July 1, 1969 J. N. MILLER ET AL 3,452,984

AUTOMATIC HOIST SYSTEM FOR BACKSTOP ASSEMBLY

Filed June 20, 1966 Sheet 1 of 2

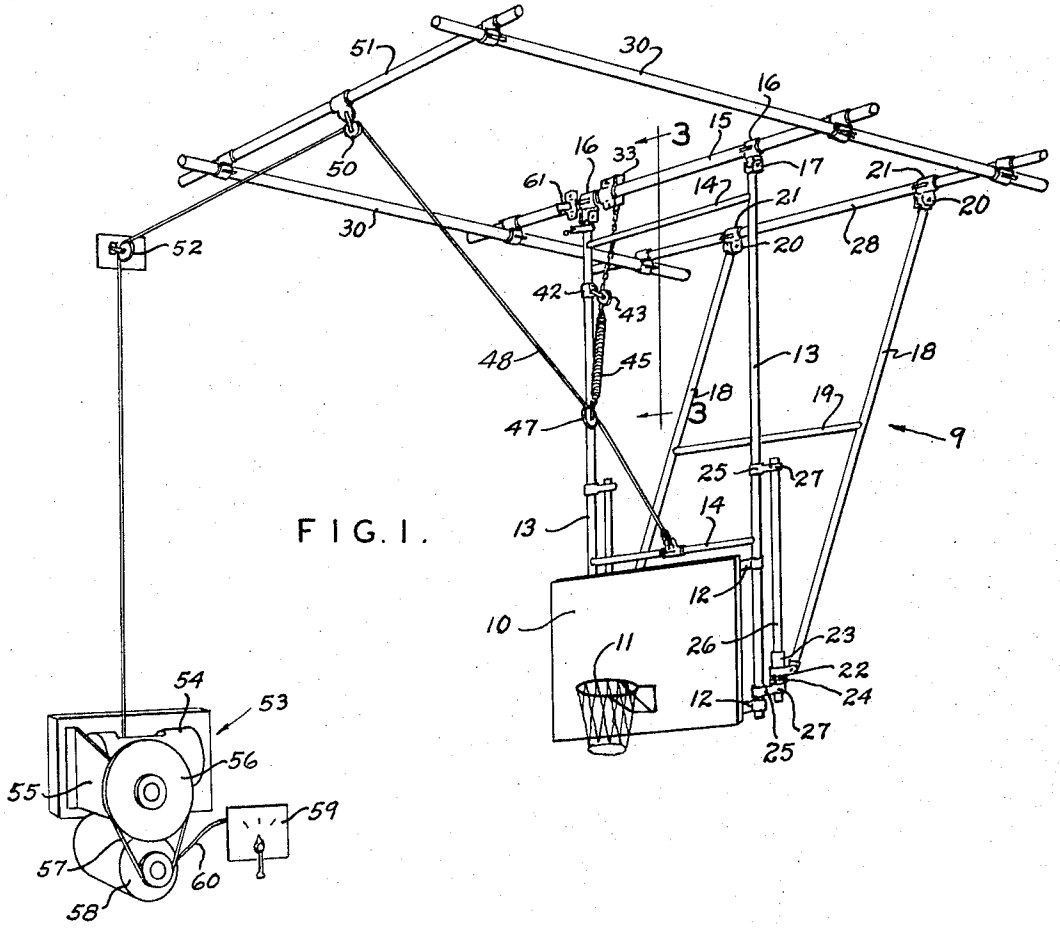


FIG. 1.

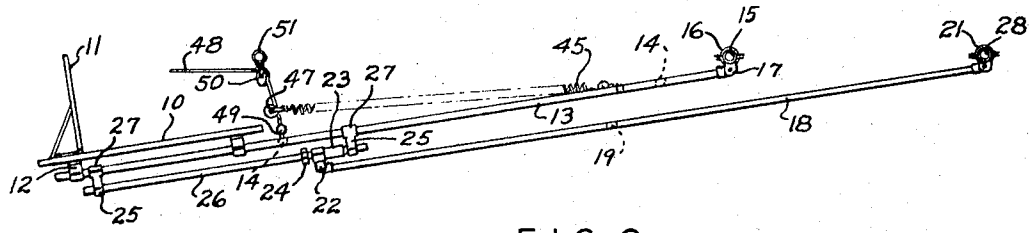


FIG. 2.

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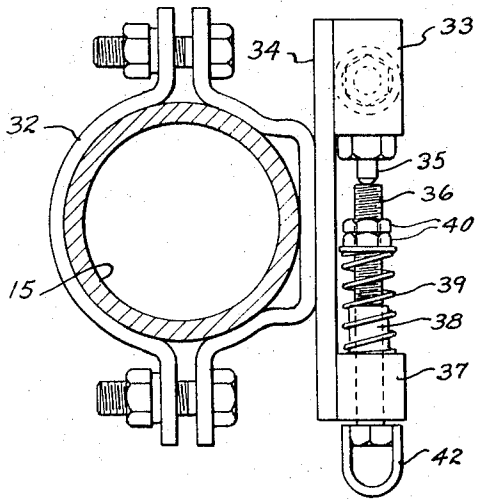


FIG. 4.

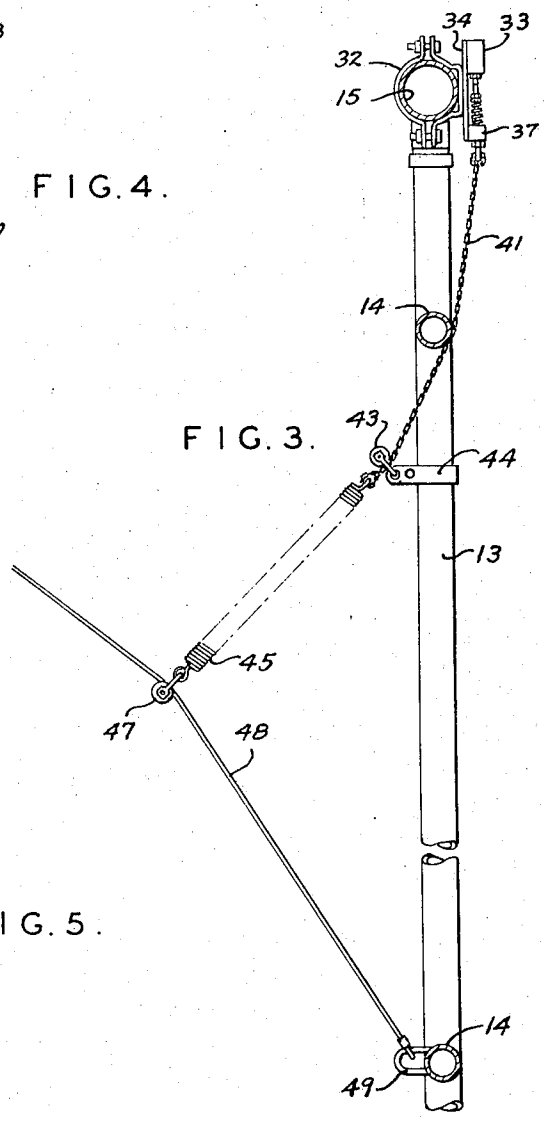


FIG. 3.

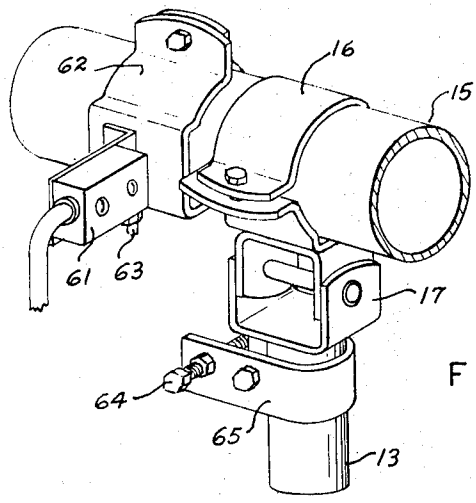


FIG. 5.

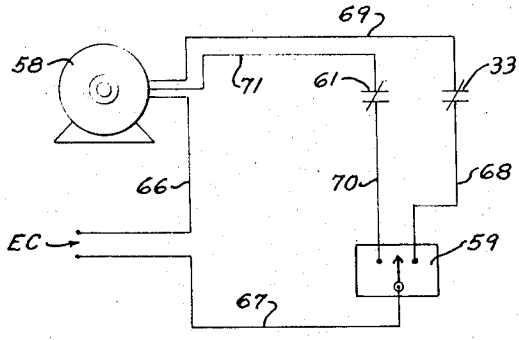


FIG. 6.

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AUTOMATIC HOIST SYSTEM FOR BACKSTOP ASSEMBLY

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U.S. Cl. 273—1.5 7 Claims

ABSTRACT OF THE DISCLOSURE

A hoisting arrangement for a folding backstop assembly of the forward-swing type where the hoisting cable is located over the field of play. A retracting means is operatively connected to a position control switch and maintains the hoisting winch energized to provide slack in the cable after the backstop is fully down and simultaneously pulls the cable upwardly out of the area of play so as to not interfere with the trajectory of the basketball. A novel circuit including a position control switch for the raised position is also shown.

This invention relates to automatic hoist systems for backstop assemblies of folding types.

A power operated winch for retractable backstops has heretofore required the operator to be in sight of the backstop for regulating the raising and lowering operation to prevent overrunning the winch. The problem in raising a backstop is stopping the power winch at the proper time to prevent stressing the backstop supports or stretching the hoisting cable. Conversely, in lowering the backstop the problem is to properly time the power winch so that the backstop is fully down and to avoid excessive unwinding of the hoist reel. Furthermore, when control devices are employed they do not accurately take into account the cable stretch so that improper lowering of the backstop often results, and raising the backstop with the use of timing devices often results in incomplete retraction.

It is therefor an important object of this invention to overcome the problems heretofore encountered with power retracted backstops by a simple yet unique backstop hoist control system that automatically accounts for cable stretch and accurately positions the backstop.

It is also an important object of this invention to provide an automatic hoist system for backstops that may be located remotely from the backstop and does not require the visual attention heretofore demanded.

A further object of this invention is to provide means directly responsive to the movement of the foldable backstop for controlling the power winch in both the retraction and lowering phases of movement.

Yet another object of this invention is to provide an automatic hoist system for foldable backstops that will prevent excessive winding and unwinding of the power winch to protect the operating components of the system and yet assure proper raising and lowering operation.

Still other objects and advantages of the present invention will be set forth in connection with the parts, components and elements of a presently preferred folding backstop system to be hereinafter described with reference to the accompanying drawings, wherein:

FIG. 1 is a perspective view of a folding backstop having the automatic hoisting means and controls therefor which will exemplify the principles of the invention, the backstop being seen when lowered into playing position;

FIG. 2 is a side view of the backstop when folded, certain components being omitted for the sake of clarity;

FIG. 3 is an enlarged fragmentary sectional view taken at line 3—3 in FIG. 1 of the backstop lowering control means;

FIG. 4 is a greatly enlarged sectional view of the control switch for the lowering control means of FIG. 3;

FIG. 5 is a fragmentary perspective view of the raising control means incorporated in the view of FIG. 1; and

FIG. 6 is a wiring diagram of the control system.

The drawings forming a part of this specification illustrate a backstop of forward folding character which will serve to disclose the principles of the invention. It is within the preview of the invention to apply the automatic hoist system to other types of foldable backstops.

In FIG. 1 the backstop assembly **9** includes a backboard **10** to support the usual goal and net **11** in normal playing position. The backboard is rigidly connected by brackets **12** to a pair of parallel tubular drop members **13** which are held in spaced relation by upper and lower spacer members **14**. The members **13** are hingedly fastened to a horizontal tubular member **15** by means of hinge clamps **16** secured on members **15** and hinge ends **17** secured to the upper ends of the drop members **13**.

The backboard **10** is braced in its down or playing position by brace members **18** that are crossbraced by member **19**. The upper ends of the brace members **18** have hinge ends **20** connected to hinge clamps **21** similar to the connections for members **13** and **15**. The lower ends of the brace members **18** are provided with slide fittings including a hinge end element **22** connected to slide sleeves **23** having adjustment elements **24** that cooperate with the brackets **25** of vertical guide rods **26**. The upper ends of the guide rods **26** are provided with brackets **25**, and both upper and lower brackets **25** (FIG. 2) are attached by clamps **27** to the members **13** supporting the backboard **10**.

It is seen in FIGS. 1 and 2 that the braces **18** are hingedly connected to a horizontal tubular member **28**, in a manner similar to the members **13**. The two tubular members **15** and **28** are rigidly connected by suitable fittings **29** to a pair of overhead structural members **30** which may be a part of a building structure, or may be specially provided to support the backstop structure as shown in FIG. 1. In FIG. 2 the folded position of the assembly illustrates the character of movement of the slide sleeves **23** on guide rods **26**, and especially the movement of drop members **13** relative to the horizontal member **15**.

The means for automatically raising and lowering the backstop, while generally located in FIG. 1, is shown best in FIGS. 3, 4 and 5, and in the wiring diagram of FIG. 6. In FIGS. 1, 3 and 4 the horizontal member **15** supports a clamp **32** for mounting a normally closed limit switch **33** by means of a bracket **34**. The switch button **35** is engaged by an actuator element **36** mounted in a bearing sleeve **37** on the bracket. The element is provided with a stop sleeve **38** of suitable length to limit the compression of the spring **39** by the adjusting nuts **40** which collapse the spring **39** when the actuator element is displaced by a pull chain **41** connected at the loop **42**. The direction of pull of the chain **41** can be adjusted by rotating the clamp **32** on member **15**.

The chain **41** extends from its connection at loop **42** to a pulley **43** connected to the adjacent drop member **13** by a clamp **44** where there is provided means to connect one end of a slack take-up spring member **45**.

The take-up spring member **45** has its opposite end connected to a pulley **47** through which is reeved the hoist cable **48**. One end of the cable **48** is connected to an anchor eye **49** fixed to the spacer member **14** adjacent the backboard **10**. The other end of cable **48** is reeved

through pulley 50 attached to overhead spacer 51 for the members 30 and through side pulley 52 before being connected to the drum or reel (not shown) of a power winch 53. The winding reel is enclosed in casing 54 which supports a gear drive unit 55 having its pulley 56 driven by belt 57 from motor 58. A reversing switch 59 is connected by conduit 60 to the motor 58 so that the cable can be wound up to hoist the backstop assembly 9 or can be unwound to lower it. The switch 33 controls the lowering of the backstop assembly as will be explained presently. It is to be understood that the . rm "cable" shall include any flexible hoisting means such as a rope, a chain, solid or stranded wire rope, or the like.

In FIG. 5 there is shown a switch 61 mounted by clamp 62 on the support member 15 adjacent one of the drop members 13 which is hinged at 16–17 to member 15. The switch 61 has its button 63 located to be actuated by means 64 adjustably mounted on bracket 65 carried by member 13. The switch 61 is normally closed when the backstop is lowered, but opens the circuit when, on hoisting the backstop assembly 9, the actuator means 64 hits button 63 and opens switch 61. Th switch 61, as well as actuator 64, may be positionally adjusted by the clamp means employed.

Referring now to FIG. 6, the circuit layout includes a source of electrical current EC having one lead 66 connected to the motor 58 and another lead 67 connected to the center tap of the reversing switch 59. From reversing switch 59, one lead 68 connects to the limit switch 33 and from there a lead 69 connects to motor 58. Another lead 70 connects to the limit switch 61, and from there lead 71 connects to motor 58.

With the present apparatus properly adjusted and installed, and the assembly 9 in lowered playing position, the switch 33 will be held open by actuator 36 and switch 61 will be normally closed as actuator 64 is separated therefrom. The reversing control switch 59 may now be turned to the "up" position in which leads 67 and 70 will be connected to complete a circuit to winch motor 58. The action of cable 48 going taut to pick up the weight of the foldable assembly will stretch out spring means 45 and eventually pull chain 41 against spring 39 so that switch 33 can reset itself to normally closed condition. Spring 45 and chain 41 have a length which is sufficient to compress spring 39. Fine adjustments for actuator 36 is made at nut 40 so that the eye 42 is just clear of the sleeve 37 with the switch open. The motor 58 will continue to reel up cable 48 until the actuator 64 strikes button 63 to open switch 61 at the elevation desired for the backstop assembly. The cable 48 remains taut at this time so that the spring 39 is compressed to allow switch 33 to stay in its normally closed position. Thus, when the control switch 59 is subsequently turned to its backstop "down" position, leads 67 and 68 will be in circuit with lead 69, motor 58 and lead 66 to operate motor 58 in a reverse direction for unreeling the cable 48.

The lowering action of the winch 53 keeps cable 48 taut until the backstop is in fully down position with its stops 24 at the bottom of slide rods 26. The winch continues to unwind the cable 48 to allow spring means 45 to retract or pull the cable 48 up and away from the backboard where it will not interfer with a basketball aimed at the goal 11. The take-up spring 45 at this time will contract until its reduced tension is overpowered by the compressed spring 39, and when this occurs the spring 39 can displace the actuator to open the switch 33. This switch opening action will stop motor 58, but not before the cable 48 has been unreeled enough to allow the retracting spring 45 to pull it up and out of the way of the area above and in front of the backboard.

It is believed fully clear that the assembly permits automatic retracting of the hoist cable to a position above the face of the backboard when the backstop is in its lowered position before the switch 33 automatically breaks the electrical circuit to the winch motor 58. This breaking of the electrical circuit permits having the winch motor control switch 33 in the "on" position longer than the time required just to lower the backstop, but not long enough to completely unwind the cable on the winch past the "unwound" condition where it would start to rewind in the opposite direction. In the raised position and during the lowering operation, the backstop hoist cable is taut from the weight of the backstop which pulls the retractor cable pulley forward. This pull transfers through the retractor cable and exerts tension on the extension spring which in turn pulls the switch actuator bolt 36 down, releasing the switch to the normally "closed" position, closing the circuit for lowering the backstop. The spring 39 on the actuator bolt 36 provides pressure to actuate switch 33 when tension is off of the retract spring 45. Additional pressure adjustment is made by means of the spring adjustment nuts 40, if adjustment is required, to overcome the weight of the retraction spring and cable assembly. Use of the "up" and the "down" limit switches 33 and 61 provides automatic control of raising and lowering the backstop assembly 9 without the operator of the control switch 59 being in sight of the backstop.

The foregoing description relates to a preferred embodiment of this invention, but all modifications that fall within the scope of the appended claims are to be included wherever possible.

What is claimed is:

1. In a backstop assembly which is foldable between raised and lowered positions over a playing area, a line attached to said backstop assembly and extending forwardly of said backstop assembly to a pulley means located over said playing area upwardly out of the field of play, said line extending to an electrically driven winch means adapted to raise and lower said backstop assembly on energization of a circuit supplying power thereto, the improvement comprising a position switch means in said circuit energized during lowering of said assembly to permit said electrically driven winch to continue operation after said backstop assembly has reached a down position and thereby provide slack in said line, and retracting means operatively connected to said position switch means and said line to pull said line upwardly of said playing area so as to be out of the way during play when said backstop assembly is in the lowered position, said position switch means causing said winch to cease operating after said line has been pulled upwardly of said playing area.

2. The improvement in foldable backstop assemblies as defined in claim 1 wherein said circuit includes a second position switch means adapted to de-energize said circuit when said backstop is fully raised.

3. The improvement in foldable backstop assemblies as defined in claim 1 wherein said position switch means includes a resiliently biased actuator means, means to vary the bias on said actuator beans, and said retracting means including spring means of sufficient strength to maintain said biased actuator extended and said position switch closed until said line is fully retracted from the field of play.

4. In a backstop assembly including a backboard, a support means supporting said backboard and being foldable between raised and lowered positions over a playing area, a line having one end connected to said backstop assembly, an electrically powered winch remotely positioned from said backboard, the opposite end of said line being connected to said electrically powered winch for raising and lowering said foldable support means, a circuit for supplying power to said electrically driven winch and permit rotation to alternately raise and lower said assembly, said circuit including position control switch means and a raising and lowering selector switch means, said position control switch means being serially connected to said selector switch in a part of said circuit energized during lowering of said backstop assembly,

a retract means having one end joined to said position control switch and the other end joined to said cable, said position control switch being normally closed during lowering, and said retract means being operative to open said position control switch to de-energize said winch after said assembly is fully lowered to a playing position and said line is pulled away from said playing area.

5. The backstop assembly of claim 4 wherein said circuit includes a normally closed second position control switch means in series with said selector switch means when said circuit is energized for raising said backstop assembly, said second position control switch being opened when said backstop assembly is fully raised.

6. In a backstop assembly, a backboard, foldable support means operably connected to said backboard to fold said backboard between raised and lowered positions over a field of play, a line having one end connected to said foldable support means, an electrically powered device remote from said backboard, the opposite end of said line being connected to said powered device for raising and lowering said foldable support means, a pair of position control switch means, a raising and lowering selector switch, and electrical circuit means connecting said selector switch, said pair of position control switch means and said powered device whereby said powered device is rendered selectively operable by said selector device to raise and lower said foldable support means, said pair of position control means being operable to stop said powered device in said raised and lowered position of the foldable support means, each of said pair of position control switch means being normally closed but alternately opened responsive to said assembly reaching its raised and lowered positions, respectively, for stopping said powered device, and a retract member connected to said line spaced from its said one end and connected to one of said pair of position control switch means, said retract member being extensible during raising and lowering of said assembly, and being retractable in the lowered position of said assembly to clear said line from above said backboard and stop said powered device.

7. The backstop assembly of claim 6 wherein said retract member includes a spring means, and said one of said pair of position control switch means includes a resilient element normally acting to open said one switch means, said spring means acting against said resilient element until said line is fully retracted from the field of play when said backstop assembly is fully lowered.

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U.S. Cl. X.R.

108—66; 273—95