

**Feb. 3, 1959**

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**2,872,192**

# BASKETBALL FOLDING BACKSTOP

Filed Aug. 30, 1954

2 Sheets-Sheet 1

FIG. 1.

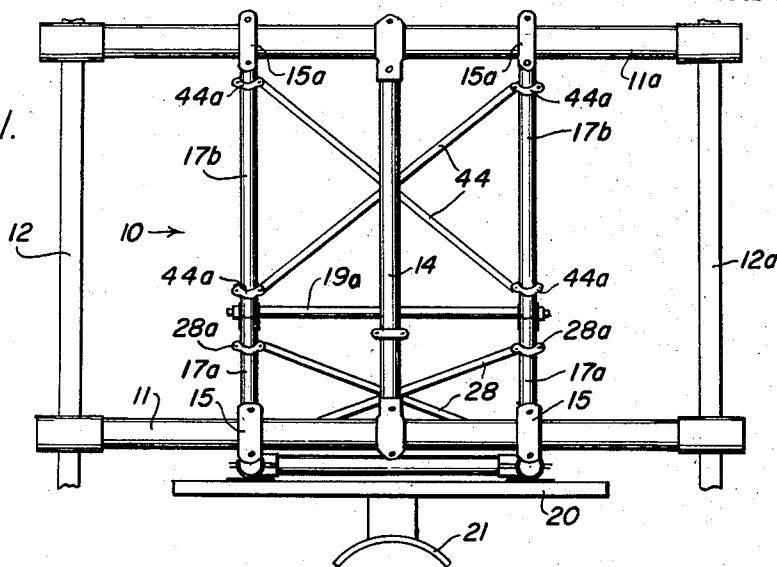
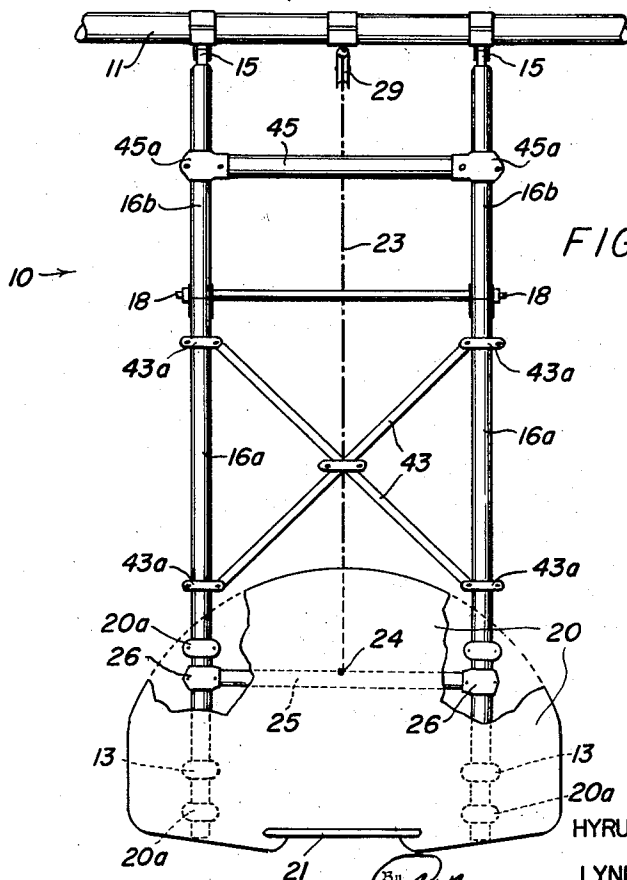


FIG. 2.



20a  
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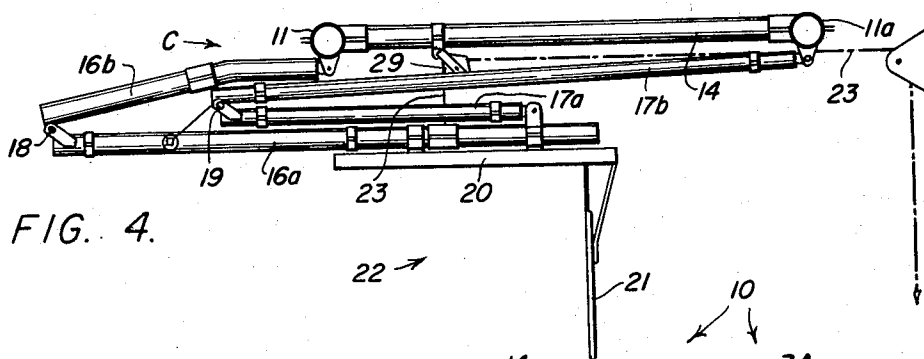


FIG. 4.

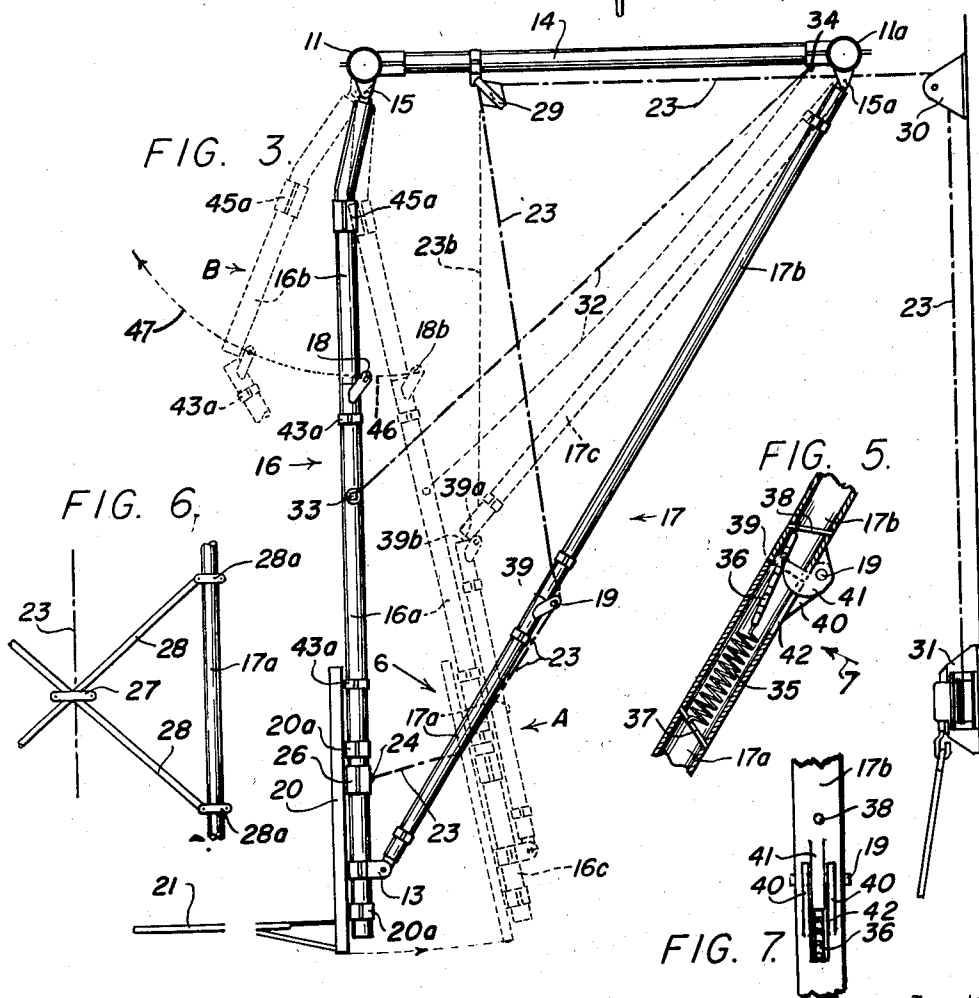


FIG. 3

FIG. 6.

FIG. 5

FIG. 7.

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## BASKETBALL FOLDING BACKSTOP

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Application August 30, 1954, Serial No. 452,958

9 Claims. (Cl. 273—1.5)

This invention relates to a folding basketball backstop in which the apparatus is easily and quickly moved from the erected form into a compact folded form and vice versa.

Folding basketball backstops are well known, but as heretofore constructed are objectionable for several reasons, the principal one being that an unduly large superficial floor area is required to accommodate the folding structure. In the process of erecting as well as in storing the apparatus of the invention, we have found it possible to accomplish the desired results without objectionable interference with the normal use of the playing area.

The principal object of the present invention is to reduce the storage space of the folded structure to such an extent that the horizontal area required to accommodate the folded structure for storage is less than the right projected horizontal area of the normal erected configuration.

Another object is to make it possible to bring the parts of the normal, erected structure into the compact storage position by merely a continuous pull on a flexible cable attached to the structure at a suitable point thereof.

The mechanism is simple in structure, efficient in operation and accomplishes its purposes without the use of spring catches for unlatching pull ropes to clear cables from the playing area, or other necessary manual operations as heretofore used.

In the accompanying drawings, which illustrate an excellent embodiment of the invention,

Fig. 1 represents a top plan in the normal or unfolded position;

Fig. 2, a front elevation corresponding to Fig. 1, back bracing eliminated for clarity;

Fig. 3, a side elevation in the normal or erected position;

Fig. 4, a side elevation of the structure in the folded or retracted position where it is out of the way;

Fig. 5, a structural detail;

Fig. 6, a fragmentary elevation looking in the direction of the arrow 6 in Fig. 3; and

Fig. 7, a fragmentary elevation looking in the direction of the arrow 7 in Fig. 5.

Referring to the drawings, the numeral 10 denotes in full lines the complete structure in the playing position ready for use. This structure may be suspended from two fixed rails 11 and 11a, which rails may advantageously be tubular in cross section. These rails may be supported on fixed portions, such as beams 12 and 12a, of a building in which the backstop is used.

A distance piece 14 extends between, and connects the rails 11 and 11a to each other. Pivotaly suspended at 15 from the rail 11 are two hanger arms 16, each composed of the parts 16a and 16b hinged together at 18. Similarly spaced apart from each other along the rail 11a are two sway braces 17, each composed of the arms 17a and 17b, hinged together at 19. The sway brace portions 17b are pivotaly connected at 15a to the

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rail 11a. The sway brace portions 17a are pivotaly connected at 13 to the respective lower arm portions 16a. A usual backboard 20 is rigidly fastened at 20a to the arm portions 16a. The backboard 20 carries the usual basket ring 21.

If and when it is desired to bring the structure 10 from the erected position in Fig. 3 to the folded position 22 in Fig. 4, the operation is, as follows: a cable 23 which is fastened at 24 to a cross piece 25, extends between and is fastened at 26 to, the respective arm portions 16a. From the point 24 the cable extends under a clamp 27, Fig. 6, disposed at the intersection of cross pieces 28, which latter have their termini connected at 28a to the respective portions 17a. From the point 27, the cable extends backwardly and upwardly under crosspiece 19a to and around guide sheaves 29 and 30, down to the drum of a winch 31. This winch is described in our copending application, Serial No. 452,770, filed August 30, 1954.

If and when motion in the proper direction is imparted to the winch 31, the cable 23, in tightening, initially draws the structure from the full line position in Fig. 3 to the dotted line position A in the same figure. Further tightening of the cable lifts the structure through the dotted line position B, Fig. 3, and into the final folded position C in Fig. 4.

A stabilizer cable 32 extends from a point 33 in the plane of the arm portion 16a to a point such as 34 on the distance piece 14, so that, when tensioned by the extension of the structure into unfolded, playing position, it will hold the knee joints 18 tightly together by means of the inherent weight of the structure. The point 33 is predetermined in such a manner that the cable 32 in slackening during the hoisting operation permits folding of the structure and at the same time keeps the slacking cable sufficiently tight to prevent the cable from catching the parts of the structure during the slacking movement of the cable, to its position in the finally folded position.

In unfolding the structure, it is desirable that the knee joints adjacent pivots 19 of the sway braces 17 be assisted into the straightline position, for example, by means of a spring bias. Such a spring bias is shown in Fig. 5 and comprises a tension spring 35 to one end of which is attached a roller chain 36. The other end of the spring 35 has an eyelet which slides home on a slanting pin 37 while in turn the other end of the chain 36 slides home on an oppositely inclined pin 38. The pin 37 is fast in the brace portion 17a while the pin 38 is fast in the brace portion 17b. As a result the tendency of the spring bias is to exert its pull at the lowest points of the respective pins 37 and 38, thereby drawing the portion 17b against the portion 17a along the faces 39a and 39b of the knee joint 39 adjacent pivot 19, Fig. 5.

After breaking the knee joint at 39 preparatory to folding, the brace portions 17a will be drawn into contact with the (Fig. 3) respective portions 16a. The hinging at 19 is accomplished by means of lugs 40 fast on 17a and an arcuate member 41 fast on 17b. Now, when portion 17b is tilted back, for example, to the position 17c during the folding operation, the joint surfaces 39a and 39b are opened causing the chain 36 to follow the curvature of member 41 until the completely folded position of the parts indicated in Fig. 4, is reached. Energy is stored in the spring 35 for assisting the frame to resume the normal position. A slotted portion 42 of 17a accommodates the member 41 if and when the joint 19 is folded clear back as in Fig. 4. The details of Fig. 5 are also applicable to knee joint 18. The component members of the hanger arm 16 and the component members of the brace 17 are preferably tubular. This permits the spring 35 to be advantageously placed inside the tubular members so as to be entirely out of the way.

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Thus, the spring does not interfere with the smooth operation of the respective knee joints.

Brace 43 in the plane of the arm portion 16a is connected to the respective arm portions at 43a. Similarly the brace 44 lies in the plane of the portions 17b and is connected to these portions at 44a. The arm portions 16b are connected by a cross piece 45 fastened at 54a, as shown in Fig. 2.

The elongate member 14 is rigid, and with the apurtenant portions of rails 11 and 11a, constitutes one side of the triangular configuration of the frame 10, as illustrated in Figs. 1 and 3. The triangle is collapsible by means of the knee joints at 18 and 19.

The backstop 20 and ring 21 are on the outside of the arms 16 and so interfere not at all with the movements of any of the foldable members into or out of their compactly nested formation illustrated in Fig. 4.

It may be noted in Fig. 3, that after the folding operation begins, as hereinbefore touched upon, the portion 16 first moves backwardly along the arc 46, into the dotted position at A, the portion 17a at the same time moving into contact with the portion 16a while the breaking of the knee joint 19 is in progress. Further pulling of the cable 23 causes the portion 16 to fulcrum at the joint 19, thereby breaking the joint 18 and reversing the direction of movement of the parts so that the portion 16b is caused to move along the arc 47. This movement continues during the final pulling stage of the cable 23 and causes the entire structure to rise during its folding action, into the final position 22 in Fig. 4.

While the present triangular structure is particularly adapted for use with basketball backstops, it can readily be seen that it is not necessarily so restricted, but can be used for other elevating purposes.

What is claimed is:

1. A folding backstop for the game of basketball, comprising a pair of hanger arms mutually spaced apart in side-by-side relationship; rigid structural means securing said hanger arms together; means at the upper set of ends of said hanger arms for pivotally suspending the latter from an overhead support; knee joint means interposed at mutually corresponding locations in the upper portions of the respective hanger arms; a pair of sway braces extending backwardly and upwardly from pivotal securement to said hanger arms adjacent the lower ends thereof; rigid structural means securing said sway braces together; means at the upper set of ends of said sway braces for pivotally suspending them from said overhead support in backwardly spaced relation to said hanger arms; knee joint means interposed at mutually corresponding locations in the respective sway braces; a basketball backboard secured to the lower end portions of said hanger arms across the forward faces of the latter; stabilizer means associated with said hanger arms for tightly holding the knee joints thereof against articulation in the extended playing position of the structure; and flexible connector means interconnecting said hanger arms and said sway braces and having a pull end for raising said backstop into folded, collapsed position adjacent said overhead support and for lowering it into extended and suspended, depending playing position.

2. The folding backstop of claim 1, wherein the stabilizer means comprises tensionable connecting structure connected to the hanger arms at a location below the knee joints thereof and anchored independently of said hanger arms backwardly and upwardly of said location.

3. The folding backstop of claim 2, wherein the tensionable connecting structure comprises a length of flexible connector having one end secured to the hanger arms at a location below the knee joints thereof and the other end anchored as specified, the said length of flexible connector being no longer than will provide for tautness thereof in the fully extended position of the backstop.

4. The folding backstop of claim 3, wherein the flex-

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ible connector means for raising the backstop into folded collapsed position and for lowering it into extended playing position, comprises a length of flexible connector having one end attached to the hanger arms at a location intermediate the two and adjacent the lower ends thereof, said length passing backwardly under the rigid structural means securing the sway braces together and passing upwardly therefrom; and wherein a winch is provided for raising and lowering the backstop, said length having its other end operatively secured to said winch.

5. The folding backstop of claim 4, wherein resilient means are associated with the knee joints of the sway braces for assisting them into the fully extended positions of said sway braces.

6. A foldable frame structure for supporting a basketball backboard or the like, comprising, in combination, an elongate support hanger including an upper hanger portion and a lower hanger portion, means for hanging the upper hanger portion in a depending position to swing about a horizontal pivot axis, means pivotally connecting the lower hanger portion to swing rearwardly on said upper hanger portion about a horizontal pivot axis from a depending position aligned with the upper hanger portion, means for retaining the lower hanger portion against forward swinging movement on the upper hanger portion when aligned, an elongate brace including an upper brace portion and a lower brace portion, means for hanging the upper brace portion to swing about a horizontal pivot axis parallel and spaced rearwardly from the pivot axis for the upper hanger portion, means pivotally connecting the lower brace portion to swing rearwardly on the upper brace portion about a horizontal pivot axis from a forwardly disposed position aligned with the upper brace portion, means for retaining the lower brace portion against forward swinging movement on the upper brace portion when aligned, means pivotally joining the lower end of said lower hanger portion and the lower end of said lower brace portion with the aligned brace portions extending rearwardly and upwardly from the hanger, whereby the structure will hang in the extended position described and said brace prevents swinging movement of the hanger, said lower brace portion being shorter in length than the lower hanger portion, said upper brace portion being shorter than the length of the upper hanger portion plus the distance between said two means for hanging, and the structure being foldable by pivoting the lower hanger and brace portions rearwardly and upwardly and the upper hanger and brace portions forwardly and upwardly to generally horizontal positions with the upper and lower brace portions nested above the lower hanger portion.

7. A foldable frame structure for supporting a basketball backboard or the like, comprising, in combination, an overhead support, an elongate support hanger including an upper hanger portion and a lower hanger portion, means for hanging the upper hanger portion on said support in a depending position to swing about a horizontal pivot axis, means pivotally connecting the lower hanger portion to swing rearwardly on said upper hanger portion about a horizontal pivot axis from a depending position aligned with the upper hanger portion, means for releasably retaining the hanger portions aligned as described; an elongate brace including an upper brace portion and a lower brace portion, means for hanging the upper brace portion on said support to swing about a horizontal pivot axis parallel and spaced rearwardly from the pivot axis for the upper hanger portion, means pivotally connecting the lower brace portion to swing rearwardly on the upper brace portion about a horizontal pivot axis from a forwardly disposed position aligned with the upper brace portion, means for releasably retaining the brace portions aligned as described, said hanger and said brace each having a length substantially greater than the spacing between said two means for

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hanging, means pivotally joining the lower end of said lower hanger portion and the lower end of said lower brace portion with the aligned brace portions extending rearwardly and upwardly from the hanger, whereby the structure will hang in the extended position described and said brace prevents swinging movement of the hanger, a pulley suspended from said support, and a tensionable cable connected to the lower hanger portion, passing rearwardly therefrom and about the brace adjacent the pivotal interconnection of upper and lower brace portions, then passing upwardly and about said pulley for folding said hanger and brace against said support by pivoting the lower hanger and brace portions rearwardly and upwardly and pivoting the upper hanger and brace portions forwardly and upwardly to generally horizontal positions wherein the hanger and brace each occupies substantially less space horizontally than its total length.

8. A foldable frame structure for supporting a basketball backboard or the like, comprising, in combination; an elongate support hanger including an upper hanger portion and a lower hanger portion; means for hanging the upper hanger portion in a depending position to swing about a horizontal pivot axis, knee joint means pivotally connecting the lower hanger portion to swing only rearwardly on said upper hanger portion about a horizontal pivot axis from a depending position aligned with the upper hanger portion, an elongate brace including an upper brace portion and a lower brace portion, means for hanging the upper brace portion to swing about a horizontal pivot axis parallel to and rearwardly spaced from the pivot axis for said upper frame portion, knee joint means pivotally connecting the lower brace portion to swing only rearwardly on said upper brace portion about a horizontal pivot axis from a forwardly disposed position aligned with the upper brace portion, said hanger and said brace each having a length substantially greater than the spacing between said two means for hanging, means pivotally joining the lower end of said lower hanger portion to the lower end of said lower brace portion with the entire brace extending upwardly and rearwardly from the lower end of said lower hanger portion, whereby the structure is held in the extended position described by the weight of the parts and said brace prevents swinging movement of the hanger, the structure being foldable by breaking the knee joint in both the hanger and the brace, pivoting the lower hanger and brace portions rearwardly and upwardly and pivoting the upper hanger and brace por-

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tions forwardly and upwardly to generally horizontal positions wherein the hanger and brace each occupies substantially less space horizontally than its total length.

9. A foldable frame structure for supporting a basketball backboard or the like, comprising, in combination; an overhead support, an elongate support hanger including an upper hanger portion and a lower hanger portion, means for hanging the upper hanger portion on said support in a depending position to swing about a horizontal pivot axis, knee joint means pivotally connecting the lower hanger portion to swing only rearwardly on said upper hanger portion about a horizontal pivot axis from a depending position aligned with the upper hanger portion, an elongate brace including an upper brace portion and a lower brace portion, means for hanging the upper brace portion on said support to swing about a horizontal pivot axis parallel to and rearwardly spaced from the pivot axis for said upper frame portion, knee joint means pivotally connecting the lower brace portion to swing only rearwardly on said upper brace portion about a horizontal pivot axis from a forwardly disposed position aligned with the upper brace portion, means pivotally joining the lower end of said lower hanger portion to the lower end of said lower brace portion with the entire brace extending upwardly and rearwardly from the lower end of said lower hanger portion, whereby the structure is held in the extended position described by the weight of the parts and said brace prevents swinging movement of the hangers, the structure being foldable to position said hanger and brace portions in generally horizontal positions by breaking the knee joint in both the hanger and the brace, pivoting the lower hanger and brace portion rearwardly and upwardly, and pivoting the upper hanger and brace portions forwardly and upwardly, and a stabilizing cable having one end secured to said support rearwardly of the pivotal mounting of the upper hanger portion and having the other end secured to said lower hanger portion adjacent the pivotal interconnection of upper and lower hanger portions, said cable being taut when the structure is extended to hold the knee joint in the hanger against articulation.

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