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(54) SPRING-LOADED INFINITE ADJUST BASKETBALL LIFT SYSTEM

(57) A movable elevator assembly for adjusting the height of a basketball goal is provided herein. The elevator assembly includes a first strut and a second strut. A locking assembly is attached to the second strut and is movable along the fixed first strut. The locking assembly includes a lock, such as a spring that grips the lower strut in a rest position and can be activate to release the first strut. By moving the lock up or down the fixed strut, the height of the basketball goal can be moved up or down. This allows a user to select any desired height for the basketball goal.

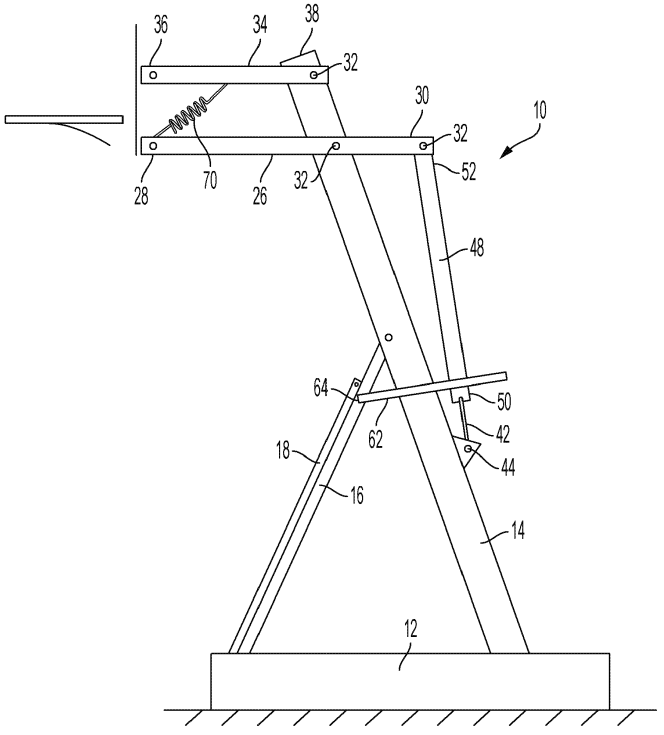

FIG. 1

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Description

FIELD OF INVENTION

[0001] This invention concerns a lift or elevator assembly for an adjustable basketball backboard system.

BACKGROUND ART

[0002] Basketball goal assemblies are used to provide a basketball goal and backboard a set distance above the ground. While regulated basketball games set the height of the goal at 10 feet above the basketball court, basketball goal assemblies used in informal or recreational play may be disposed at various height locations. For such assemblies, a lift mechanism or subassembly is used to set the goal to a desired height. Prior lift mechanisms include a vertical bar with notches set at predetermined locations that correspond to discrete heights of the goal. A user sets a horizontal bar into the notch corresponding to the desired height. However, such systems allow a user to only set the goal to a few predetermined heights based on the location of the notches.

[0003] A variable-length, locking gas strut has been used to overcome this problem and allow for a sliding height adjustment providing an infinite number of potential height locations. However, the gas strut is prone to leaking over time. This causes two problems. First, the strut can stick and become difficult to move. Second, the strut may unexpectedly release during play, which may be dangerous to those around the backboard.

[0004] What is needed, then, is a variable lift mechanism that allows for infinite height locations and that does not require a gas strut.

SUMMARY OF INVENTION

[0005] A basketball goal system having a base supporting a pole, a backboard support assembly having a top arm with a proximal end coupled to a backboard and a distal end rotatably connected to the pole, and a bottom arm with a proximal end coupled to a backboard and a middle section rotatably coupled to the pole, an elevator assembly having a lower strut having a lower end affixed to the pole, a spring assembly having a spring expandably coiled around the lower strut, and a housing containing the spring, an upper strut having an upper end rotatably connected to a distal end of the bottom arm and a lower end coupled to the housing, and a handle pivotally attached to the pole and pivotally attached to the housing, and having a spring trigger configured to expand the spring when triggered and contract the spring when released.

[0006] A height-adjustable basketball goal system having a vertical support, a backboard assembly having a goal, and an elevator assembly, the elevator assembly having a lower strut attached to the vertical support, a locking assembly comprising a lock adapted to grip the lower strut in a rest position and to release the lower strut in an activated position, an upper strut connected to the locking assembly and pivotally connected to the backboard assembly; and a handle rotatably attached to the pole and comprising a trigger adapted to move the lock from a rest position to an activated position when gripped by a user, wherein when the handle is rotated upward, the goal moves from a first position to a second position, and when the handle is rotated downward, the goal moves from the second position to the first position.

[0007] A height-adjustable basketball goal system having a pole, a backboard assembly supported by the pole and having a goal, and an elevator assembly, the elevator assembly having a lower strut having a first end attached to the pole; a spring assembly comprising a spring expandably coiled around the lower strut, an upper strut connected at a first end to the spring assembly and at a second end to the backboard assembly, and a handle rotatably attached to the pole and comprising a trigger adapted to expand the spring when gripped and contract the spring when released.

BRIEF DESCRIPTION OF THE FIGURES

[0008]

Figure 1 depicts an embodiment of the lift system disclosed herein.

Figure 2 depicts a close-up perspective view of the handle and lift assembly according to an embodiment of the lift system disclosed herein.

Figures 3A and 3B depict a spring locking mechanism according to an embodiment of the lift system disclosed herein.

Figure 4 depicts another embodiment of the lift system disclosed herein.

Figure 5 depicts another embodiment of the lift system disclosed herein.

Figure 6 depicts another embodiment of the lift system disclosed herein.

DETAILED DESCRIPTION

[0009] Applicant discloses herein a basketball goal assembly **10**, an embodiment of which is depicted in Figure 1. Generally, a basketball goal assembly **10** has a vertical support, such as a pole **14** as depicted in Figure 1, with a backboard assembly **20** attached at its proximal end to the top of the pole **14**. The backboard assembly **20** has a backboard **24** with a goal or rim **22** at the distal end of the backboard assembly **20**.

[0010] More particularly focusing on the vertical support, the pole **14** of vertical support may be secured in-

place directly in the ground, or it may be attached to and situated on a base **12**. The pole **14** may be substantially vertical, or it may lean forward and be supported by additional support struts **16**, as shown in Figure 1. The pole **14** is rigid and may be formed as a single piece or have multiple parts that are fit into each other. Some embodiments may also include a portable base **12**. Such a portable base **12** typically has wheels to allow the base **12** to be moved into a desired location. The portable base **12** may also include ballast, such as sand or water, to provide a counterweight for stabilizing the entire basketball goal assembly **10.** A cover **18** may also be provided to cover the struts **16**, pole **14**, and/or base **12.** In other embodiments the pole **14** may be substantially vertical and sunk in concrete poured into the ground. In such embodiments a base, supporting struts, and/or a cover maybe absent.

[0011] The backboard assembly **20** is connected to the top of and extends away from the pole **14.** The backboard assembly **20** includes at least one primary arm **26** that is attached to the pole **14** by a pin **32** in the middle portion of the primary arm **26.** The distal end **28** of the primary arm **26** is secured to and supports the backboard **24** by screws, bolts, welding, or other permanent or semi-permanent fasteners. The proximal end **30** of the arm **26** extends some distance behind the pole **14** in the opposite direction from the backboard **24.** The primary arm **26** may be a single beam, or it may be multiple beams (e.g., one on each side of the pole **14** to provide a pair of beams as the arm **26**) and attached to and supporting the backboard **24** at multiple points. The beams of the primary arm **26** may be curved or straight as desired. In some embodiments, the backboard assembly **20** may also include one or more additional arms **34** such as that shown in Figure 1. Such additional arms provide further support and stability to the backboard **24.** In the embodiment depicted in Figure 1, additional arm **34** at the distal end **36** is attached to and secures the backboard **24** in the same manner as the primary arm **26.** The proximal end **38** additional arm **34** is attached with a pin **32** at the top of the pole **14.** In other embodiments, the proximal end **38** of the additional arm **34** may also extend backwards behind the pole **14**, as does the primary arm **26.** In addition, like the primary arm **26**, the one or more additional arms **34** may be formed of one or more beams for securing and stabilizing the backboard **24.**

[0012] The lift or elevator assembly **40** allows a user to adjust the height of the basketball backboard **24.** In general, the elevator assembly **40** has a lower strut **42**, an upper strut **48**, and a locking assembly **54.** The bottom end **44** of the lower strut **42** is fixedly attached to the pole **14.** Preferably the lower strut **42** is secured such that the locking assembly **54** and the handle **62** (described below) are positioned at a comfortable height for the user. The top end **46** of the lower strut **42** is left free. It may be left uncovered, covered by a sheath, or hidden inside the upper strut **52** if the upper strut **52** is hollow and situated over the lower strut **46.**

[0013] Figure 2 provides a close-up view of the lock housing **54** and other portions of the elevator assembly **40.** A lock housing **54** is slidably attached to the lower strut **42.** The lower end **50** of the upper strut **48** is secured to the housing. As shown in Figure 2, the there are two upper struts **48**, one on each side of the lock housing **54**, and a bar **60** intersects each upper strut **48** and the lock housing **54** to secure the components together. Although the embodiment shown in Figure 2 includes two upper struts **48**, other embodiments may include only one upper strut **48.** For example, there may be an upper strut **48** on only one side of the lock housing **54.** As another example, the upper strut **48** may be hollow inside and slide over the upper end **46** of the lower strut **42**, such that it continues along the same longitudinal axis as the lower strut **42.** In such an embodiment the upper strut **48** may secure directly into the lock housing **54.** The upper end **52** of the upper strut **48** is connected by a rotatable pin **32** to the proximal end **30** of the primary arm **26.** Thus, as the upper strut **46** moves up or down, the primary arm **26** moves the backboard assembly up or down as well. In the embodiment depicted in Figure 1, as the upper strut **48** moves up, the primary arm **26** rotates about the pin **32** pinning the primary arm **26** to the pole **14** such that the backboard **24** moves down. In reverse, as the upper strut moves down, the backboard **24** moves up.

[0014] Figure 3 depicts the interior of the lock housing **54.** The lock as depicted in this embodiment is a spring **56** coiled around the lower strut **42.** The spring **56** has a resting inner diameter that is less than the diameter of the lower strut **42**, such that when applied around the lower strut **42**, the spring **56** naturally coils tightly around the lower strut **42.** Accordingly, in the resting position the spring **56** applies a normal force inwardly against the lower strut **42**, creating a static frictional force that locks the spring **56** into place and prevents slipping. Because one end of the spring **56** is secured to the housing **54**, the locked spring **56** supports the housing **54**, and by extension the upper strut **48** and other components of the basketball goal assembly **10**, locked in place during use. Accordingly, the spring **56** must be of a sufficient length, diameter, and number of coils to result in a strong normal force against the lower strut **42** to generate enough frictional force to lock the assembly in place. As a nonlimiting example, one or more springs approximately 1 inch (25.4 mm) long having approximately 17 coils of 0.055 inch (1.4 mm) diameter wire, and having an outer coil diameter of approximately 0.60 inches (15 mm) and coiled to apply around a 0.40 inch (10 mm) rod can maintain a load of 2000 lbs (900 kg). Other diameters, sizes or weight ratings may be selected based on particular design or performance requirements.

[0015] The locking mechanism can also include other variations. For example, as shown in Fig. 4, in some embodiments the lock may be a clamp that grips the lower strut **42** with sufficient normal force to generate the necessary frictional force for holding the assembly at the desired height. A lock may also include some combina-

tion of springs and/or clamps.

[0016] Returning to Figure 3, the second end of the spring **56** is free to be pushed or pulled in order to expand or contract the spring **56.** This end of the spring **56** may in some embodiments have an activator **58** that attaches to the spring and coordinates with a piston **68.** In other embodiments, the piston **68** may attach directly to the spring **56.** The piston **68** engages a handle **62** that includes a trigger **66.** In some embodiments, the trigger **66** is located on the handle **62** such that a user can grab the handle **62** and the trigger **66** with one hand. In other embodiments the trigger **66** may be activated by a second hand. As shown in Figure 3, the handle **62** is attached to the pole struts **16** and forms a U shape extended backwards away from the pole **14.** In other embodiments, the handle **62** may be attached directly to the pole **14.** The handle **62** may also be a bar, rather than a U shape. The handle **62** extends further from the pole **14** than the lower strut **42** and housing **54.** When the handle **62** is gripped and the trigger **66** is pulled, the trigger **66** moves the piston **68** to push the spring **56** to an open expanded position. If a clamp lock is used instead of a spring, the clamp is pushed to an open position. Once the spring **56** is in this open position, the housing **54** is free to slide along the lower strut **42.** As the handle **62** is rotated upward, the housing **54** slides upward along the lower strut **42**, thereby moving the upper strut **48** and the backboard assembly **20** to a new vertical position. Similarly, as the handle **62** is rotated downward, the housing **54** slides downward along the lower strut **42.** In this way, the user may move the backboard **24** to any desired height permitted by the range of movement of the housing **54** along the lower strut **42.** Once the desired height is reached, the user stops moving the handle **62** and releases the trigger **66.** Upon releasing the trigger, the spring **56** moves back to its original position and coils tightly around the lower strut **42.**

[0017] The lower strut **42** may also be marked to indicate the location where the basketball backboard **24** or goal **22** are at a specific height above the ground. For example, markings may be made to indicate the location to set the goal **22** at 8 feet, 8.5 feet, 9 feet, 9.5 feet, and 10 feet. However, the user may adjust the height to any height in the range, not simply those that are marked at preselected intervals.

[0018] Another embodiment is depicted in Figure 4. Here, the handle **62** is attached directly to the pole **14**, rather than supporting pole struts **64.**

[0019] Another embodiment is depicted in Figure 5. In this embodiment, the orientation of the lower strut **42** relative to the pole **14** and lock housing **54** is reversed. In embodiments such as those described with reference to Figures 1 and 5, the lower strut **42** is in tension in a static state. This is because the weight of the backboard assembly **20**, when left unbalanced by the locking force of the spring **56**, tends to pull drop downward on the front side of the pole **14.** This results in the proximal end **30** of the primary arm **26** pulling the elevator assembly **40** upward. In the embodiments of Figures 1 and 4, the lower strut **42** is thus pulled upward and placed in tension. In Figure 5, the lower strut **42** is oriented such that the upper end **46** is attached to the pole **14**, and the lower end **44** is free. Thus, the balancing forces place the lower strut **42** in compression.

[0020] Figure 6 depicts another embodiment of an assembly with an elevator mechanism. In this embodiment, the elevator assembly **140** and the backboard assembly **120** move up and down in the same direction, rather than in opposite directions as shown in Figures 1, 4, and 5. In assembly **110**, a pole **114** is provided as secured into the ground. Per the embodiment shown in Figure 1, the pole may also be secured to a portable base in this embodiment in Figure 6. In Figure 6 the backboard assembly is connected to a collar that slides up and down the pole **110.** As the upper strut **148** moves upward, it pushes the collar upward. The backboard **124** is secured to the collar, and the goal **122** is secured to the front of the backboard **124.** The lock housing **154** attaches to the lower strut **142** and is operated by the handle **162.** These may be any of the variations in the elevator assemblies as described above with reference to Figures 1-5. Thus, the primary difference in the embodiment of Figure 6 is that the backboard assembly **120** is not pinned to the pole **114** and instead moves upward or downward in the same direction as the upper strut **148** when the upper strut **148** is moved.

[0021] It is to be understood that any given elements of the disclosed embodiments of the invention may be embodied in a single structure, a single step, a single substance, or the like. Similarly, a given element of the disclosed embodiment may be embodied in multiple structures, steps, substances, or the like.

[0022] The foregoing description illustrates and describes the processes, machines, manufactures, compositions of matter, and other teachings of the present disclosure. Additionally, the disclosure shows and describes only certain embodiments of the processes, machines, manufactures, compositions of matter, and other teachings disclosed, but, as mentioned above, it is to be understood that the teachings of the present disclosure are capable of use in various other combinations, modifications, and environments and are capable of changes or modifications within the scope of the teachings as expressed herein, commensurate with the skill and/or knowledge of a person having ordinary skill in the relevant art. The embodiments described hereinabove are further intended to explain certain best modes known of practicing the processes, machines, manufactures, compositions of matter, and other teachings of the present disclosure and to enable others skilled in the art to utilize the teachings of the present disclosure in such, or other, embodiments and with the various modifications required by the particular applications or uses. Accordingly, the processes, machines, manufactures, compositions of matter, and other teachings of the present disclosure are not intended to limit the exact embodiments and examples disclosed herein. Any section headings herein are

provided only for consistency with the suggestions of 37 C.F.R. § 1.77 or otherwise to provide organizational queues. These headings shall not limit or characterize the invention(s) set forth herein.

Claims

1. A basketball goal system comprising:

a) a base supporting a pole;
b) a backboard support assembly having a top arm with a proximal end coupled to a backboard and a distal end rotatably connected to the pole, and a bottom arm with a proximal end coupled to a backboard and a middle section rotatably coupled to the pole;
c) an elevator assembly comprising

i) a lower strut having a lower end affixed to the pole;
ii) a spring assembly having a spring expandably coiled around the lower strut, and a housing containing the spring;
iii) an upper strut having an upper end rotatably connected to a distal end of the bottom arm and a lower end coupled to the housing; and
iv) a handle pivotally attached to the pole and pivotally attached to the housing, and having a spring trigger configured to expand the spring when triggered and contract the spring when released.

2. A height-adjustable basketball goal system having a vertical support, a backboard assembly having a goal, and an elevator assembly, the elevator assembly comprising:

a) a lower strut attached to the vertical support;
b) a locking assembly comprising a lock adapted to grip the lower strut in a rest position and to release the lower strut in an activated position;
c) an upper strut connected to the locking assembly and pivotally connected to the backboard assembly; and
d) a handle rotatably attached to the pole and comprising a trigger adapted to move the lock from a rest position to an activated position when gripped by a user, wherein when the handle is rotated upward, the goal moves from a first position to a second position, and when the handle is rotated downward, the goal moves from the second position to the first position.

3. The system of Claim 2, wherein the vertical support comprises a pole.

4. The system of Claim 3, wherein the vertical support further comprises a portable base.

5. The system of Claim 2 wherein the lock comprises a spring coiled around the lower strut.

6. The system of Claim 5 wherein the locking assembly comprises a housing containing the spring.

7. The system of Claim 2 wherein the lock comprises a clamp substantially wrapped around the lower strut.

8. The system of Claim 7 wherein the locking assembly comprises a housing containing the clamp.

9. The system of Claim 2, wherein the backboard assembly is rotatably pinned to the top of the vertical support.

10. The system of Claim 9, wherein when the handle is rotated upward, the first position of the goal is higher than the second position of the goal.

11. The system of Claim 2 wherein when the handle is rotated upward, the first position of the goal is lower than the second position of the goal.

12. A height-adjustable basketball goal system having a pole, a backboard assembly supported by the pole and having a goal, and an elevator assembly, the elevator assembly comprising:

a) a lower strut having a first end attached to the pole;
b) a spring assembly comprising a spring expandably coiled around the lower strut;
c) an upper strut connected at a first end to the spring assembly and at a second end to the backboard assembly; and
d) a handle rotatably attached to the pole and comprising a trigger adapted to expand the spring when gripped and contract the spring when released.

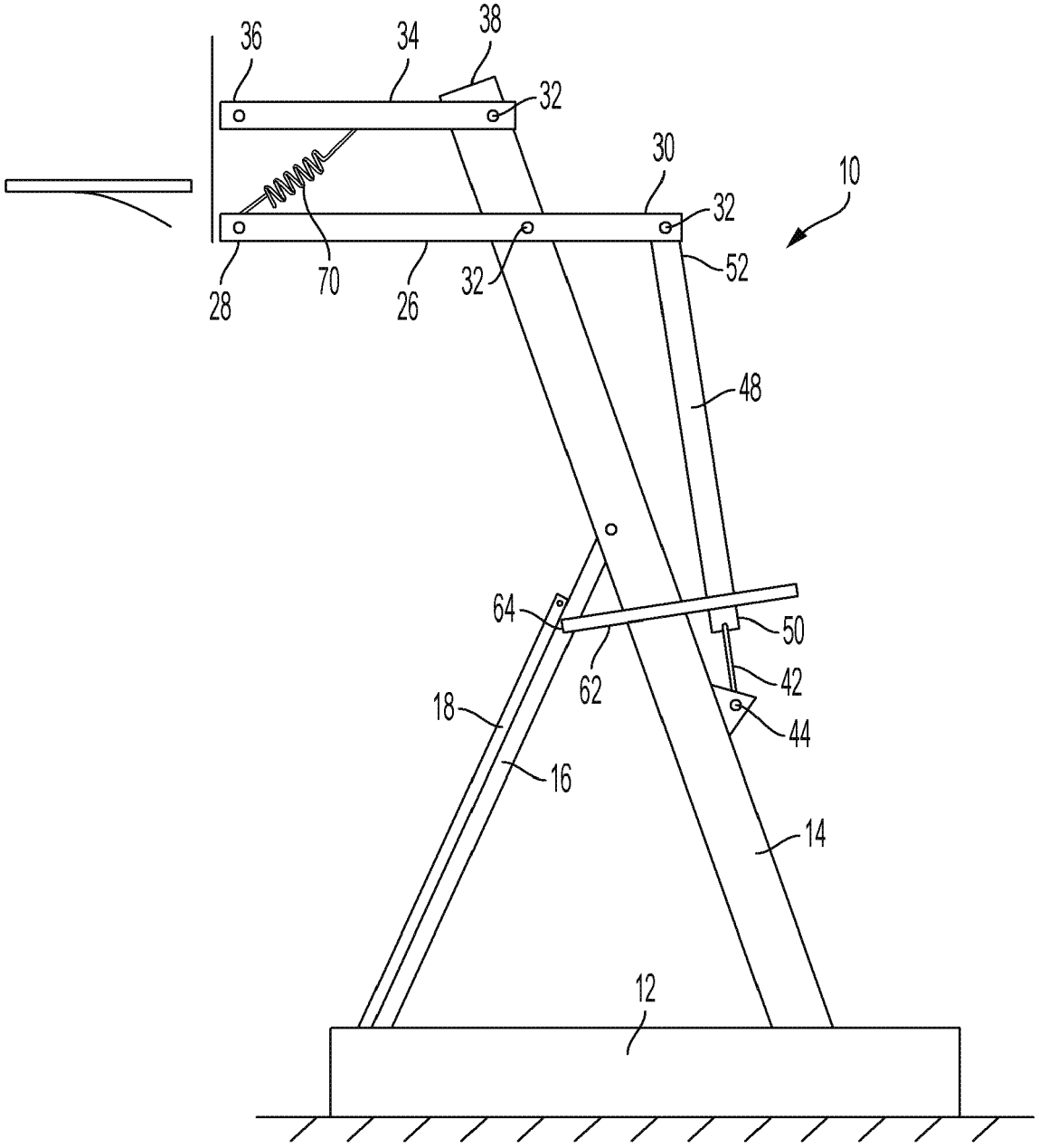

FIG. 1

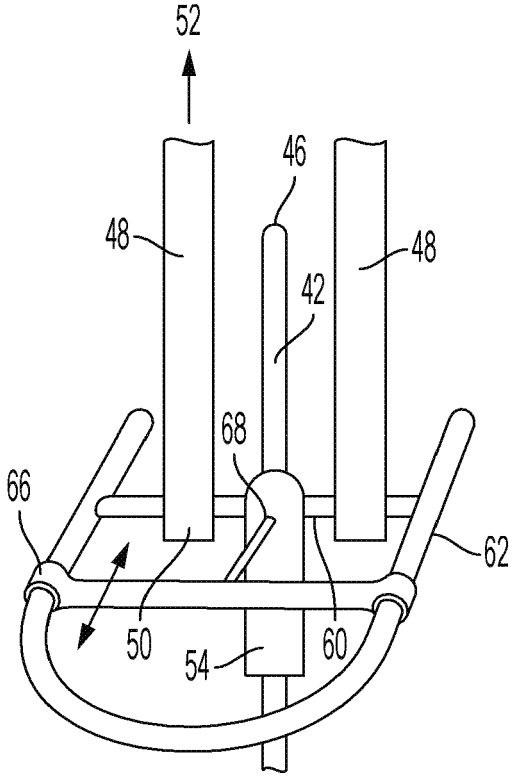

FIG. 2

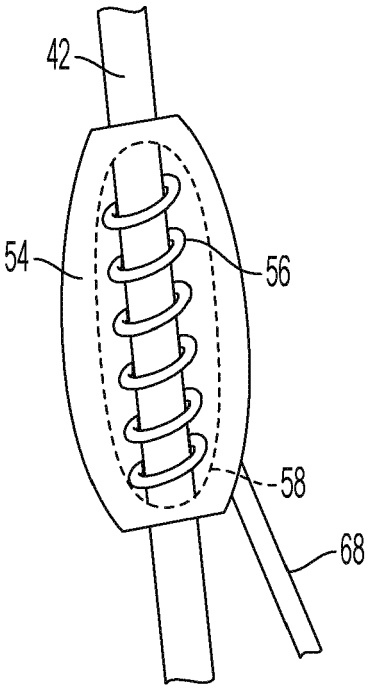

FIG. 3A

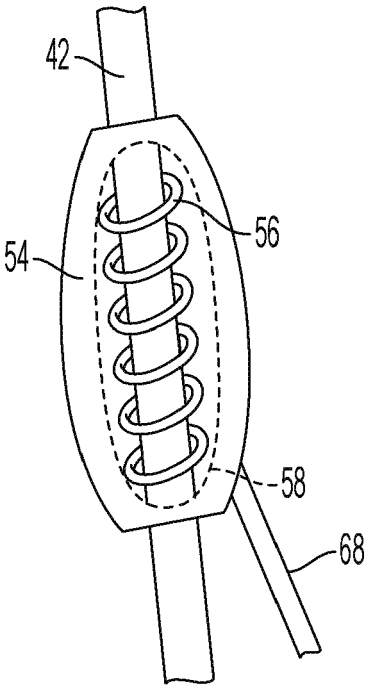

FIG. 3B

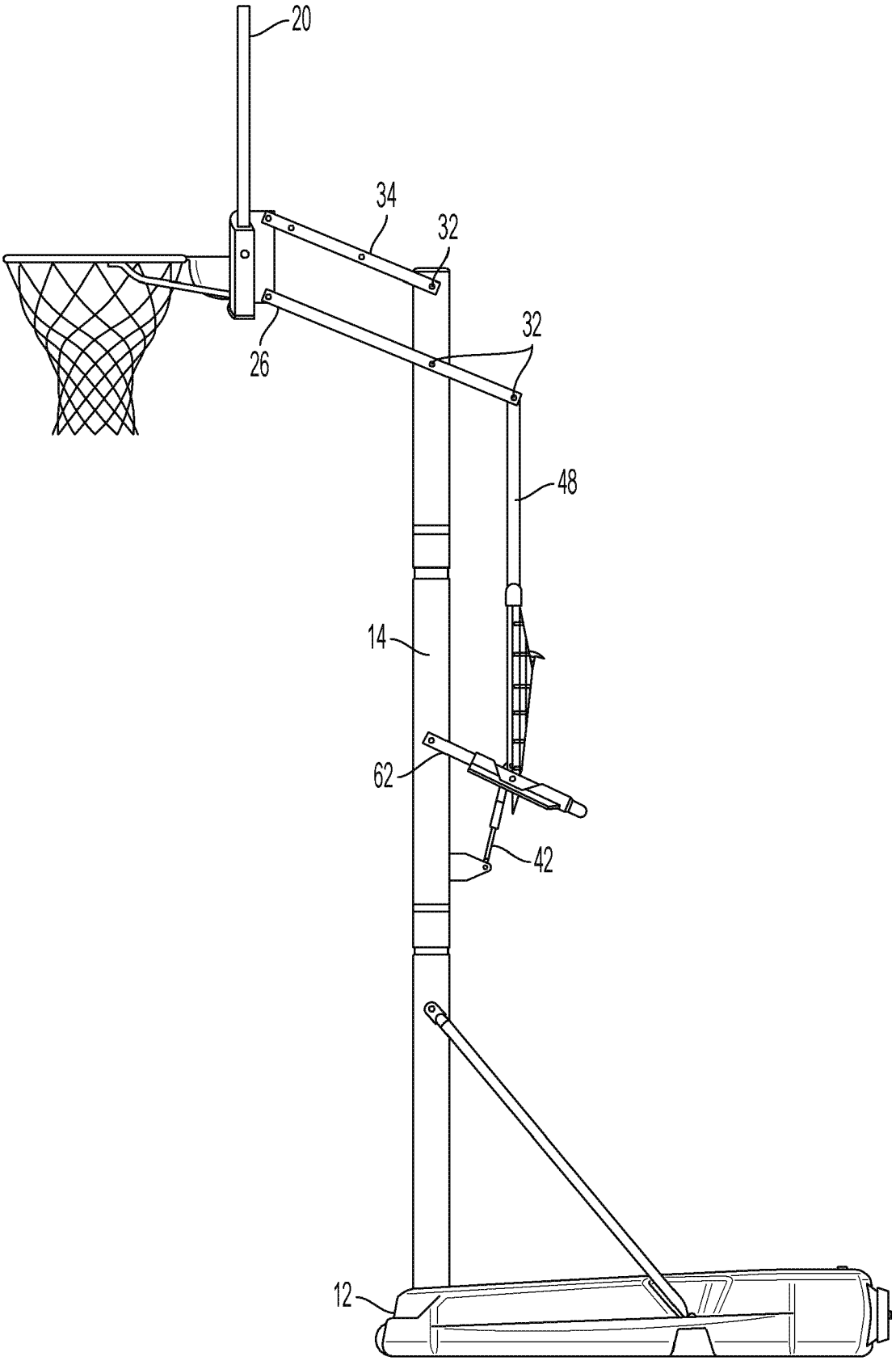

FIG. 4

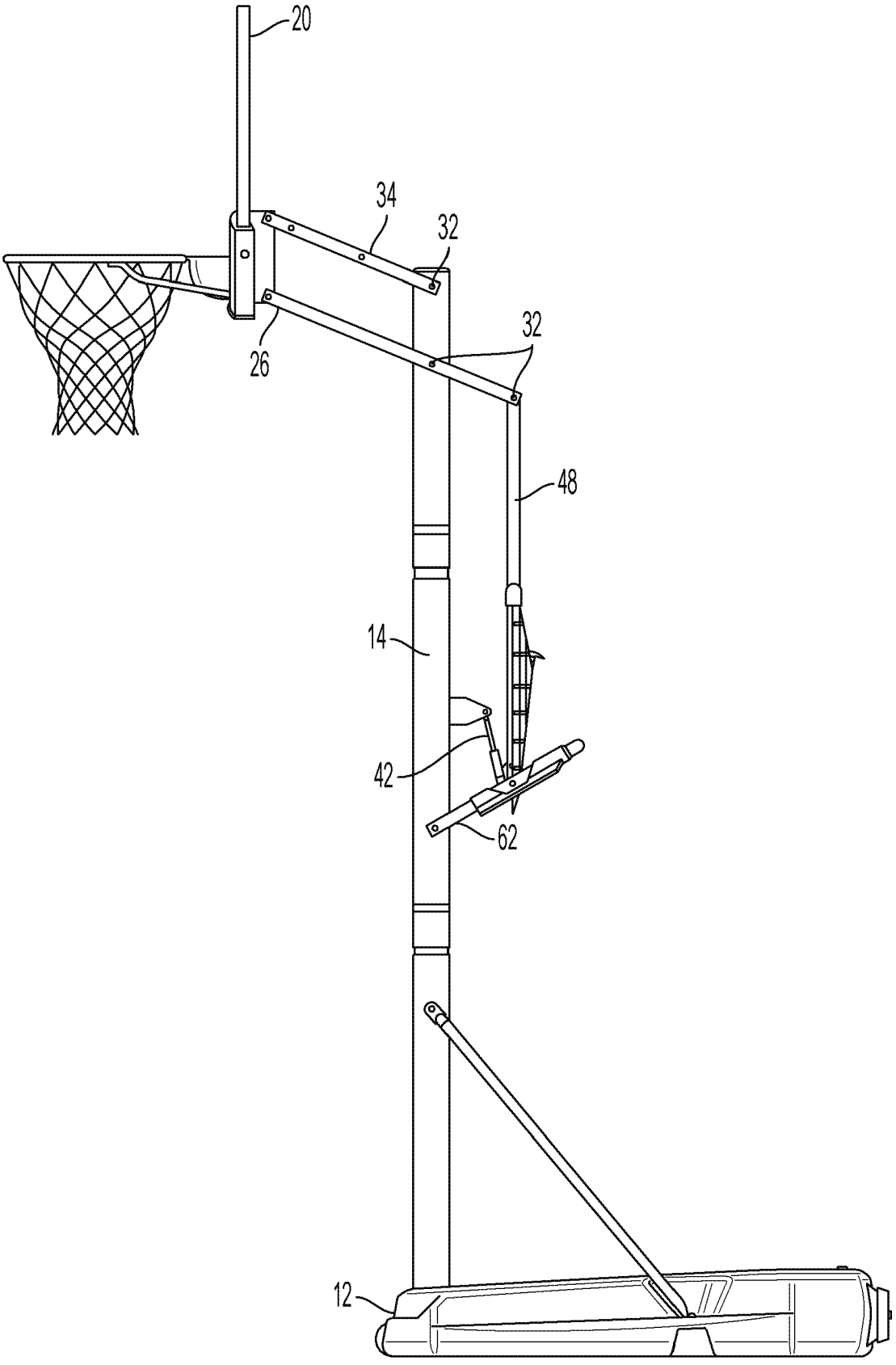

FIG. 5

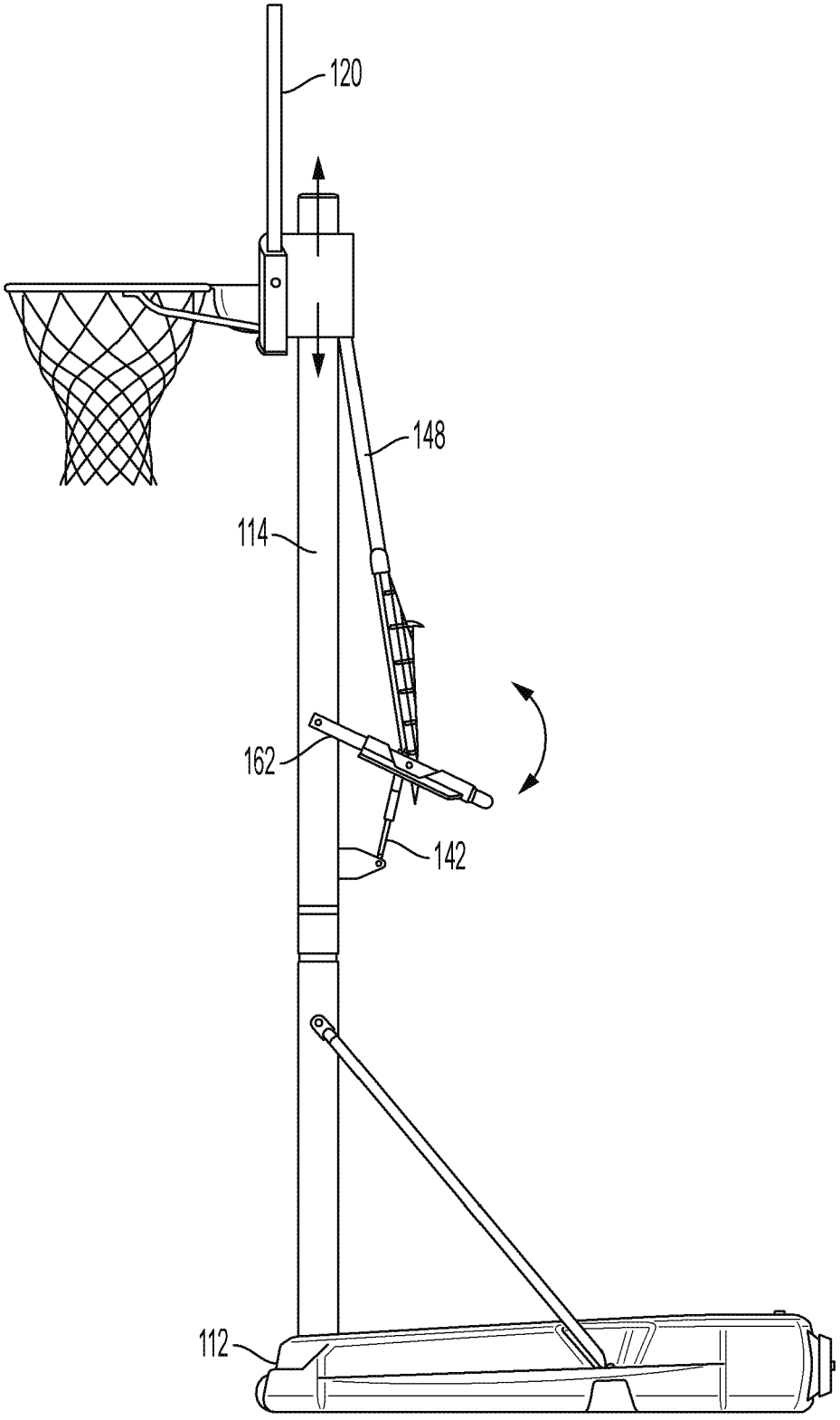

FIG. 6

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EUROPEAN SEARCH REPORT

Application Number
EP 19 19 9815

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	WO 99/38579 A1 (LIFETIME PROD INC [US]) 5 August 1999 (1999-08-05) * pages 5-17; claims; figures *	1-12	INV. A63B63/08 ADD.
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TECHNICAL FIELDS SEARCHED (IPC)

A63B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	21 January 2020	Herry, Manuel

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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