United States Patent

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[54] CONTROLLED TRAMPOLINE STRUCTURE

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[52] **U.S. Cl.** **272/65**

[51] **Int. Cl.** **A63b 5/10**

[58] **Field of Search** 272/65

[56] **References Cited**

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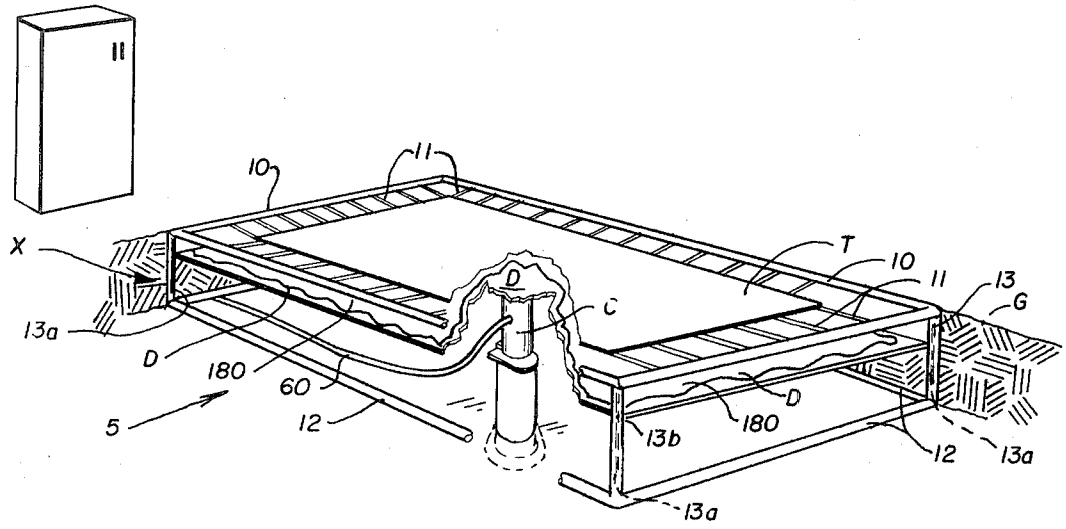
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[57] **ABSTRACT**

This invention is a trampoline net structure having means for rendering the same inoperable by placing an object in contact with a trampoline net member or loosening the support of the trampoline net member. This invention relates to a trampoline net structure having control means to render the net structure inoperative with the control means having a coin accumulator mechanism and a warning signal to inform the user to disengage from the trampoline net before the same is automatically made inoperable. More specifically, this invention relates to a hydraulic structure operable to move a support object into and out of engagement with a trampoline net structure after a predetermined time period controlled through a timer member to render the same inoperative.

4 Claims, 9 Drawing Figures



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SHEET 1 OF 3

FIG. 1

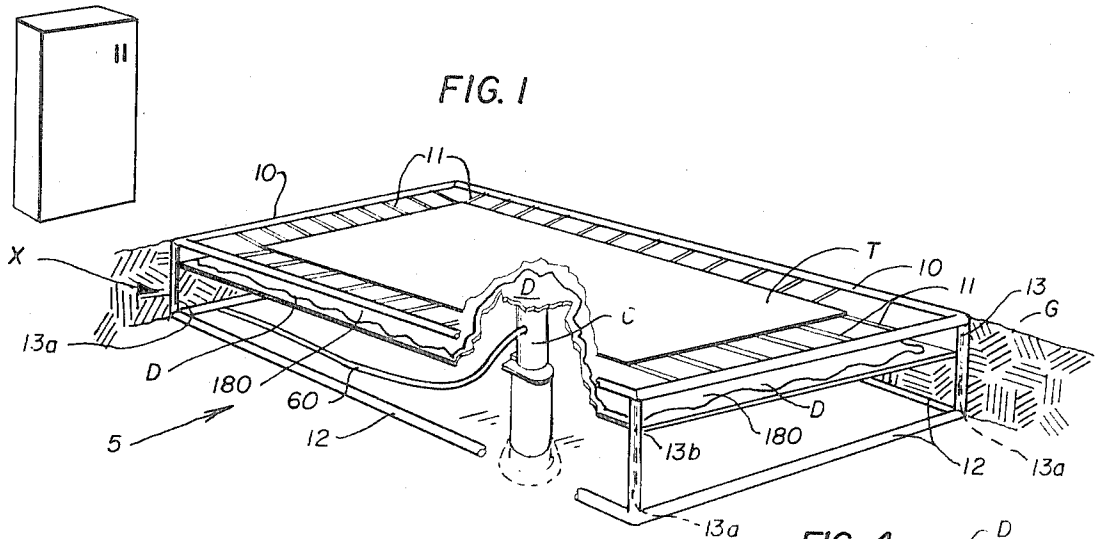


FIG. 4a

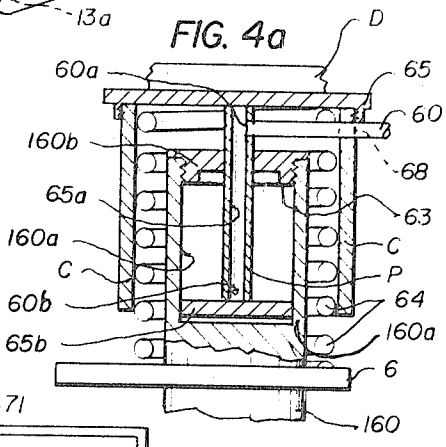


FIG. 2

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FIG. 3

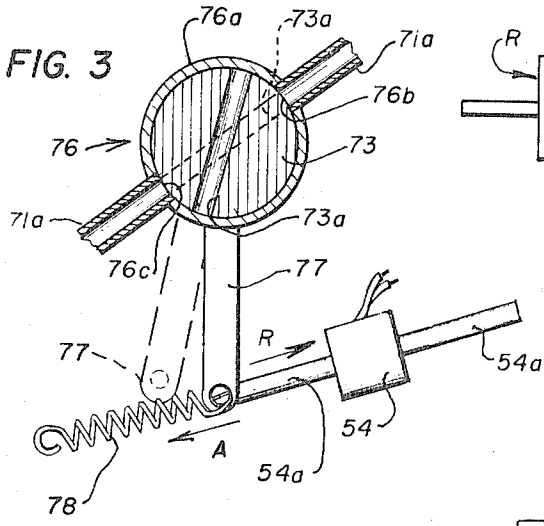


FIG. 5

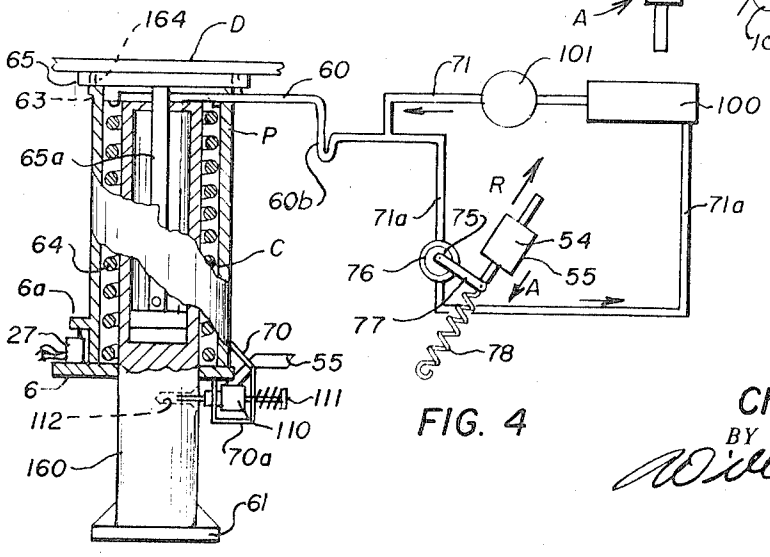


FIG. 4

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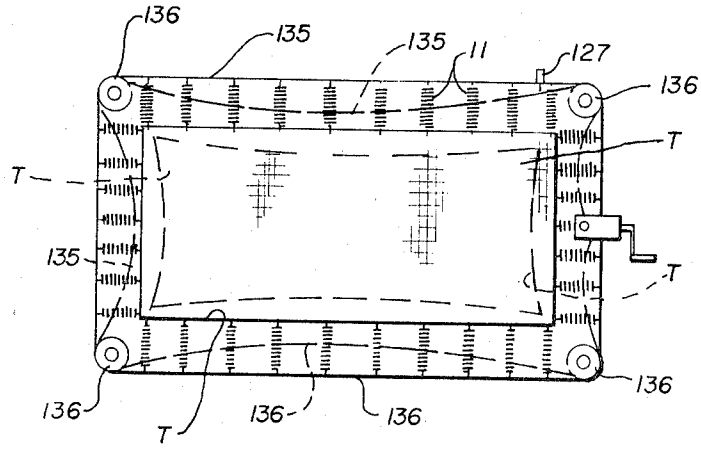


FIG. 6

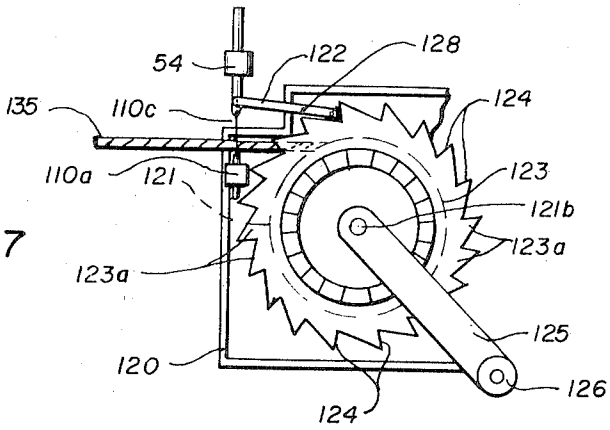


FIG. 7

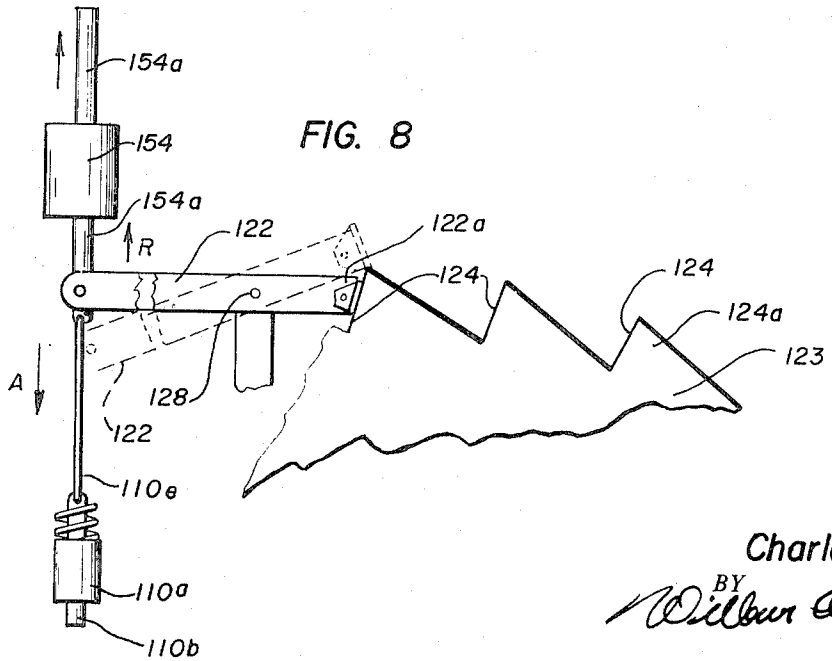


FIG. 8

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CONTROLLED TRAMPOLINE STRUCTURE

My invention pertains to trampolines, and more particularly to the provision of a coin-control timer mechanism in combination with an electrical actuator means for automatically operating a device in combination therewith designed to permit only a predetermined play time period on the trampoline net, and for automatically then placing the net in nonusable condition upon the expiration of that time.

My invention relates specifically to so-called public trampoline amusement game lots, whereon there are several trampoline nets.

In a preferred embodiment, I provide each individual trampoline with a coin and timer electric circuit combination and mechanisms where the player has to insert a coin to cause a solid floor, normally held upwardly by a spring means against the under side of the net to make the net nonplayable, to be lowered by a hydraulic means thereunder for a predetermined time, such as for a play period of approximately 10 minutes. Then at the expiration of that period of time the control mechanisms will automatically cause the floor to be raised to close proximity under the net to prevent further play on the net.

I provide an audio and a visible alarm warning systems in combination with the circuit and control mechanisms to warn the player a short time before the floor is raised, so that he may have sufficient opportunity to get off and not be hurt by any continued play as might otherwise occur were the floor to be raised suddenly without giving him warning and time to get off.

I provide suitable electrical circuits to accomplish my said purposes, and wired so that an operator of the play plot, should he for any reason desire, could have full control to release the wooden floor from just under the trampoline net or to return it into that position.

Trampoline nets are very beneficial exercising games to those who play them and are fast becoming universally used in places of amusement. The public play plot or lot may be constructed with a plurality of those nets and, preferably, with each net being mounted on a frame in a suitable depression in the ground so that the nets are substantially even with the surface of the ground.

In my novel trampoline net coin-controlled and restricted time playable preferred floor combination, I use suitable hydraulic pressure with a ramjetlike contractable cylinder and piston as the means to lower the floor and to hold the floor removed from and under the net, or into trampoline operative condition, in combination with an electric circuit and timer-actuator valve control means for in turn controlling that pressure, and in combination with a spring means for otherwise normally raising the floor into inoperative trampoline condition.

I provide hydraulic pressure and actuator means, including a hydraulic reservoir and conduit, having a pump in the conduit, and directing the fluid from the pump into the internal portion within the ram-cylinder, with a closable valve-controlled bypass conduit from the main conduit, having a rotary valve therein, for controlling the hydraulic pressure in the cylinder and in one valve position thereof for relief pressure returning of the liquid to the reservoir through that valve when the trampoline is desired to be placed in unplayable trampoline net condition. I operate my said rotary valve in that bypass fluid line by an electrical solenoid, as an actuator means in valve-closed direction upon the energization of that solenoid for usable trampoline play, and as an actuator means in valve-open direction, by a tension spring on deenergization of that solenoid for nonusable trampoline play.

It will be seen the basic concept of my invention is to provide suitable coin-control and timer means in combination with an operable means for normally making the net unplayable and for rendering the trampoline net playable for a period of insert of a coin and then automatically rendering it inoperable on end of that period.

I do not wish to be limited by the preferred embodiment mentioned as there are many other suitable coin-control timer-actuator operable net-control combinations possible within the teaching of my invention, such as having the outer peripheral horizontal net tension coil springs, normally attaching the net to the outer trampoline peripheral frame, instead of being directly fastened to the frame, to fasten those springs to an outer peripheral flexible steel loop cable combination with that loop operably tightened by a suitable windlass, and when tightened held by a suitable releasable latch means, and automatically releasable upon the expiration of a predetermined time-controlled by my coin-control timer-actuator mechanisms, and when the outer steel loop cable is released thereby to cause a sagging of the entire net rendering it nonoperable or nonplayable by the net sagging as a loose mass several feet below its normal playable position. In other words, I show a modification of my invention in the form of a means to slacken the trampoline cords to make the net nonoperable after a predetermined time of play, automatically controlled by my said novel coin-timer-actuator and electrical-circuit control combinations.

Other objects and features of my invention will become apparent from the following detailed descriptions.

While in the following descriptions and the accompanying drawings, I describe and illustrate preferred embodiments of my invention, it is to be distinctly understood that many changes and modifications and other different methods of carrying out my invention may be had within the teaching thereof and within the scope of the claims hereto appended.

In the drawings:

FIG. 1 is a perspective partially exploded view of a trampoline net constructed with a vertically movable floor D thereunder, designed to be placed in a depression in the ground, with the trampoline net T thereof substantially in horizontal alignment with the surface G of the ground.

FIG. 2 is a diagrammatic sketch of my ram-cylinder tension-spring and hydraulic valve combination method of raising and holding that floor just under the trampoline net T, on hydraulic in-operation, to render the net nonusable.

FIG. 3 is an enlarged vertical partial cross-sectional diagrammatical view of the rotary valve which I use in the hydraulic system, shown as operated in the direction R by energization of a solenoid **54** or into valve-closed position to cause a lowering of the floor D to render the trampoline net T useable.

FIG. 4 is an enlarged partial fragmentary vertical cross-sectional and diagrammatic view of the ram-cylinder coil-spring and hydraulic system which I use to operate the floor d, illustrating certain additional parts thereof, showing hydraulic pressure caused floor D in lowered position.

FIG. 4*a* is an enlarged fragmentary vertical cross-sectional view of the coil-tension spring-expandable hydraulic contractable ram cylinder I use to raise and lower the floor D under the trampoline net.

FIG. 5 is a diagrammatical layout of the coin control electrical circuits I use, having timer control, alarm buzzer, light systems and actuator-control means combinations to operate the hydraulic valve **76**, in conjunction with a limit switch and a latch mechanism, and other parts so shown.

FIG. 6 is a reduced diagrammatical plan view of a modification of my invention having a novel releasable flexible horizontal loop rope construction for normal holding of the trampoline net.

FIG. 7 is a diagrammatical partial view of the use of my novel coin-control, time-and-actuator circuit means for releasing the latch of the windlass used in normally holding the rope loop of the trampoline net of this modification.

FIG. 8 is an enlarged diagrammatic partial view of the solenoid lever latch system I use to operably engage and release the pivot latch of the windlass in this second modification.

Throughout the drawings, like characters of reference have been used to indicate like or similar parts.

In FIG. 1, G designates the surface of the ground, and in a depression or pit X in the ground I place the trampoline unit, indicated by the reference **5**. The trampoline woven net T is

conventionally suspended from its outer horizontal rectangular frame **10** by suitable coil-tensioned springs **11**. The frame **10** is supported by and on a like lower horizontal rectangular frame **12** as a base and by identical hollow posts **13** at each corner between frames **10** and **12**. The inner vertical side of each post **13**, inwardly of the framework, has a vertical elongated slot **13***a* formed therein as a guide for receiving a knoblike projection **13***b* of each corner of the floor D, as will be explained. The posts **13** hold the upper rectangular frame **10** spaced horizontally parallel about 3 feet above the lower frame **12**, being of sufficient distance to permit a person to jump or bounce on the net T and without the stretchable springs **11** of the net extending the net downwardly as far as the place of the lower rectangular frame **12**.

A solid horizontal doorlike floor, indicated as D, is provided to be mounted on a vertical hydraulic ramjetlike cylinder C and its piston P, centrally of the floor unit, for vertical operation of the cylinder on and with relation to the piston.

I provide a vertical piston rod **160** secured rigidly to a base **61** and anchor that base solidly by lug screwbolts into a concrete footing well below the lower floor of the depression in the ground.

The upper portion **160***a* of rod **160** is formed hollow as a cylindrical tube. A screw-threaded cap washer **160***b*, having a central opening, is seated onto **160***a* to otherwise close the upper end of the hollow upper rod tube **160***a* except for its central washerlike opening. A larger outer cylinder tube C is suitably secured, as by screw-threading, at its upper end to a cap **65** to close that upper end, as shown in FIG. **4***a*. A peripheral shoulder platform or lug **6** is secured to the rod **160**, just below the cylinder C, when the parts are as shown in FIG. **4***a*. Before insert of cap washer **160***b*, an inverted T piston P is placed with its leg portion through the opening of that washer and with its crossbar portion **65***b* circular and a size to slideably act as a piston within the upper hollow cylindrical portion **160***a* of the rod **160**. The leg of that inverted T-piston P is hollow and is adapted to fit slideably snug within the opening of washer **160***b*. A tension coil spring **64**, of a length to normally cause an expansion of the parts of this ramlike cylinder, is during assembly placed within the cylinder C, outside of the inner hollow rod portion **160***a*, and extends between upper cap **65** and outer platform **6**, for reason to be explained. The internal peripheral neck threadable portion of upper cap **160***b* acts as a stop member on a spring raising of piston **65***b* thereagainst by spring **64**. An inlet port **60***a* is provided near the top of hollow leg **65***a*, and that is connected by a suitable flexible hose or pipe **60** extending through a port **68** in the cylinder C wall to the hydraulic line **71**. An outlet port **60***b* is provided in leg **65***a* near its lower end within the chamber portion of **160***a*.

A downwardly and outwardly extending platform **70** is attached to the outside of the cylinder to form a horizontal shoulder **70***a*, as shown exteriorly of the lower end of the cylinder, and on which I mount a solenoid latch mechanism **110**, to be explained. On the same side of the rod **160**, as illustrated in FIG. **4**, to the latch **110**, I provide an indented horizontal socket opening **112** in the rod and adapted to receive the armature pin **111** of the latch **110**, as will we explained. Substantially diagrammatically opposite that opening **112** in the rod **160**, I provide a limit switch **27** secured on platform **6** exteriorly to the rod **160** and which has a mechanism adapted to be triggered by a lug **6***a* secured exteriorly of cylinder C, and as will be explained, upon movement of the cylinder C with relation to portion **160***a*. The solid floor D extends horizontally on top of and is secured to the flange **65** and extends completely under the trampoline net T, and at each corner of the floor there is the knob extension **13***b* adapted to slideably extend within the slot **13***a* of the adjacent post **13**, as explained, so that upon a raising and lowering of the floor D, each **13***a* knob slides vertically in its slot **13***b*, and thereby the floor D is prevented from rotating horizontally, and in turn, the cylinder C being attached to the floor is thereby prevented from rotating on the rod **160**, since posts **13** are fixedly held in place.

Now to describe may actuator mechanism and combinations for effecting and controlling the lowering and raising of the solid floor D out of and into so-called inoperative and operative play use of the trampoline spring-net T. In this modification I provide a hydraulic means for lowering and holding the heavy solid floor D, against the tension of spring **64**, in combination with my vertically operable cylinder-piston mechanism just explained, and an electric circuit coin-and-timer-controlled actuator means to be explained. In FIG. **2**, I diagrammatically illustrate that floor D and its cylinder C with relation to the reciprocating piston portions **160***a* and P, showing floor D as raised by the spring **64** and in close proximity to the underside of the net T, which floor position I call trampoline-inoperative position. Whereas in FIG. **4**, I show may ram-cylinder hydraulic-pressure-actuated movement, against the tension of spring **64**, to thereby cause the floor D to be lowered below the trampoline net T, and this position I call trampoline-operative position.

I provide a suitable liquid hydraulic power source means for that cylinder C operation. On a platform within the bed X in the ground, not shown, I provide a liquid hydraulic reservoir, **100**. I connect that supply reservoir by a suitable hydraulic pipe **71**, having a flexible portion **60***b*, to the collar projection around the port **68** at the top of the cylinder C, and provide a suitable hydraulic pressure pump **101**, operated by a suitable electric motor M, in that supply line, so as to normally force pressurized liquid therethrough into the interior **160***a* of the cylinder chamber to cause a plunger separation of piston P from opposing cap head **160***b*, to normally thereby lower the floor D against the tension of the coil spring **64**. I provide an offset or relief pipe **71***a* from the pipe **71** and extending back to the reservoir, and in that offset pipe **71***a* I provide an operable rotary-pressure release valve **76**. Rotary valve **76** is of conventional construction, having a tubular exterior body **76***a* with aligned peripheral diametrically opposed ports **76***b* and **76***c* to and from which pipes **71***a* are secured and extend, with a frictionally tight but rotatable internal solid valve core **73** having a transverse diametrical opening **73***a* therein positioned, in a certain rotational position thereof, to be aligned with the inlet and outlet ports and pipes **71***a*. It will be understood, that upon a further rotation of **73** within **76** a disalignment of that opening **73***a* with said inlet and outlet ports, **76***b* and **76***c*, will occur and then no liquid can pass through that central valve core opening **73***a*. The core **73** has a peripheral indentation formed adjacent each of its ends, and which are aligned with similar peripheral indentations formed on the inner sides at adjacent ends of the valve cylinder **76**, and within each of those aligned peripheral opposing indentations at each end is placed a suitable neoprene ring seal washer, so as to make the valve leakproof, in conventional manner. The inner valve core **73** has a reduced extension neck **75** at one of its ends and suitably solidly secured thereto is a radially extending arm **77**. On the bracket for this valve, I suitably position an electric solenoid **54**, having its armature shaft **54***a* slidably operable to the right as shown in FIG. **4**, upon energization thereof or in the direction indicated by the arrow R, and that armature being pivotally connected on energization to rotatably operate the radial valve by its arm **77** against the tension of a spring **78** to close that valve, as a release actuator means for effecting trampoline net play. It will be seen in FIG. **3**, that on solenoid **54** deenergization in direction A, that the spring **78** will rotate arm **77** to thereby open the valve **76**, by aligning valve opening **73***a* with ports **76***b* and **76***c* to let pressured fluid in cylinder **160***a* and between head **160***b* and piston **65***b* to escape back through **71***a* to reservoir **100**, to let spring **64** raise floor D, as will be explained. Thus my vertical operable hydraulic cylinder-piston, just heretofore explained, is hydraulically raisable by spring **64** on that open valve **76** condition. Solenoid **54** is energized to operate the solenoid shaft **54***a* in the direction R to close the valve **76**, as explained, and operation of **76** in the other direction or direction A, on the solenoid deenergization, is caused by the action of the contraction tension spring **78** as explained. All of said parts together comprise what I call ac-

tuator means for controlling the actuating or lowering of the floor D, and thus to make the net T in usable or operable position, and also, respectively, for raising the floor D and thus making the trampoline net T in nonusable or inoperative position.

To repeat I thus have thereby provided and explained *an actuator means*, comprising the parts just explained, and as referred to in a dual capacity, namely, referring to FIGS. 3 and 4, and the arrows there designated as directions A and R, I shall refer to the direction A as open-valve *return-actuator means*, and shall refer to the direction R as closed-valve *release-actuator means*. As explained, the operation of the parts just explained in the one direction A will permit the floor to be raised or returned by spring 64, when there is no hydraulic pressure within chamber 160*a*, to thereby prevent trampoline play, and is called return-actuator means; and, conversely, the operation of those parts just explained in the other direction R will by hydraulic pressure in cylinder chamber 160*a* thereby cause the floor to be lowered or placed into a position for permitting trampoline play, and is called release-actuator means.

I will now explain the parts of the electrical circuit, which I utilize to operate or control my just explained actuator means, in combination with my coin, timer and alarm controls for causing or releasing hydraulic pressure in turn to cause the floor to be lowered against spring 64 tension, for play on the net and for permitting returning of the floor to its raised position to cause the net to be inoperable, respectively.

Referring to FIG. 5, in the circuit diagram, I have selected a diagram circuit which permits all the components to be used on a standard powerline, a power circuit P such as a regular 100 volt line. The circuitry is adapted to operate generally by pulses, that is, by using switches which are spring-loaded or otherwise adapted to momentarily close to place only a pulse on the switch and relays, and interlocks are used where it is desired to hold a circuit in its powered position. A coin chute Cc is adapted to receive a coin to trip a mechanical lever 20 which is linked to close a first, normally open coin-actuated pulse switch 21, and to close a second, normally open coin-actuated pulse switch 22.

The pulse switch 21 is in the return actuator circuit 25. The circuit 25 commences at one power source lead, extends through a holding relay 26, thence to the pulse switch 21, thence to the solenoid 54 of the actuator which is indicated as a solenoid valve combination, FIG. 3, thence to a normally closed limit switch 27 and thence to the other lead of the power circuit. The limit switch 27 is mounted upon the lug 6 on the rod 160 and its operator finger is contacted by the lug 6*a* on the cylinder C, and this is physically operated by lowering of the table D. When the table D is completely lowered, it is locked by a spring-loaded mechanical latch 111 on the cylinder which snaps into a socket 112 on the lower solid portion of the rod 160, at the lowered C position, and at the same time the limit switch 27 is opened to open and deenergize the circuit 25, and the motor M of pump 101 stops. A shunting branch 25*a* includes a relay switch 26*a* which functions as an interlock. When switch 21 momentarily closes, electric current passing through the circuit 25 energizes the relay 26 to close switch 26*a*. Thereafter, after switch 21 opens, the electric current passes through circuit 25, through circuit 25*a* to power the actuator A and does so until the limit switch 27 opens to open all switches in this circuit.

The switch 22 is in a play-period circuit 30 which is connected to a power lead, extends through a normally closed timer switch 31, thence through a play-period timer 32, thence through a holding relay 33, thence through the switch 22, thence through a relay solenoid 34 and thence to the other lead of the power circuit. The timer 32 is of a conventional type which may be set to mechanically actuate a time arm 32*a* to pull and then release this arm after the expiration of a selected time interval such as for example, 5 minutes. A shunting circuit 30*a* shunts the holding solenoid 33 and includes a switch 33*a* to form an interlock. Therefrom, when the pulse switch 22 momentarily closes by placing a coin in the chute Cc the current through the circuit 30 energizes solenoid 33 to close its switch 33*a* and thereafter, after switch 22 opens, the current continues through the circuit 30 through the shunting lead 33*a* until the time arm 32*a* shifts switch 31 open to open the circuit and permit switch 33*a* to also open.

Solenoid 34 in this circuit 30 is energized to open a normally closed solenoid switch 34*a* in a circuit 35 which included a warning light 36 to warn people that the table is at the up position and that the trampoline is inoperative. Circuit 35 commences from one lead of the power circuit extending through light (or lights) 36, thence through the normally closed switch 34*a* and thence to the power lead. Thus, as soon as solenoid 34 is energized by circuit 30, switch 34*a* opens and remains open as long as the circuit 30 is energized to shut off lights 36 to indicate that the trampoline is operative and of course, as soon as the timer 32 opens switch 31, switch 34*a* again closes and the warning lights turn on.

The circuits heretofore described condition the table from the inoperative to the operative position. A further circuit system is required to operate the release solenoid 110 and preferably, such is delayed by a warning signal such as a buzzer to get the occupant off the trampoline so that he will not be injured. A starting circuit 40 commences from one lead of a power circuit, extends through a relay solenoid 41, thence to a normally open switch 42 connected with the arm 32*a* of the timer and thence to the outer lead of the power circuit. When the timer 32 ends its period and the arm 32*a* is shifted, switch 42 momentarily closes to energize solenoid 41. This circuit 40 starts another time delay circuit 45. This time delay circuit 45 commences at a power circuit lead, extends through a normally closed switch 46, thence through a warning period timer 47 having its shifting arm 47*a* connected to the switch 46. Thence the circuit extends to a normally open switch 41*a*, thence through a holding relay 48 and thence to the other lead of the power circuit. This circuit 45 is shunted by a lead 45*a* having switch 48*a* to form an interlock. Accordingly, when the timer 32 momentarily closes switch 42 to momentarily close switch 41*a*, the current flowing through circuit 45 energizes relay 48 to close switch 48*a* and permit the current to flow through circuit 45*a* after switch 41*a* opens. Thereafter, current flows through circuit 45 and circuit 45*a* until the timer 47 completes its cycle, say for example 30 seconds, and shifts the arm 47*a* to open switch 46 and to open the circuit 45*a*. Another lead 45*b* shunts the timer 47 and includes a warning buzzer 49 or similar device to emphasize to the occupant of the trampoline that his time is about up and that he should get off the trampoline before the table lifts to render it inoperative.

It is to be noted that the arm 32*a* of the timer 32 could be connected directly to the switch 41*a*, as indicated by a dot-dash line, to thereby eliminate circuit 40 if the setup were advantageous to do so.

A control relay circuit 50 is connected to one lead of the power circuit and extends thence to a control relay 51, thence to a normally open switch 52 which is connected to the arm 47*a* of the timer 47 and thence to the other lead of the power circuit. When the arm 47*a* shifts the switch 52 is momentarily closed to energize solenoid 51.

The solenoid 51 actuates a normally open relay switch 51*a* in a relay actuator circuit 55. This circuit connects with the lead of the power circuit and includes: a normally closed, manually operated hold switch 56; the release solenoid 110; the normally open switch 51*a*; and extends thence to the other lead of the power circuit. Whenever solenoid 51 is energized, it closes switch 51*a* to energize this circuit and to operate the release solenoid 110. In the circuit thus described, the release solenoid 110 pulls the mechanical latch 111 as heretofore mentioned, and it is contemplated that a sustained current would not be necessary for this release solenoid, for, once pulled the table D is released to be lifted by the springs 64.

A circuit 57 shunts the normally open switch 51*a* and includes a normally open, manually operated switch 58. The

switch 58 is a release switch and the switch 56 heretofore mentioned is a holding switch. When it is desirable to use the trampoline for an extended period of time after the table has been lowered, the switch 56 may be opened manually so that the release solenoid 110 will not operate to pull latch 111 after the warning buzzer period and the trampoline may be used for an indefinite period, by valve 76 remaining closed and the table D down as in FIG. 4. The normally open switch 58 may be closed to operate the release the solenoid 110, and pull latch 111 to permit table D to be raised by 64 ahead of time, for example when an occupant leaves the trampoline with time still available. After solenoid 110 is operated and the latch 111 pulled, the fluid pump 101 motor M remains inoperative until another coin starts the operational cycle again on insert at Cc, as will be understood. A number of other control switches such as 56 and 58 may be arranged in different ways to operate this circuitry.

Now to explain the modifications of my invention by a means to slacken and thereby control the trampoline cords, illustrated in my FIGS. 6, 7 and 8. Therein I diagrammatically illustrate the trampoline net T secured in conventional manner, but, instead of to a solid frame 12, its outer horizontal net periphery I secure by its springs 11 to a normally flexible but drawn tight steel outer peripheral loop or drawstring rope 135, extending horizontally through horizontally aligned suitable pulley 136 on posts 13 at each corner of a suitable similar frame. The pulleys are suitably journaled in a horizontal plane to the framework at each post corner to form a rectangular loop as shown. The tension springs 11 each extend from that peripheral steel rope 135 to the network T by each spring having a suitable slideable ring at its outer end, not shown, through which the rope 135 extends as an overall drawstring loop. Upon a slackening of the rope 135 the net T will sag, as indicated diagrammatically by the dotted lines 135 and T of FIG. 6. For trampoline play that rope 135 is first tightened by a player, by a manually operable conventional windlass 123, indicated diagrammatically as having a conventional crank wheel having peripheral latchlike teeth 123*a*. The windlass wheel is suitably journaled for turning on a pivot 121*b* by conventional means to a suitable framework 120, and there is a radial winch 125 secured to the wheel 123, with a projecting handle 126 extending from the end of 125 for the player to grasp to turn in clockwise direction to tighten the loop rope 135, as will be explained. A conventional windable drum member means 121 is a part of the windlass wheel 123 and windingly turns with it. That windlass drum is adapted to have one end of the rope 135 conventionally secured thereto and wound therearound, so that upon a clockwise turning thereof the rope will be wrapped around it and thereby tightened and held by that drum by its latch member, as will be explained. The other end of that rope is suitably securely attached to the frame adjacent that windlass. A conventional operable limit switch 127 is secured to the frame and positioned as illustrated to be physically operated or opened by contact with and on the loop rope 135 being tightened, for similar purpose to switch 27 of the first modification, to deenergize the circuit and allow trampoline play by a tension coil spring of a solenoid 110*a* causing a locking-the-latch pivot lever 122 in latching-holding position, illustrated by solid lines, to permit rope 135 to remain tightly held by 121 to allow that play. Secured to the windlass framework is a pivoted lever latch member 122 having its latch end 122*a* frictionally adapted to rest in engagement against an individual peripheral tangential latch surface 124 of the latch wheel. The lever latch 122 is pivotally secured rockably vertically on a fulcrum pivot 128 on the frame. That latch engagement of lever 122 is effected upon and by energization of solenoid 154, by its armature shaft 154*a* having its lower end suitably pivoted to the longer lever end of 122 opposite to its latch engagement end. That solenoid energization of 154 causes 122 lever or latch-engaging R direction movement, and which I call release-actuator direction R movement for permitting tightening of 135 for operative play use of the trampoline net, as explained. Pivot lever latch 122 comprises a latch-locking means for holding the rope 135 on the windlass drum 121, after it is manually tightened thereon, for permitting trampoline net T play, and that locking is held against pivotal release by another solenoid 110*a*, secured thereto as explained and illustrated, and as heretofore similarly in the prior modification with relation to latch 111 and its release solenoid 110; as when 110*a* is operated or energized and latch 122 thereby disengaged, then net T becomes inoperative by the slackening of rope 135 by armature 110*b* pulling the pivot lever 122 on its pivot into unlatched relationship with the windlass 123. To restate, pivoted latch lever 122 is adapted to be disengaged from such latch-holding relationship upon deenergization of the solenoid 154 and when and on solenoid 110*a* energization, which then causes the armature shaft 110*b* to be moved in the direction which I call return-actuator direction A, as explained, to thereby cause latch disengagement of 122 and the trampoline net loop rope 135 to become loose, as a result of the windlass drum then becoming unwound and the net then hanging loosely downwardly into inoperable position as indicated by the dotted line 135*a* sagging position of outer loop wire 135, and by dotted line T of FIG. 6. It will be noted on my windlass-winding wheel 123 peripheral cogs 123*a*, that I provide the holding surface 124 of each cog on an eccentric extended peripheral radius with relation to that wheel 123. I provide a pivotal shoe 122*a* at the latch-holding end of the lever latch 122, for ease of frictional latch insert and release of that latch-holding end 122*a* against and from such a surface 124 of any given cog.

I use substantially the same electrical parts and circuits as heretofore explained, without the motor M, as in my prior preferred embodiment with relation to the operation of the similar solenoid there indicated as 54, but in this modification for solenoid 154, and with a limit switch 127 in this modification for prior switch 27, and, except for the latch 11 release by solenoid 110, in this modification I use the lever 122 and release it by the release solenoid 110*a*, as will be understood. Shaft 110*c* extends arm 110*b* pivotally to the end of 122 as shown. I use substantially those same circuits to provide the timing of the play period, after insert of a coin and for the operation of a buzzer alarm and the danger light as hereinbefore explained and used in the preferred embodiment. It will be understood in this modification, that solenoid 154 energization operation causes its armature shaft 154*a*to move in the direction indicated by the arrow R and which I call release actuator direction "R." Therefrom it will be seen that, before the insert of a coin into the chute Cc of the coin mechanism, the solenoid 154 will be deenergized and the armature 154*a*will have been moved in the direction A, in the prior play cycle, by the solenoid 110*a*, as explained, so that the latch 122 will be in latch disengagement or in the dotted-line position illustrated in FIG. 8, and that though a player may attempt without coin insert to tighten the rope 135 by a clockwise movement of the windlass 123, by its handle 126, nevertheless the latch will not engage any tooth 124, and so no latch-tightening of rope 135 can be accomplished. To be able to latch holdingly play the net T, the player must first deposit a coin in the chute Cc and the circuit then resulting therefrom will cause the solenoid 154 to be energized, and the armature 154*a* will thereby be moved in what I call release-actuator direction R, or upwards as illustrated in FIG. 8, thereby pivoting the lever 122 on its fulcrum 128 and thereby engaging the latch end 122*a* of 122 with a tooth edge 124, and then the winch can be suitably revolved clockwise manually by the player and the rope 135 thereby tightened and held by latch 122 and then the trampoline net T can be played on or used while so rope 135 latch held for the timer circuit period allowed. It will be understood that on such 154 energization, as the drum of the windlass is by a player manually turned clockwise by wheel 123 as explained, that the latch end 122*a* *of pivoted lever 122 will bouncingly ride over cog teeth 123a*, by a pivoting of that latch lever 122 on its fulcrum pivot 128, until the spring of 154 seats end 122*a* into an indentation ad-

jacent an edge 124 of a cog tooth, into latch-holding position, on stop of turning of the wheel 123*a*. It will be further seen that the play-period timer circuit, warning-light circuit, get-off buzzer circuit and the main release actuator circuit, as illustrated in FIG. 5 and as previously explained, will go into operation on a coin insert and will operate as before in the preferred embodiment, and the player will have the timer period to play the trampoline net for the coin he has placed in there, before the buzzer rings and the light goes on and before the latch 122 in this modification will be disengaged by solenoid 110*a*, as explained, and the winch wheel 123 thereby loosened at the end of that time period, by latch 122 disengagement caused by solenoid 110*a*, which will then result in a slackening of the rope 135 and inability to play the net thereafter until another coin is inserted. The handle 125 of the winch wheel 123 will be understood to be conventionally ratchet-constructed so as on that wheel to apply revolving torque 51 clockwise movement only to that wheel, and further thereby to permit that wheel to turn counterclockwise without turning that handle with it, though not illustrated.

A suitable mattresslike cushion pad, similar to pad 180 used on door D of the first embodiment, is provided in this modification also, under the net, though not shown, for obvious reason of preventing injury to a player, if net T is attempted to be played on when in inoperative condition.

To summarize, with relation to the operation of this second modification illustrated in FIGS. 5, 6, 7 and 8: Lever latch 122 is connected to armature 154*a* of solenoid 154; Lever latch 122 holds on a cog of 124 by friction; Solenoid 154 pulls lever 122 into operative latch-holding position and provides spring action of that lever; Solenoid 154 is on or energized until cable 135 is tight and limit switch 127 opens and solenoid 154 then is off; Then lever 122, held by unenergized solenoid 110*a*, holds rope 135 tight (similarly to 110 holding in the prior modification); and at the end of play time the solenoid 110*a* is then energized by the timer circuits to pull lever 122 to release its latch-holding position to then slack the cable 135 as the net T of the trampoline is then made unplayable.

Having thus fully illustrated and described a preferred modification and also an alternate modification of several possible embodiments of my invention, I wish to be bound in the teaching, spirit and scope thereof only by the hereunto appended claims.

What I claim and desire to secure by Letters Patent is:

1. In combination with a bounceable, resilient trampoline net:

a. a restraining means to be normally shifted to a first position substantially in engagement with the underneath side of said net to render the same inoperative to prevent its unauthorized use and to be shifted to a second position out of engagement with the net to permit it to be operative and used;

b. a shifting means connected to said restraining means to shift the restraining means from the said first position to the second position and to hold the restraining means at the second position; and

c. a timer means operably connected to said shifting means to reverse the action of said shifting means to return said restraining means to the first said position after the lapse of a selected time interval without interferring with one using said net except rendering said net unable to move in a downward movement.

2. In combination with a bounceable, resilient trampoline net as defined in claim 1, including a second timer means and a warning signal, said second timer means being correlated with the first said timer means to energize said warning signal and emit a warning signal a short period of time before the first said timer means actuates to reverse said shifting means to move same to said first position.

3. A gram comprising a bounceable trampoline net connected to a frame member, actuator means closely associated with the trampoline and being operative for alternatively rendering said trampoline net usable and nonusable, control means for operating said actuator means to render said trampoline net usable said control means being operatively connected to said actuator means, electrically operated means for effecting actuating of said actuator means, said control means comprising switch means dominating said electrically operated means, and said switch means being so arranged so that, when said actuator means is actuated, said trampoline net is rendered usable for a predetermined period, said actuator means including a windlass windable and releasable drawstring flexible loop operable means connected to said trampoline net and said frame member for controlling the usable playability of the trampoline net by varying the tension from usage to nonusage conditions on operation of said control means.

4. A game comprising a bounceable trampoline net combination as defined in claim 1 and further defined by said actuator means including a pressurized-fluid source and means for connecting the fluid source to said actuator means, and including an operable valve mounted in said fluid source operably connected to said control means.

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