembly is rigid from end to end and the hoist means is adapted to pivot the front and rear support assemblies forwardly as the backboard support structure is raised from playing to storage position. In the backward fold embodiment, the rear support assembly is comprised of a pair of separate sections pivotally connected together, which sections collapse upwardly during the backward folding operation. A safety latch mechanism is provided to prevent the support structure from swinging downwardly in an unrestrained manner from storage position in the event of a failure in the hoist means.



PATENTED OCT 19 1971 3,614,099

Fig. 1



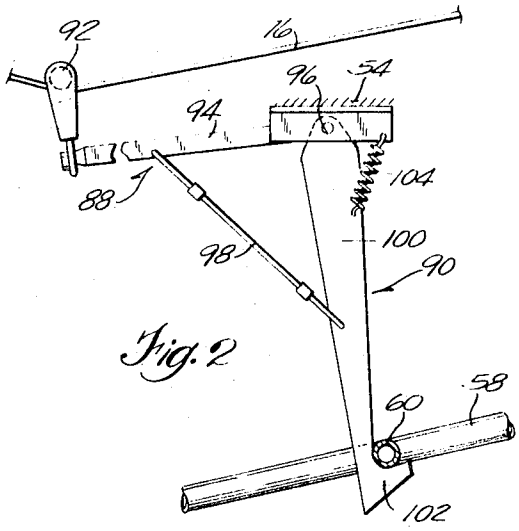


Fig. 2

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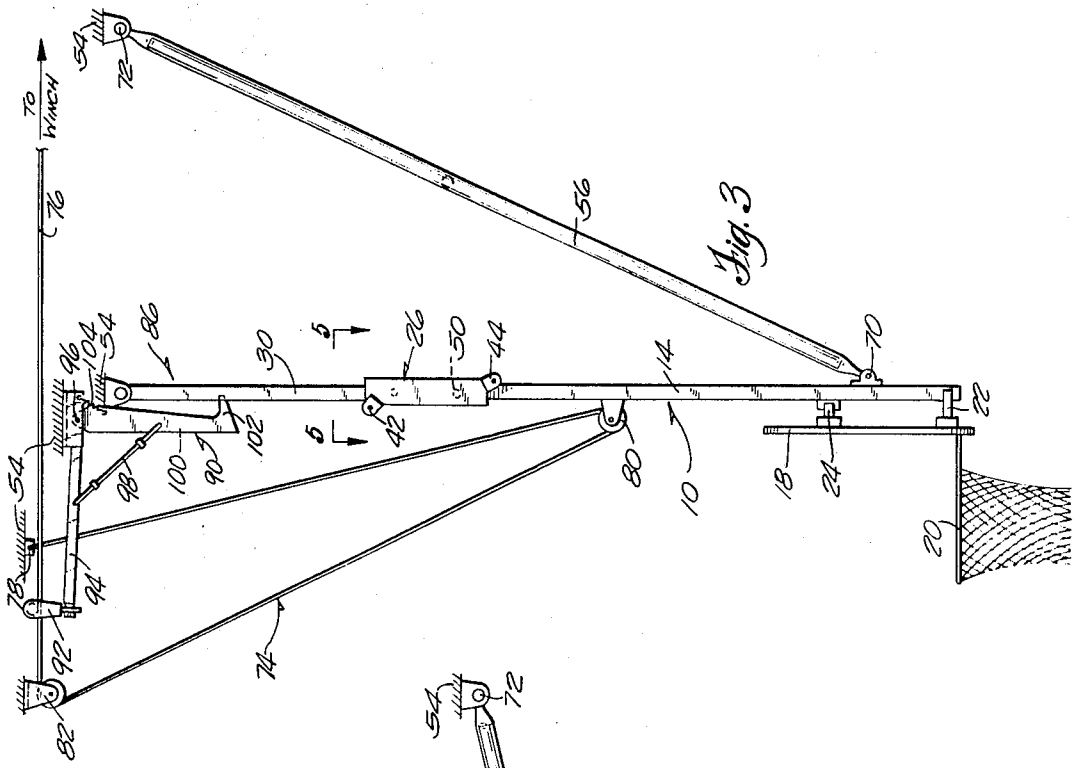


Fig. 3

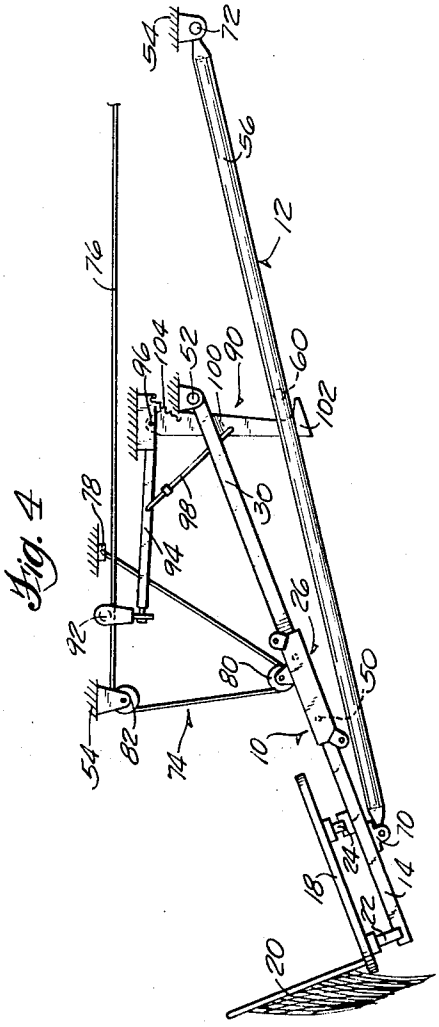


Fig. 4

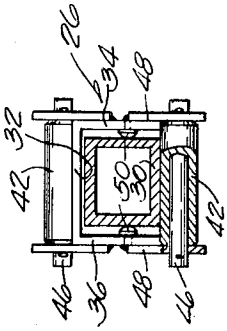


Fig. 5

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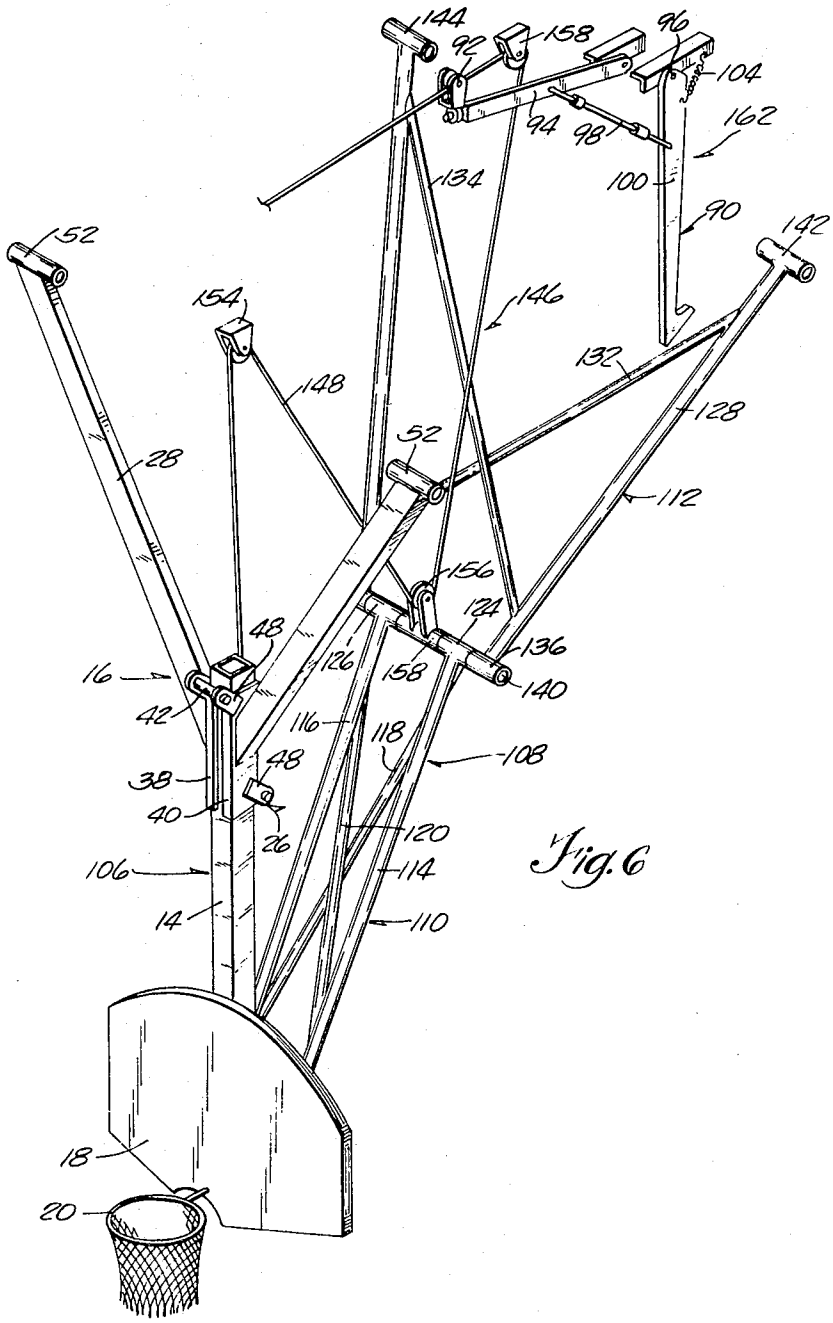


Fig. 6

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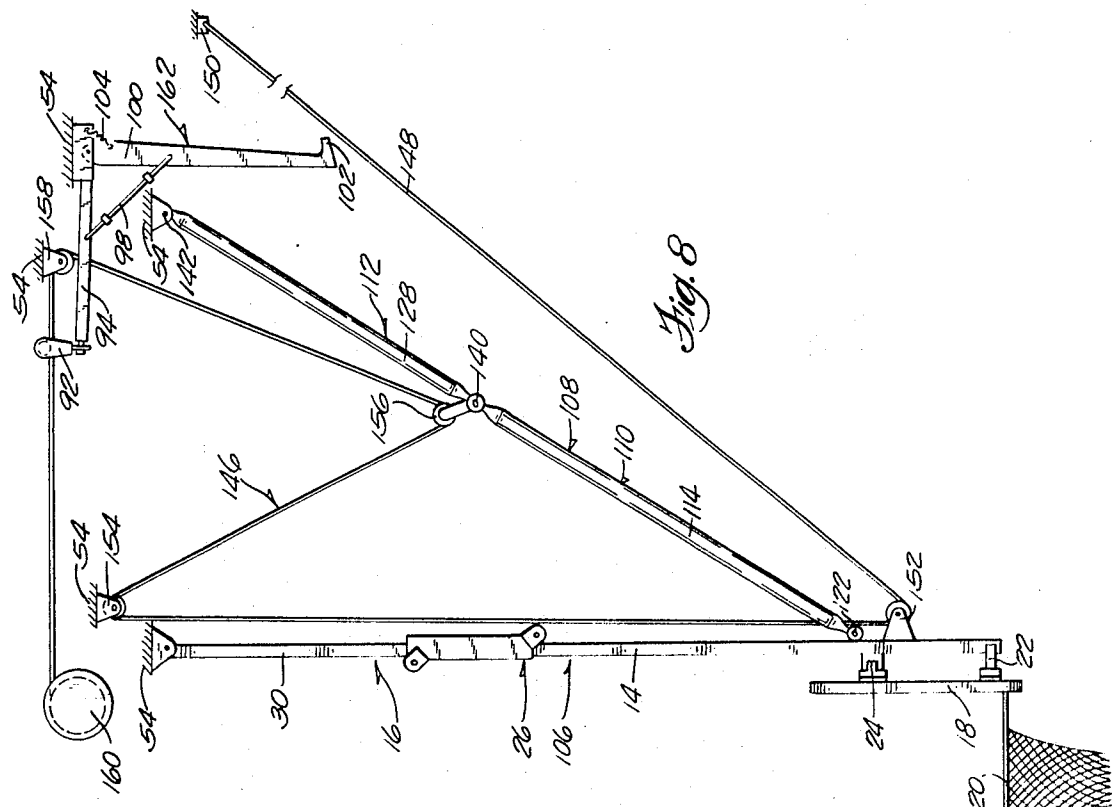


Fig. 8

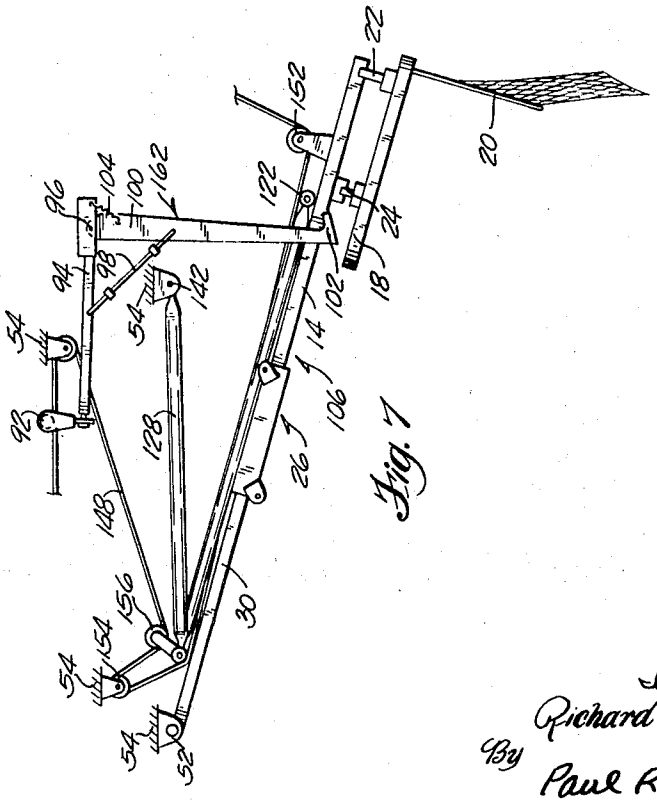


Fig. 7

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RETRACTABLE OVERHEAD BASKETBALL BACKBOARD SUPPORT STRUCTURE

BACKGROUND OF INVENTION

I. Field of Invention

This invention relates to a retractable basketball backboard structure supported from on overhead ceiling support structure and adapted to be folded upwardly from a playing position to a storage position.

II. Description of Prior Art

Prior retractable basketball backboard support structures have generally been of rather complex design, employing a relatively large number of parts to provide both the rigidity required of the support and the capability of retracting the support when desired. Such complex arrangements are not only expensive, but obstruct v visibility and are somewhat unsightly from an appearance standpoint. The principle object of this invention, therefore, is to provide a backboard support structure which employs a relatively small number of simplified components and provides an attractive appearance with a minimum of obstruction to visibility. A further object is to provide the above characteristics with a structure which can be readily retracted in either a forward or backward folding operation, there being a number of identical components employed in both the forward and backward fold embodiments.

SUMMARY OF INVENTION

A retractable overhead basketball backboard support structure supported from an overhead ceiling support comprising a front support assembly on which the backboard is mounted and a rear support assembly pivotally connected at its upper end to the overhead support structure and pivotally connected at its lower end to the front support assembly. The front support assembly is comprised of an upper yoke member and a lower post member with the two members telescopically engaged with each other so that the effective overall length of the front support assembly can progressively change as the assembly is rotated about its pivotal connection to the overhead support. A hoist means is provided for pivoting the support structure either forwardly or backwardly from a playing position to a storage position. In the forward fold embodiment, the rear support assembly is rigid from end to end and in the backward fold embodiment the rear support structure is comprised of two separate sections pivotally connected together which when retracted will collapse upwardly.

The invention also includes a safety latch mechanism adapted to engage and retain the support structure in its storage position should for any reason there be a failure in the hoist means. The safety latch mechanism is comprised of a sensing means for sensing the tautness of the support cable and a latch means operatively connected to the sensing means and adapted to snap into supporting engagement with the support structure when there is a into of tautness in the support cable.

DESCRIPTION OF DRAWINGS

FIG. 1 is a perspective view of the forward fold embodiment of the present invention;

FIG. 2 is an enlarged fragmentary side view of the safety latch mechanism of the invention;

FIG. 3 is a side elevation view of the forward fold embodiment with the structure in the playing position;

FIG. 4 is a side elevation view of the forward fold embodiment in the storage position;

FIG. 5 is a fragmentary sectional view taken along line 5—5 of FIG. 3;

FIG. 6 is a perspective view of the backward fold embodiment of the invention;

FIG. 7 is a side elevation view of the backward fold embodiment with the structure in the storage position; and

FIG. 8 is a side elevation view of the backward fold embodiment in the playing position.

DESCRIPTION OF PREFERRED EMBODIMENTS

Referring now to the drawings in detail, FIGS. 1, 2, 3, 4 and 5 show the forward fold embodiment of the invention and FIGS. 6, 7 and 8 show the backward fold embodiment of the invention.

The forward fold support is comprised of a telescoping front support assembly 10 and a rear support assembly 12. Front support assembly 10 is comprised of post member 14 telescopically engaged with a yoke assembly 16. A basketball backboard 18 with basket 20 is mounted on the bottom portion of post member 14 by any suitable means such as brackets 22 and 24 shown in schematic form in the drawings.

Post 14 is preferably made from a length of 2-½ ×4 inches rectangular steel tubing. Yoke assembly is of welded steel fabrication and is comprised of an elongated collar member 26 having a pair of support arms 28, 30 welded to the sides thereof. Collar member 26 (FIG. 5) is of substantially C-shaped cross section having a rear wall 32, sidewalls 34, 36 and front retaining flanges 38, 40 which together form a substantially rectangular enclosure in which post 14 is slidably mounted and retained. AS will be explained hereinafter, it is important that collar 25 be formed to provide a slot or opening in the front face thereof between flanges 38 and 40.

It is important that post 14 be mounted in collar 25 so it will slide therethrough with a minimum of friction and without any binding. To this end, a pair of nylon rollers 42, 44 are mounted at opposite ends of collar 26 and positioned for rolling engagement with the front and rear face of post 14. As most clearly shown FIG. 5 rollers 42, 44 are mounted on the collar by means of roller pins 46 supported between ears 48 welded to walls 34, 36 of collar 26.

To further reduce friction between the parts, a pair of nylon glide members 50 are mounted in each of walls 34, 36 of collar 26. Glide members 50 are preferably in the form of plugs which are frictionally mounted in openings in walls 34, 36.

The upper ends of support arms 28, 30 are provided with bushings 52 for pivotal connection to the ceiling structure of the gymnasium in which the backstop structure is installed. Since such ceiling structure (indicated schematically in the drawings by reference numeral 54) is not a part of the present invention, it is not disclosed in detail herein.

Rear support assembly 12 is of welded tubular construction comprising a pair of longitudinal side members 56, 58, a cross support member 60 and X-type bracing member 62, 64, 66 and 68 as shown in FIG. 1. Rear support assembly 12 is provided with pairs of bushings 70 and 72 welded to opposite ends of side members 56, 58 for pivotal connection of assembly 12 to the lower portion of post 14 at one end thereof and to the ceiling structure 54 at the other end thereof. Side members angle outwardly from bottom to top to provide additional rigidity to assembly 12.

The basketball backstop structure described above it raised and lowered between its playing position (FIGS. 1 and 3) and its storage position (FIG. 4) by a cable arrangement 74. In the preferred embodiment cable arrangement 74 is comprised of a support cable 76 anchored to the ceiling structure at point 78 from which point it extends substantially vertically to a pulley 80 mounted on the front face of post 14 and then back up to a second pulley 82 mounted on the ceiling structure. From pulley 82 cable 76 extends substantially horizontally at about ceiling level to a winch 84 which as shown in FIG. 1 may be located at ceiling level to the rear of the backstop structure. Winch 84 could of course be located at ground level by the use of additional pulleys and can be either manually or power operated.

When winch 84 is operated to raise the backstop from its FIG. 3 to its FIG. 4 position, the force exerted on the structure through pulley 80 on post 44 will tend to cause front and rear support assemblies 10 and 12 to be pivoted forwardly about their respective pivotal connections to the ceiling structure 54. It will be appreciated that to accommodate such forward swinging action of the structure, the "effective length" of front support assembly 10 must be progressively shortened.

This is accomplished by the telescopic relationship between post 14 and yoke assembly 16 wherein the post is slidably retained in collar 26. Thus as the structure is caused to swing forwardly, post 14 will slide upwardly through collar 26 to thus provide the progressiing shortening of the "effective length" of the front support assembly required to sustain the forward swinging movement from playing to storage position. It is important to note at this point that even though the effective length of front support assembly 10 will vary through the raising and lowering operations such support 10 retains its structural rigidity on all positions. Such structural rigidity is insured by the use of elongated collar member 26 which in the preferred embodiment is approximately 18 inches long. In this regard, it should be appreciated that when the structure is in the playing position the backboard 18 is sufficiently rigid for basketball playing purposes, without the need for additional mechanism for locking the structure in such position. The weight of the backstop members together with the with the particular design characteristics of such members combines to provide a very stable and rigid support for the backboard. I should be noted that as the structure is raised from the FIG. 3 to the FIG. 4 position, pulley 80 on post 14 will slide upwardly into the slot in collar 26 formed by spaced flanges 38 and 40. In certain installations where post 14 is of shorter length pulley 80 will slide past the collar and bracket connection 24 will slide into the slot in the collar.

It will also be appreciated that the streamlined single post design of front support assembly 10 provides an attractive appearance with minimum obstruction to visibility. The backstop structure requires relatively view parts of uncomplicated design and provides excellent rigidity characteristics without the need for complex locking mechanisms, and, this, provides cost advantages over many prior designs.

Another feature of this invention is a safety latch mechanism 86 the construction and operation of which is best illustrated by reference to FIGS. 2 and 4 of the drawings. With the backstop structure in the storage position (FIG. 4) the unit is held against the force of gravity by means of cable arrangement 74. Thus, if any component of cable arrangement 74 should fail (such as cable 76, one of the pulleys etc.) the entire unit will be free to swing downwardly to playing position (FIG. 3) in an unrestrained manner. Such an occurrence is quite obviously very undesirably from the standpoint of both safety to spectators and damage to the equipment. As will now be explained, safety latch mechanism 86 provides a very effective solution to this problem.

Safety latch mechanism 86 is comprised of two basic components, namely, a sensing means 88 for sensing the tautness of support cable 76 and a latch means 90 operatively connected to the sensing means and adapted to snap into supporting engagement with the backstop structure when there is a loss of tautness in the support cable to thereby restrain and support the backstop structure in storage position should there be a failure in cable arrangement 74.

Sensing means 88 is comprised of a pulley 92 positioned for engagement with the horizontal portion of cable 76. Pulley 92 is mounted on one end of a rod member 94 which is pivotally connected at its other end to ceiling structure 54 by pin 96. The movement of pulley 92 is transmitted to latch means 90 by a tie rod member 98 which in the preferred embodiment is in the form of a short length of cable.

Latch means 90 is comprised of a latch member 100 pivotally connected at its upper end to the ceiling structure by pin 96. A hook portion 102 is provided at the other end of latch member for movement into supporting engagement with cross support 60 of rear support assembly 12 as will be explained hereinafter. Cable member 98 is connected between the approximate midpoints of rod 94 and latch 100 and latch 100 is biased for rotation into supporting engagement with cross support 60 by a spring 104.

As shown in FIG. 4, the pairs of safety latch mechanism 86 are normally positioned with hook 102 of latch arm spaced from cross support 60 so that as the backstop structure is raised and lowered between playing and storage positions there will be no interference with the movement of such structure by the safety mechanism. Since cable 76 will be in a taut condition during all normal operation of the backstop there will be little or no movement of latch arm 100 during such operation.

Referring now to FIG. 2, if for any reason a component of the cable arrangement such as cable 76, pulley 82, etc., should fail when the backstop is in storage position, safety latch mechanism 86 will operate as follows. Such a failure will immediately result in a loss of tautness in cable 76 which in turn will result in a downward movement of pulley 92 and rod 94 of sensing means 88. Such downward movement of rod 94 about it pivot point 96 will allow latch arm 100 to be pivoted to the right by spring 104 which in turn will cause hook portion 102 at the end of the latch arm to snap into supporting engagement with cross support 60 of rear assembly 12 as shown in FIG. 2. Latch are 100 will thereafter serve to support the backstop structure in its storage position until the necessary repairs are made to the cable assembly 74. Once the cable assembly is repaired and the cable 76 is again tightened by winch 84, the parts of safety latch assembly will be returned to the position shown in FIG. 4.

Referring now to the backward fold embodiment of the invention as shown in FIGS. 6, 7 and 8, such embodiment is comprised of a telescoping front support assembly 106 and a rear support assembly 108. The front support assembly 106 is of substantially identical construction to the front support assembly 10 of the forward fold embodiment shown in FIGS. 1–5. Since assemblies 10 and 106 are the same, identical reference numerals have been used to designate the various parts thereof, and no detailed description of such front support assembly 106 of the backward fold embodiment will be repeated herein.

The principle difference between the forward and backward fold embodiments is the construction of the rear support assembly. As previously described, rear support assembly 12 of the forward fold embodiment is in the form of a single rigid support structure whereas in the backward fold embodiment the rear support assembly 108 is comprised of two separate sections 110 and 112 pivotally connected to each other. Sections 110 and 112 are of welded tubular construction with section 110 being comprised of a pair of longitudinal side members 114, 116 having X-type bracing members 118 and 120. A single elongated bushing 122 is welded to the lower end of the section and a pair of bushing members 124 and 126 are welded to the upper ends of the section.

The upper section 112 is comprised of a pair of longitudinal side members 128 and 130 which angle outwardly and upwardly in a manner similar to side members 56, 58 of rear support assembly 12. Section 112 also includes a pair of X-type bracing members 132 and 134. A pair of bushing members 136 and 138 are welded to the lower end of the section for pivotal connection to section 110 by means of a pin 140. A pair of bushings 142 and 144 are welded to the upper end of section 112 for pivotal connection to the ceiling support structure 54.

The backward fold backstop structure is raised and lowered between its playing position (FIGS. 6 and 8) and its storage position (FIG. 7) by a cable arrangement 146. As best shown in FIG. 7, cable arrangement 146 is comprised of a support cable 148 anchored to the ceiling structure at a point 150 from which point it angles downwardly to a pulley 152 mounted on the rear face of post 14 and then extends vertically back up to a second pulley 154 mounted on the ceiling structure. From second pulley 154 the cable extends downwardly to third pulley 156 mounted on a bushing 158 positioned between bushings 124, 126 and supported therebetween by pivot pin 140. From third pulley 156 the cable extends upwardly to a fourth pulley 158 mounted on the ceiling structure. From fourth pulley 158 the cable then extends substantially horizontally at about ceiling levels to a winch 160 which as shown in FIG. 8 may be located at ceiling

level. Just as in the case of the forward fold embodiment, winch **160** can be located at ground level by the use of additional pulleys.

When winch **160** is operated to raise the backstop from its FIG. **8** to its FIG. **7** position, as upward force will be applied to the pivotal connection between sections **110** and **112** of the rear support assembly **108**. Such action will cause assembly **108** to collapse upwardly and, at the same time, will cause the front support assembly **106** to be pivoted toward the rear about its pivotal connection to the ceiling structure. Such backward swinging motion of the front support assembly **106** will be accommodated by the progressive shortening of the effective length of the front support assembly produced by the telescopic connection between post **14** and yoke **16** in the manner previously described with respect to the forward fold embodiment. The folding action thus described will continue until the backstop structure reaches the position shown in FIG. **7**. It will be noted that just as in the case of the forward fold embodiment, the slot in collar **26** formed by spaced flanges **38** and **40** will permit the passage of bracket connection **24** should this be necessary in the particular installation involved.

With the backstop structure in its FIG. **7** position, it will be compactly arranged for storage out of the way of any activity going on in the gymnasium.

Another important feature of the forward and backward fold embodiments is the fact that the respective structures employ a considerable number of identical parts to thus reduce manufacturing cost.

As shown on FIGs. **6**, **7** and **8**, the backward fold embodiment is also provided with a safety latch mechanism **162**. The construction and operation of safety latch mechanism **162** for the backward fold embodiment is essentially identical to that of the foreward fold embodiment, and, thus, no detailed description of safety latch mechanism **162** will be repeated here. Since the component parts of the respective safety mechanisms **86** and **162** are of substantially identical construction, the same reference numerals have been used to designate the various component parts in the drawings.

The major difference between safety latch arrangement for the forward and backward fold arrangements is that in the backward fold mechanism the latch arm **100** is positioned for supporting engagement with elongated bushing member **122** located at the pivotal connection between rear support assembly **108** and the rear face of post member **14**. This can be compared to the foreward fold embodiment wherein latch arm **100** is adapted for engagement with cross support **60** located approximately midway between the ends of rear support assembly **12**. There may be some slight variations between the corresponding parts of the two latch mechanisms. For example, the length of the latch arm **100** may be slightly different in the two embodiments. As indicated, however, the basic construction and operation of the two mechanisms **86** and **162** are the same.

Although this invention has been illustrated and described in connection with particular embodiments thereof, it will be apparent to those skilled in the art that various changes and modifications may be made therein without departing from the spirit of the invention or from the scope of the appended claims.

I claim:

1. A retractable basketball support structure supported from an overhead ceiling support structure having in combination:

a front support assembly including a unitary postlike member including an elongated collar within which said postlike member is telescopically retained, said post and yoke members together forming a rigid support assembly;

a rear support assembly pivotally connected at its upper end to the overhead support structure and pivotally connected at its lower end to the lower portion of said unitary postlike member of said front support assembly; and

a hoist means for pivoting said front and rear support assemblies about their pivotal connections to the overhead support structure to thereby raise and lower the backboard support structure between playing ans storage positions, the effective length of said front support assembly being progressively reduced and increased by virtue of the telescopic engagement of the post and yoke as said front support assembly is pivoted between playing and storage positions.

2. A retractable basketball support structure according to claim **1** in which the front face of said elongated collar is slotted from end-to-end.

3. A retractable basketball backboard support structure supported from an overhead ceiling support structure having in combination:

A front support assembly including a lower unitary postlike member on which the backboard is mounted and an upper member pivotally connected at its upper end to the overhead support structure, said upper member including an elongated collar portion within which said lower postlike member is slidably retained, said lower and upper members telescopically engaged with each other so that the effective overall length of said front support assembly can change as said assembly is rotated about its pivotal connection to the overhead support, said elongated collar portion having a pair of antifriction rollers mounted on opposite ends thereof for engagement with said post to thereby reduce friction between said post and said collar;

a rear support assembly pivotally connected at its upper end to the overhead support structure and pivotally connected at its lower end to said lower member of said front support assembly; and

a hoist means for pivoting said front and rear support assemblies about their pivotal connections to the overhead support structure to thereby raise and lower the backboard support structure between playing and storage positions.

4. A retractable basketball backboard support structure supported from an overhead ceiling support structure having in combination:

a front support assembly including a lower unitary postlike member on which the backboard is mounted and an upper member pivotally connected at its upper end to the overhead support structure, said upper member including an elongated collar portion within which said lower postlike member is slidably retained, said lower and upper members telescopically engaged with each other so that the effective overall length of said front support assembly can change as said assembly is rotated about its pivotal connection to the overhead support, said upper member of said front support assembly having a pair of support arms fastened to said collar portion which extend upwardly for pivotal connection to the overhead ceiling support;

a rear support assembly pivotally connected at its upper end to the overhead support structure and pivotally connected at its lower end to said lower member of said front support assembly; and

a hoist means for pivoting said front and rear support assemblies about their pivotal connections to the overhead support structure to thereby raise and lower the backboard support structure between playing and storage positions.

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,614,099 Dated October 19, 1971

Inventor(s) Richard L. Sarno

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Column 5, line 66, "member including an elongated collar within which said" should read --member on which the backboard is mounted and a yoke member including an elongated collar within which said--.

Column 6, line 9, the word "ans" is misspelled and should read --and--.

Signed and sealed this 14th day of March 1972.

(SEAL)
Attest:

EDWARD M.FLETCHER,JR.
Attesting Officer

ROBERT GOTTSCHALK
Commissioner of Patents