(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) **EP 3 643 369 B1**

(12) **EUROPEAN PATENT SPECIFICATION**

(45) Date of publication and mention of the grant of the patent:
18.08.2021 Bulletin 2021/33

(51) Int Cl.:
A63B 63/08 *(2006.01)* *A63B 71/02* *(2006.01)*

(21) Application number: **19199815.2**

(22) Date of filing: **26.09.2019**

(54) SPRING-LOADED INFINITE ADJUST BASKETBALL LIFT SYSTEM

FEDERBELASTETES STUFENLOS VERSTELLBARES BASKETBALLHEBESYSTEM

SYSTÈME DE LEVAGE DE BASKET-BALL À RÉGLAGE CONTINU ET À RESSORT

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR

(30) Priority: **02.10.2018 US 201816150027**

(43) Date of publication of application:
29.04.2020 Bulletin 2020/18

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EP 3 643 369 B1

Printed by Jouve, 75001 PARIS (FR)

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 3.048 m (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.

[0005] WO 99/38579 discloses a quick release locking mechanism for an adjustable basketball goal having a locking rod telescopically arranged in an extension arm. A long and short opening are provided in the extension arm receiving a pair of upper and lower locking plates and are arranged about the locking rod and at an angle thereto, with a long spring arranged between the pair of locking plates in the long opening and a short spring arranged between the locking plates within the short opening. The long spring biases the locking plates against the locking rod to inhibit upward and downward movement of the locking rod. A handle is slidably arranged about a lower end of the locking rod. Upon upward movement of the handle, a lower abutment portion moves the lower locking plate, disengaging from the locking rod, allowing upward movement of the extension arm relative to the locking rod. Upon downward movement of the handle, an upper abutment portion moves the upper locking plate disengaging from the locking rod, allowing downward movement of the extension arm relative to the locking rod.

[0006] EP-A-1,767,252 discloses an apparatus for adjusting the height of a basketball backboard and hoop assembly comprising an adjustment arm in telescoping relation with a threaded rod. A handle is fixed to the arm having a trigger for disengaging locking mechanism biased against a spring from engagement with an adjustment nut threadedly arranged on the threaded rod. The locking mechanism may now be moved along the threaded rod by a moving the handle up or down, which applies a force via thrust bearings to the locking mechanism spinning along the threaded rod.

[0007] In accordance with the present invention, there is provided a basketball goal system comprising a vertical support comprising 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 vertical support and pivotally attached to the housing, and having a spring trigger configured to expand the spring when triggered to release a normal force on said lower strut and contract the spring to apply a normal force on the lower strut when released.

[0008] Also disclosed is 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.

[0009] Also disclosed is 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

[0010]

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 example, which is not part of the invention, of the lift system disclosed herein.

DETAILED DESCRIPTION

[0011] 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 with a goal or rim at the distal end of the backboard assembly **20.**

[0012] More particularly focusing on the vertical support, the pole **14** of vertical support may be secured inplace 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 may be absent.

[0013] 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 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. 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 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. In the embodiment depicted in Figure 1, additional arm **34** at the distal end **36** is attached to and secures the backboard in the same manner as the primary arm **26.** The proximal end of additional arm **34** is attached with a pin **32** at the top 38 of the pole **14.** In other embodiments, the proximal end 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.**

[0014] The lift or elevator assembly allows a user to adjust the height of the basketball backboard. In general, the elevator assembly 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 **48** if the upper strut **48** is hollow and situated over the lower strut **42.**

[0015] Figure 2 provides a close-up view of the lock housing **54** and other portions of the elevator assembly. 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 54. As shown in Figure 2, 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 **48** moves up or down, the primary arm **26** moves the backboard assembly 20 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 moves down. In reverse, as the upper strut 48 moves down, the backboard moves up.

[0016] Figure 3A and 3B depict 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 non-limiting 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.

[0017] 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 combination of springs and/or clamps.

[0018] Returning to Figures 3A and 3B, 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 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.**

[0019] The lower strut **42** may also be marked to indicate the location where the basketball backboard or goal are at a specific height above the ground. For example, markings may be made to indicate the location to set the goal at 243.84 cm (8 feet), 259.08 cm (8.5 feet), 274.32 cm (9 feet), 289.56 cm (9.5 feet) and 304.8 cm (10 feet). However, the user may adjust the height to any height in the range, not simply those that are marked at preselected intervals.

[0020] Another embodiment is depicted in Figure 4. Here, the handle **62** is attached directly to the pole **14,** rather than supporting pole struts **64.**

[0021] 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 is attached to the pole **14,** and the lower end **44** is free. Thus, the balancing forces place the lower strut **42** in compression.

[0022] Figure 6 depicts another example, which is not part of the invention, of an assembly with an elevator mechanism. In this embodiment, the elevator assembly 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 is secured to the collar, and the goal is secured to the front of the backboard. 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.

[0023] The invention is defined in the appended claims.

Claims

1. A basketball goal system comprising:

    a) a vertical support (14,16) comprising a pole (14);
    b) a backboard support assembly (20) having a top arm (34) with a proximal end (36) coupled to a backboard and a distal end rotatably connected to the pole (14), and a bottom arm (26) with a proximal end coupled to a backboard and a middle section rotatably coupled to the pole (14);
    c) an elevator assembly comprising
    a lower strut (42) having a lower end (44) affixed to the pole (14);

        an upper strut (48) having an upper end (52) rotatably connected to a distal end of the bottom arm (26)
        characterized in that the elevator assembly further comprises a spring assembly having a spring (56) expandably coiled around the lower strut (42) and a housing (54) containing the spring (56);
        the upper strut (48) having a lower end (50) coupled to the housing (54); and

            i) a handle (62) pivotally attached to the vertical support (14,16) and pivotally attached to the housing (54), and having a spring trigger (66) configured to expand the spring (56) to release a normal force on said lower strut (42) when triggered and contract the spring to apply a normal force on the lower strut (42) when released.

2. The system of Claim 1, wherein the vertical support (14,16) further comprises pole struts (16), the handle (62) being pivotally attached to the pole struts (16).

3. The system of Claim 2, wherein the vertical support is provided with a portable base (12).

Patentansprüche

1. Basketballtor-System, umfassend:

    a) eine vertikale Stütze (14, 16), die einen Pfosten(14) umfasst;
    b) eine Rückwandträgeranordnung (20), die einen oberen Arm (34) mit einem proximalen Ende (36), das mit einer Rückwand gekoppelt ist, und einem distalen Ende, das drehbar mit dem Pfosten (14) verbunden ist, und einen unteren Arm (26) mit einem proximalen Ende, das mit einer Rückwand gekoppelt ist, und einem mittleren Abschnitt, der drehbar mit dem Pfosten (14) gekoppelt ist, aufweist;
    c) eine Hebeanordnung, die umfasst:

        eine untere Strebe (42) mit einem unteren Ende (44), das an dem Pfosten (14) befestigt ist;
        eine obere Strebe (48), die ein oberes Ende (52) aufweist, das drehbar mit einem distalen Ende des unteren Arms (26) verbunden ist,
        dadurch gekennzeichnet, dass die Hebeanordnung des Weiteren eine Federanordnung umfasst, die eine Feder (56), die dehnbar um die untere Strebe (42) gewunden ist, und ein Gehäuse (54) aufweist, das die Feder (56) beinhaltet;
        wobei die obere Strebe (48) ein unteres Ende (50) aufweist, das mit dem Gehäuse (54) verbunden ist; und

            i) einen Griff (62), der schwenkbar an der vertikalen Stütze (14, 16) und schwenkbar an dem Gehäuse (54) angebracht ist und einen Federauslöser (66) aufweist, der eingerichtet ist, die Feder (56) auszudehnen, um eine Normalkraft auf die untere Strebe (42) freizugeben, wenn er ausgelöst wird, und die Feder zusammenzuziehen, um eine Normalkraft auf die untere Strebe (42) auszuüben, wenn er ausgelöst wird.

2. System nach Anspruch 1, wobei die vertikale Stütze (14, 16) des Weiteren Pfostenstreben (16) umfasst, wobei der Griff (62) schwenkbar an den Pfostenstreben (16) angebracht ist.

3. System nach Anspruch 2, wobei die vertikale Stütze mit einer tragbaren Basis (12) versehen ist.

Revendications

1. Système de but de basket-ball comprenant :

    a) un support vertical (14, 16) comprenant un poteau (14) ;
    b) un ensemble support de panneau (20) ayant un bras de dessus (34) avec une extrémité proximale (36) couplée à un panneau et une extrémité distale couplée en rotation au poteau (14), et un bras de dessous (26) avec une extrémité proximale couplée à un panneau et une section médiane couplée en rotation au poteau (14) ;

c) un ensemble élévateur comprenant
une jambe de force inférieure (42) ayant une extrémité inférieure (44) apposée au poteau (14) ;
une jambe de force supérieure (48) ayant une extrémité supérieure (52) raccordée en rotation à une extrémité distale du bras de dessous (26) **caractérisé en ce que** l'ensemble élévateur comprend en outre un ensemble ressort ayant un ressort (56) enroulé de manière extensible autour de la jambe de force inférieure (42) et un logement (54) contenant le ressort (56) ;
la jambe de force supérieure (48) ayant une extrémité inférieure (50) couplée au logement (54) ; et

i) une poignée (62) attachée en pivotement au support vertical (14, 16) et attachée en pivotement au logement (54), et ayant un dispositif de déclenchement de ressort (66) configuré pour étendre le ressort (56) afin de libérer une force normale sur ladite jambe de force inférieure (42) lorsqu'il est déclenché et contracter le ressort afin d'appliquer une force normale sur la jambe de force inférieure (42) lorsqu'il est libéré.

2. Système selon la revendication 1, dans lequel le support vertical (14, 16) comprend en outre des jambes de force de poteau (16), la poignée (62) étant attachée en pivotement aux jambes de force de poteau (16).

3. Système selon la revendication 2, dans lequel le support vertical est pourvu d'une base portative (12).

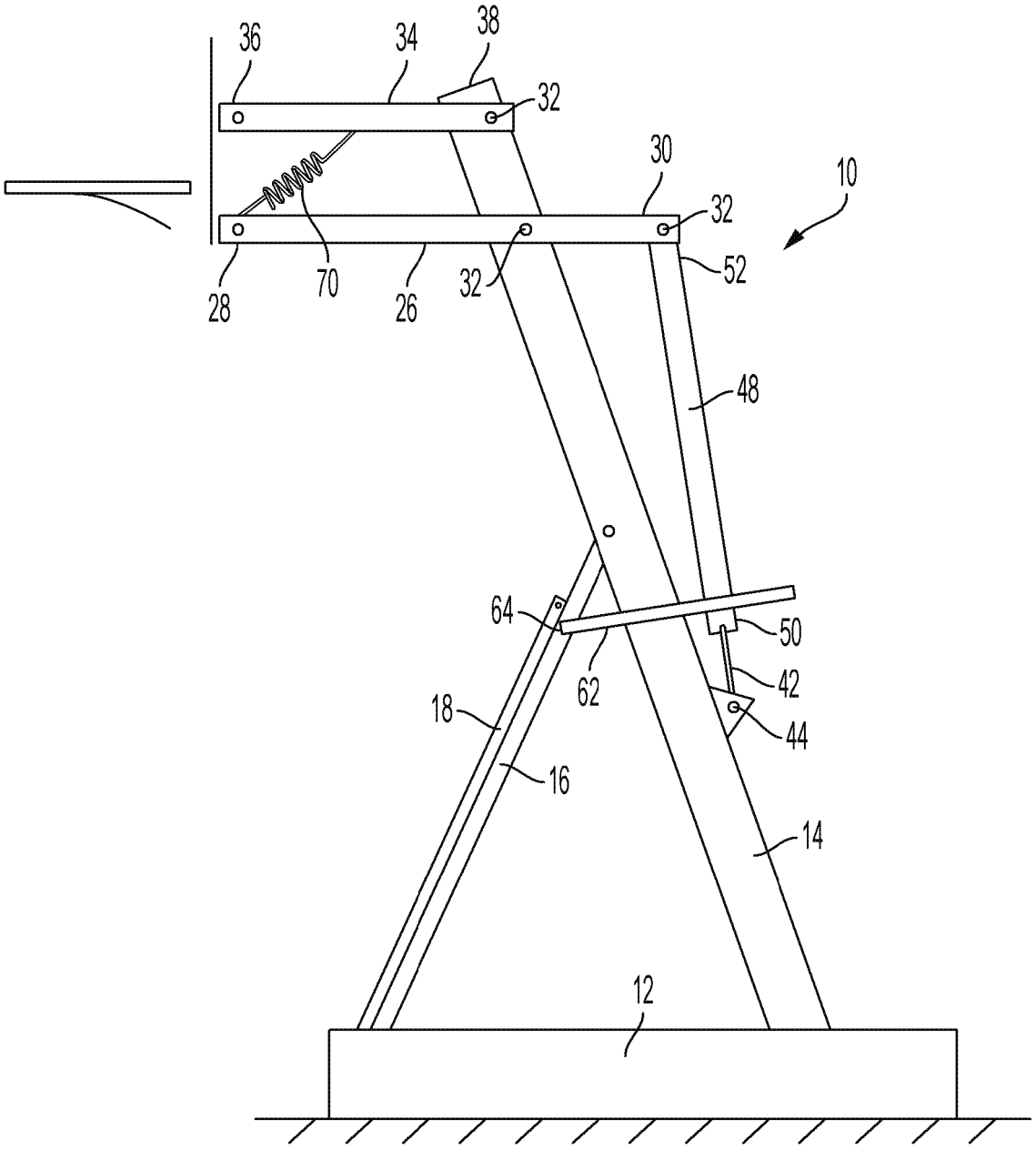

FIG. 1

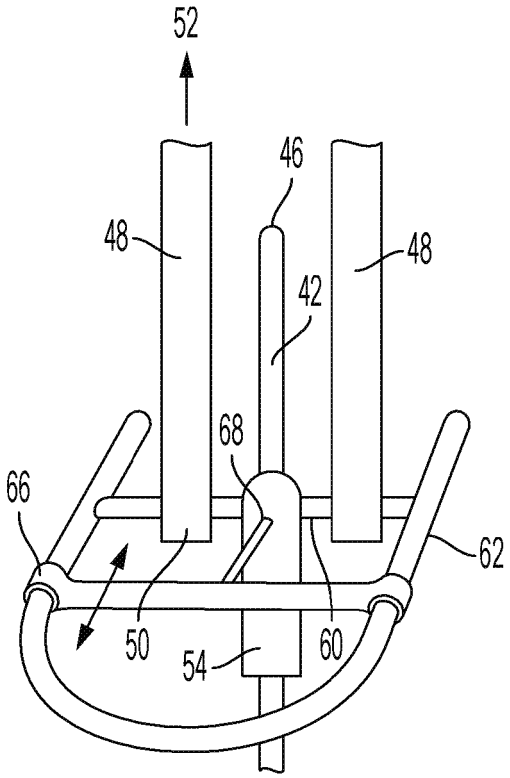

FIG. 2

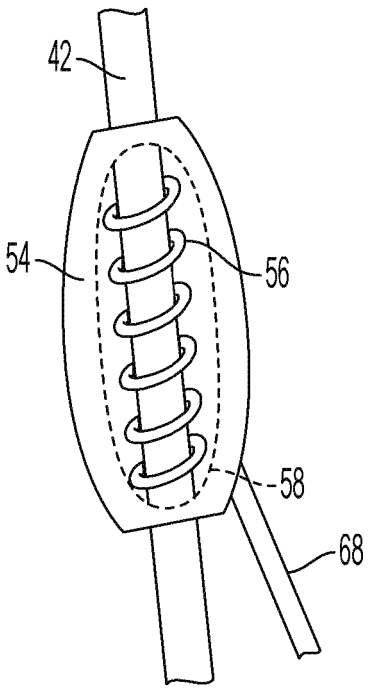

FIG. 3A

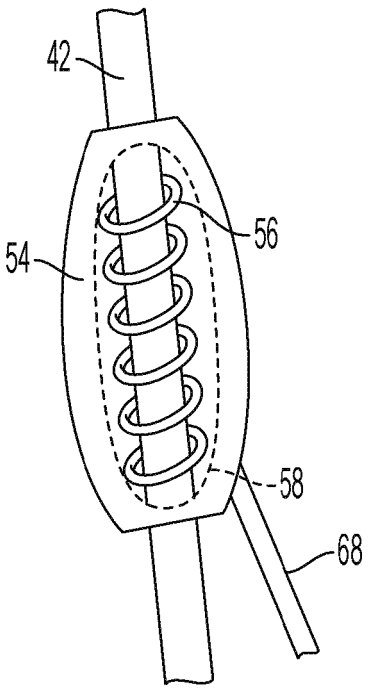

FIG. 3B

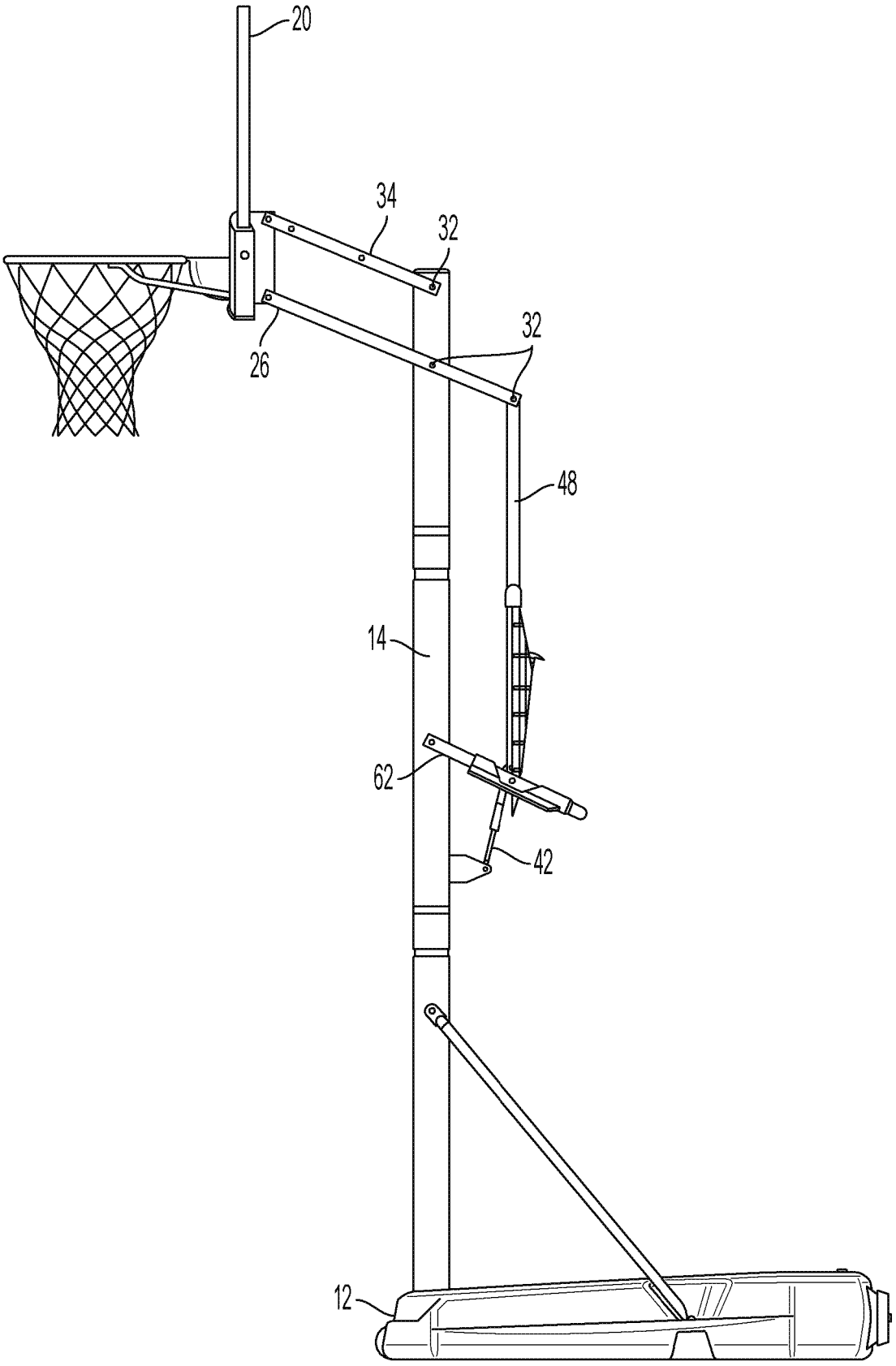

FIG. 4

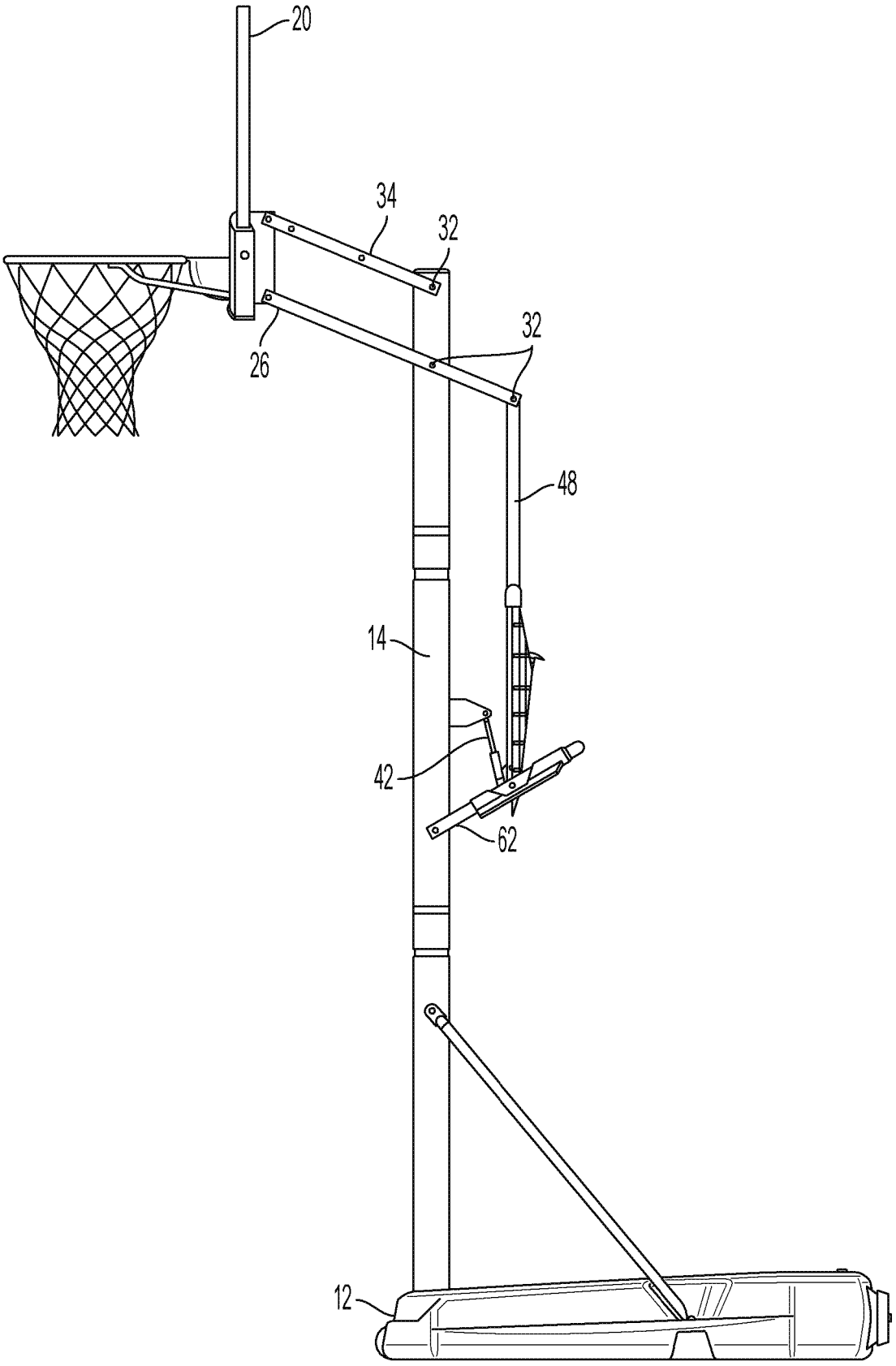

FIG. 5

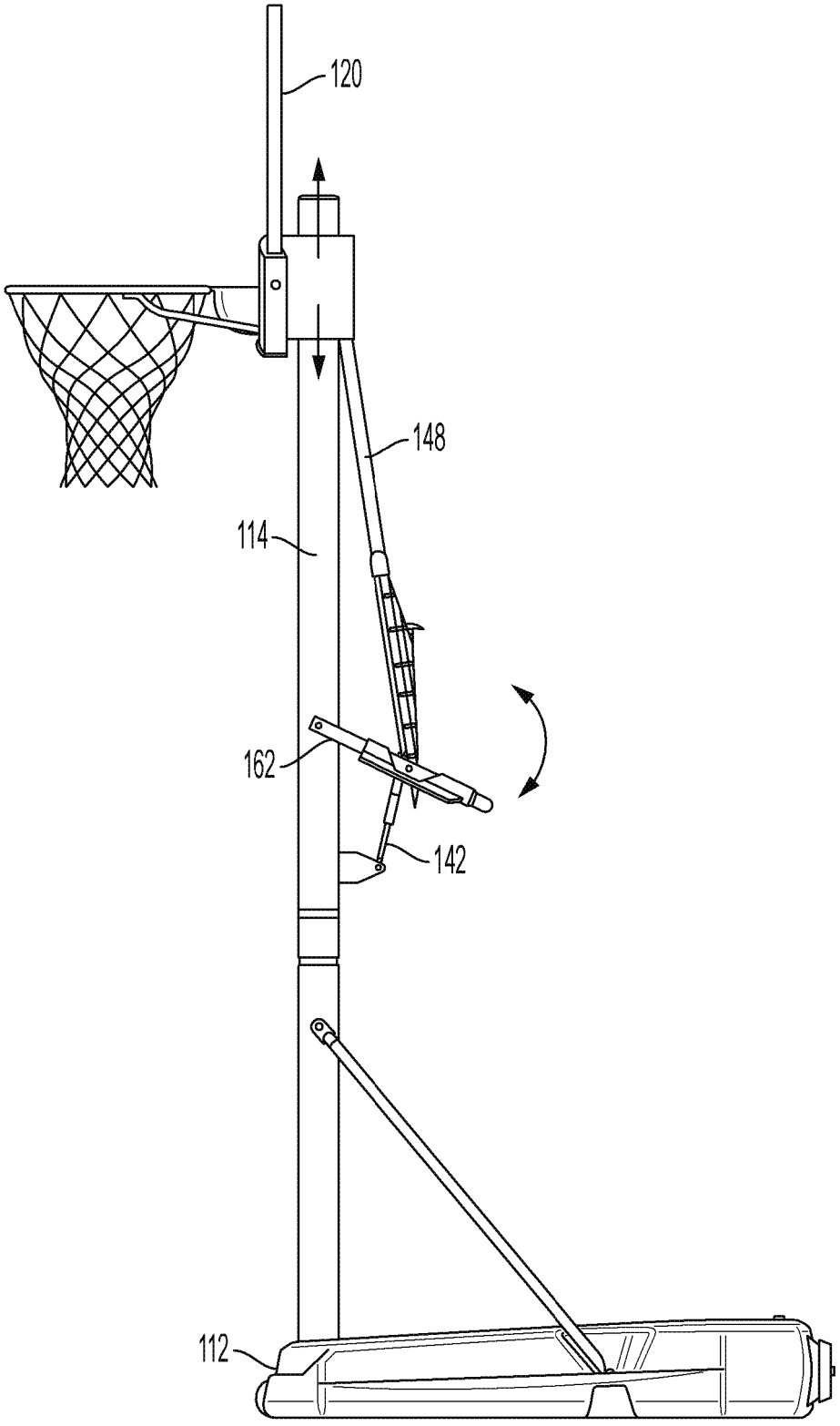

FIG. 6

REFERENCES CITED IN THE DESCRIPTION

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