

[54] BASKETBALL TRAINING DEVICE

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46/119, 129, 163; 124/32, 34; 40/106.3, 106.31,  
106.34, 106.35, 106.41

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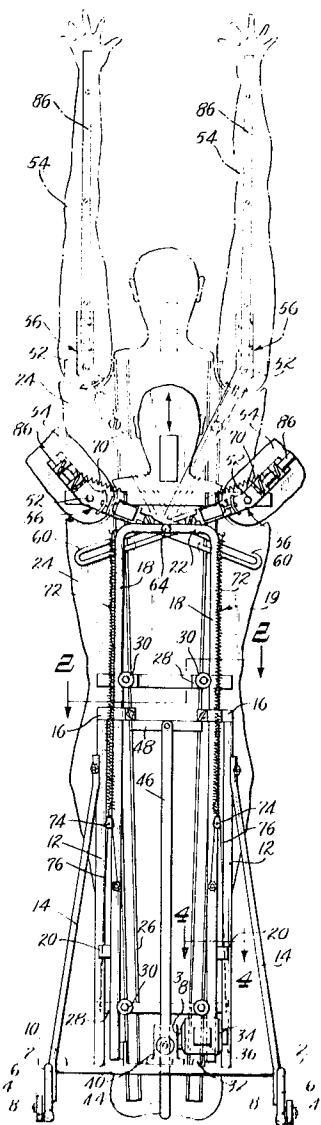
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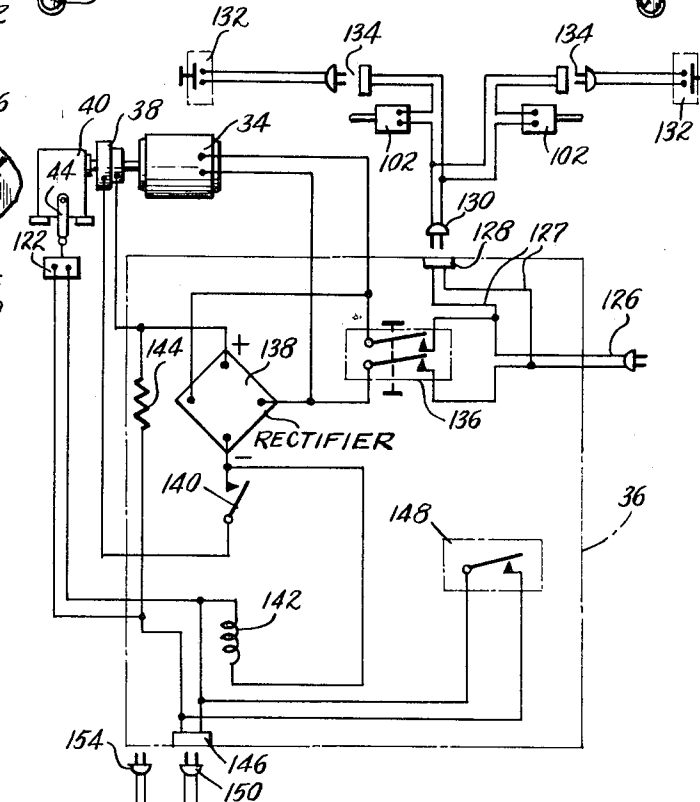
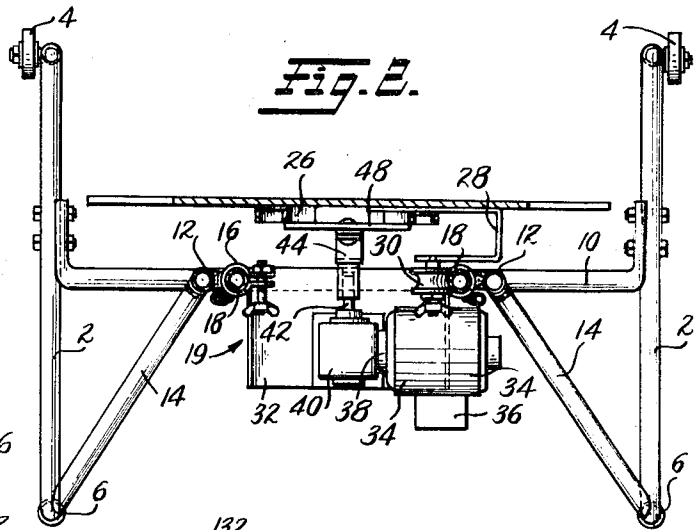
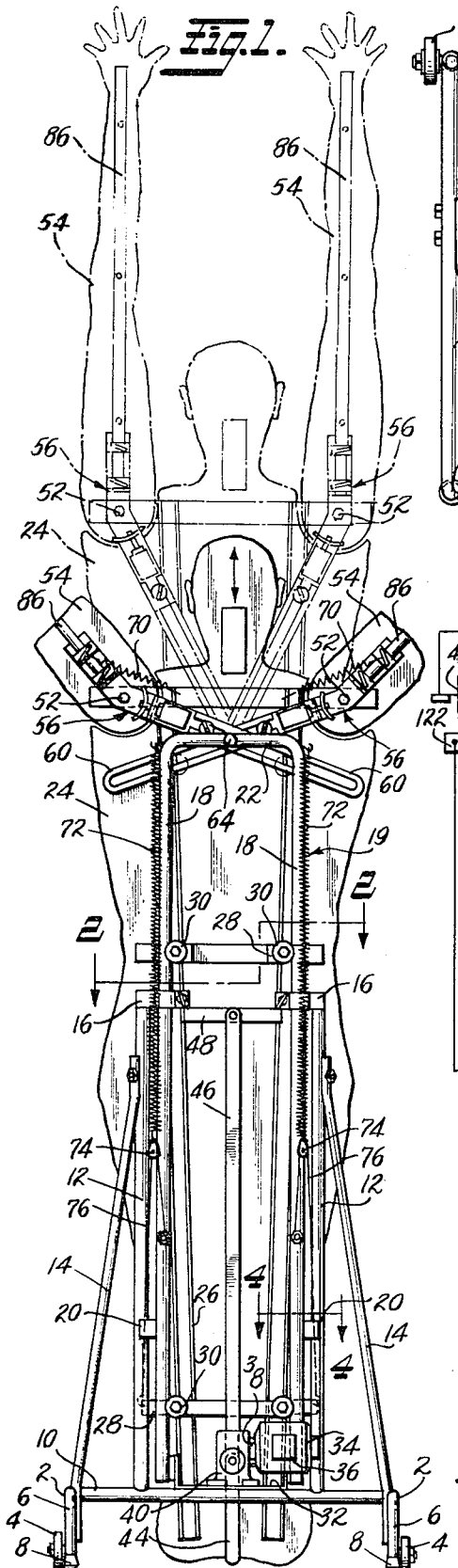
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[57] ABSTRACT  
A representation of a basketball player is mounted for up and down movement to simulate jumping. A drive motor causes the representation to jump up and come down once, and a cycle of operation can be initiated at will by a person operating a remote control device or by a player shooting from a given position for a field goal. The representation is vertically adjustable to simulate players of different height and has pivoted arms that swing upwardly as the figure jumps upwardly. Either or both arms can be disconnected from the drive motor. Selectively operable controls permit continuous jumping movement.

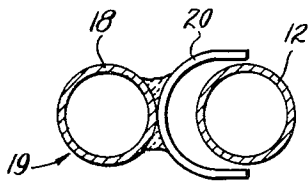
11 Claims, 10 Drawing Figures



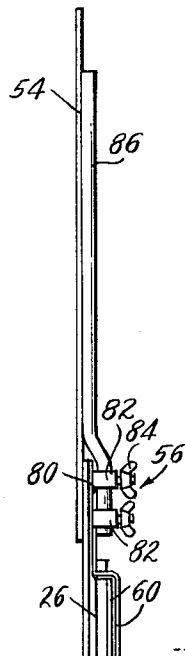


**Fig. 10.**

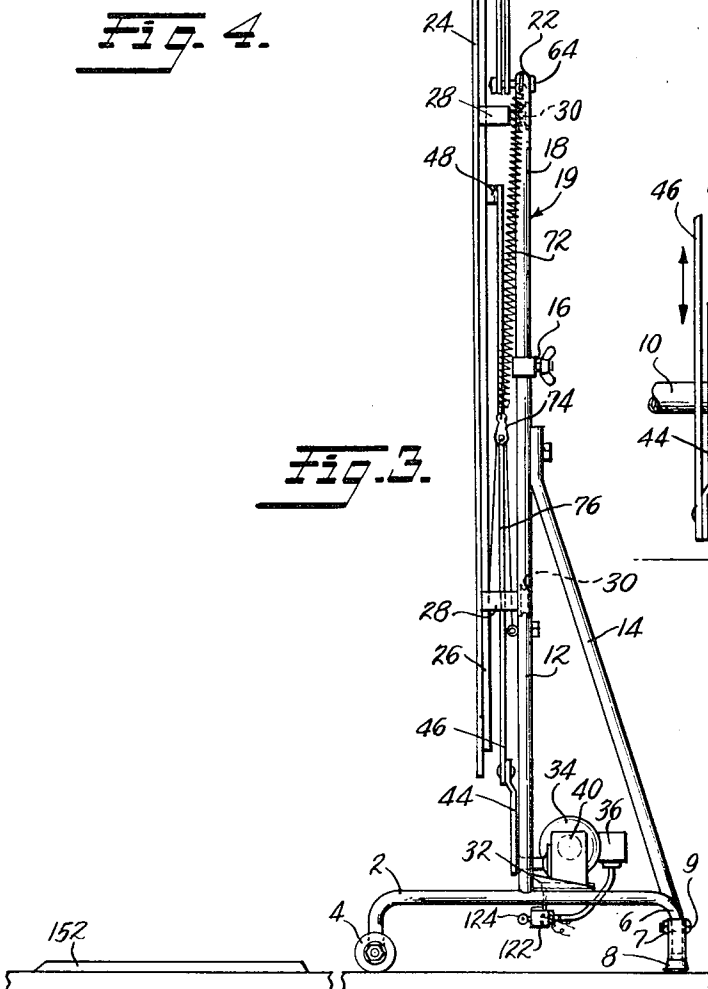
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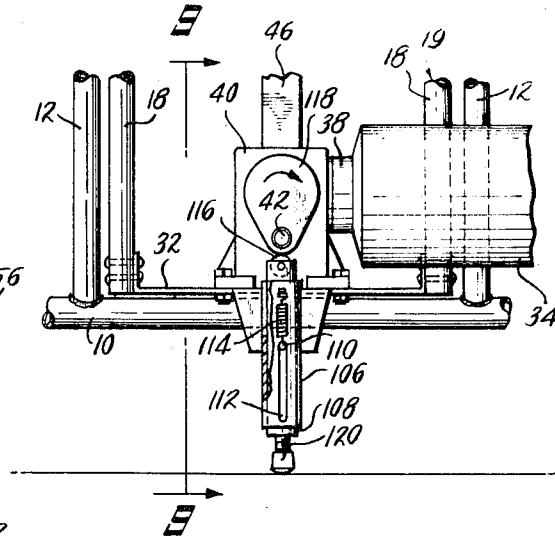
**Fig. 4.**



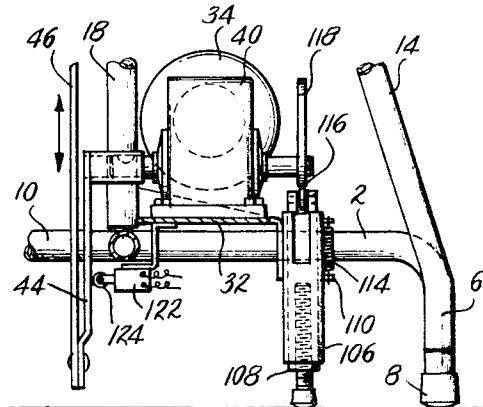
**Fig. 3.**



**Fig. 8.**



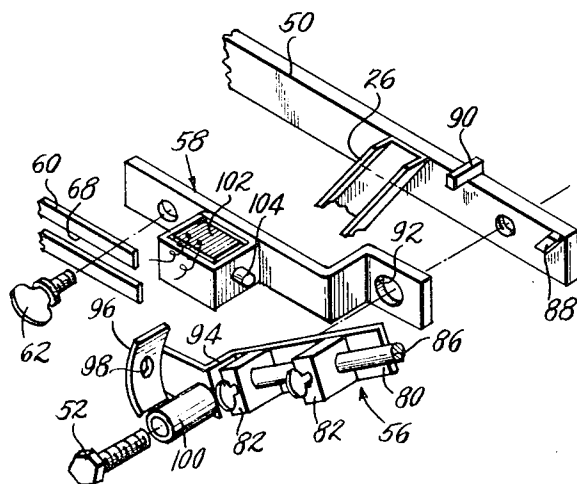
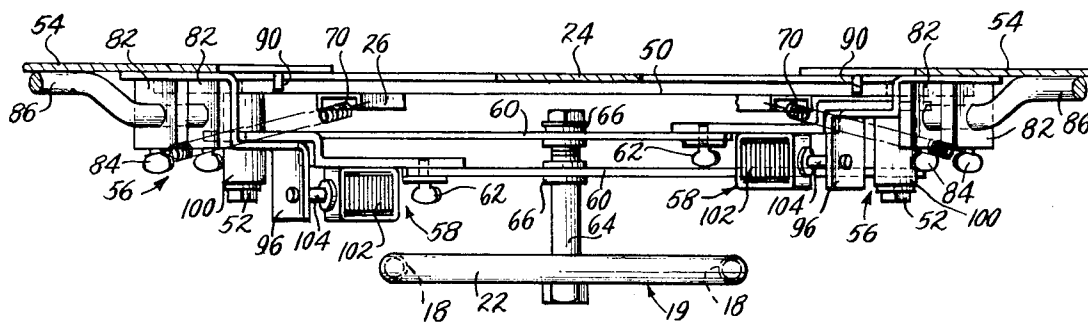
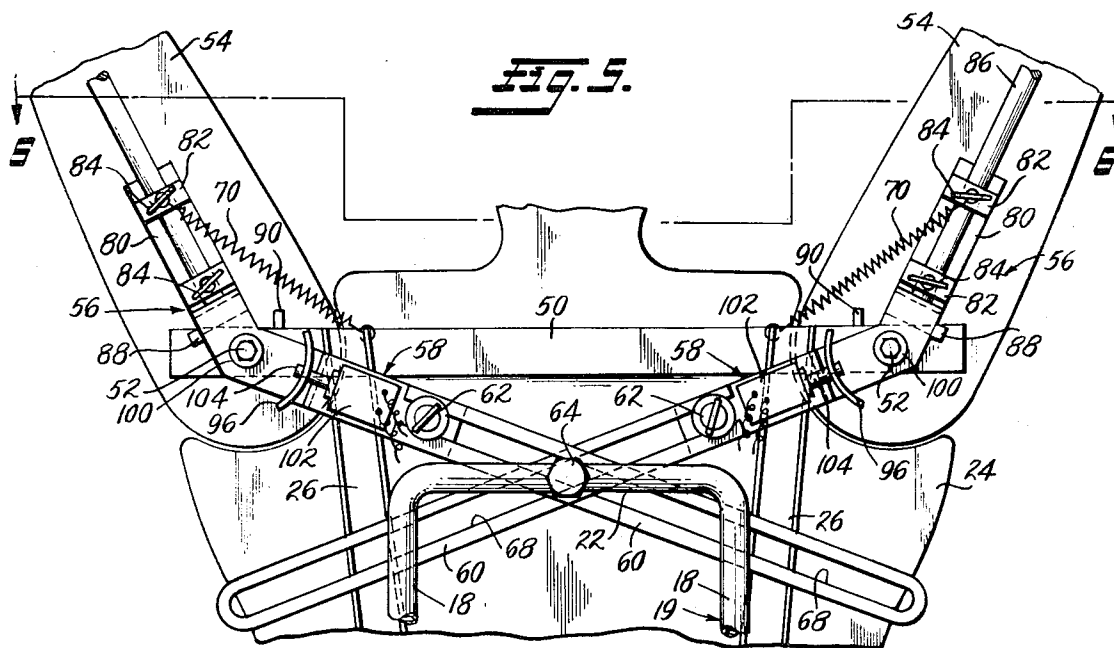
**Fig. 9.**



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## BASKETBALL TRAINING DEVICE

## BACKGROUND OF THE INVENTION

This invention is in the field of training devices and particularly simulated defensive basketball players for use in training offensive players to shoot baskets in the presence of a defender.

Heretofore there has been a great need for means for training offensive basketball players to shoot baskets in the presence of a defending player. No satisfactory devices are known to applicant to be in use, and it has heretofore been the custom to have an actual player serve as a defensive man for training purposes.

## SUMMARY OF THE INVENTION

In general, the invention comprises a simulated basketball player and motor means for causing it to move up and down to simulate a jumping defender. The simulated player comprises a representation of a player having pivoted arms movable from a lower position to upwardly extending positions, and drive means are provided for causing the representation to jump upwardly while simultaneously swinging his arms to their upper position to simulate the natural movements of a live defender. Means are provided for adjusting the range of vertical jumping movement to simulate defensive players of different or selected height, and selectively operable control means may be used to initiate jumping movement in synchronism with the movements of the player being trained. The control means may also be operated from a remote position to operate the training device in several different modes of operation.

## BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a rear elevational view of an embodiment of the invention;

FIG. 2 is an enlarged horizontal sectional view taken along the line 2—2 of FIG. 1;

FIG. 3 is a side elevational view of the device of FIG. 1;

FIG. 4 is an enlarged transverse sectional view taken on line 4—4 of FIG. 1;

FIG. 5 is an enlarged rear elevational view of a portion of FIG. 1;

FIG. 6 is a transverse sectional view taken on the line 6—6 of FIG. 5;

FIG. 7 is an exploded perspective view of a portion of the mechanism shown in FIGS. 5 and 6;

FIG. 8 is an enlarged fragmentary rear view of a portion of a modified form of the invention;

FIG. 9 is a side elevational view of the modification shown in FIG. 8; and

FIG. 10 is a schematic wiring diagram showing the electrical and control circuits for the device.

## DESCRIPTION OF THE PREFERRED EMBODIMENTS

In certain figures of the drawings some detail parts have been omitted to avoid overcrowding the drawings and to facilitate illustration.

The device illustrated comprises a base having inverted U-shaped side members 2 defining front and rear legs for the base. The lower ends of the front legs are preferably provided with wheels or rollers 4 to render the apparatus readily movable to a desired position, and the rear legs 6 thereof are preferably provided with rubber foot portions 8 to rest directly on a floor. As shown in FIG. 3, the rear legs 6 may have an adjustable sleeve 7 thereon, held by bolt 9, whereby the length of the leg may be adjusted. Foot 8 is carried by sleeve 7. A cross member 10 is secured to the side members 2 and is provided with upstanding posts 12 securely fastened thereto, such as by welding. The posts 12 are braced by diagonal braces 14, as shown. The upper ends of the posts 12 are provided with split clamping devices 16 (see FIG. 2) secured thereto and adapted to embrace and hold upright legs 18 of an inverted U-shaped support member 19. Adjacent their lower ends, the legs 18 of

the support member are provided with guides 20 loosely engaging the upstanding posts 12 (see FIG. 4) and securely fastened to the legs 18. It will be obvious that the legs 18 of the support member may be vertically adjusted to any desired height above the floor and securely held in such a fixed position by means of clamps 16. In addition to the legs 18, the support member 19 has an upper transverse portion 22 joining the upper ends of the leg members 18. The leg members 18 of the support define rails or guide means for the simulated player.

The simulated player comprises a relatively thin sheet 24 of rigid material cut to the outline of a basketball player and preferably provided with photographic or other pictorial features on its front face representing an actual person. The representation 24 is provided with a suitable stiffening frame 26. Also secured to the representation 24 and frame 26 are brackets 28 (see FIG. 2) having grooved rollers 30 journaled thereon and rollably engaging the legs 18 of the support member. As can be seen from FIG. 1, the rollers are arranged in pairs, an upper pair above the base posts 12 and a lower pair adjacent the lower end of the representation 24.

A generally horizontal platform 32 is rigidly attached to the lower ends of the support legs 18, and on the platform 32 is mounted an electric motor 34 having a control box 36 and driving through a suitable clutch 38 and gear box 40 to an output shaft 42, having crank 44 thereon. The outer end of the crank 44 is pivotally connected to the lower end of a connecting rod 46, which is pivoted at its upper end to a stiffening frame member 48 constituting part of the frame 26 of the representation. As will be obvious, operation of the motor and gear box 40 will result in rotation of the crank 44, which in turn transmits up and down movement to the representation 24, which is guided along the support legs 18 by rollers 30. As is also obvious, the support member may be vertically adjusted to any desired position along with the posts 12 to preselect a range of up and down movement for the representation 24 and enabling the user to simulate defensive basketball players of any desired height, within the structural limitations of the device.

Referring to FIGS. 5 and 6, a rigid cross bar 50 is secured to the representation 24, and may be considered as part of stiffener frame 26, at the level of the shoulders of the simulated player, and adjacent its outer ends the bar 50 supports pivot pins 52 on which swingable arms 54 are mounted. Brackets 56, to be described in more detail later, are pivoted on the pivot pins 52 and support the arms 54. The brackets 56 are provided with inwardly and downwardly extending inner arm portions 58 to which slotted bars 60 are releasably secured by suitable screw means 62.

The upper cross member 22 of the support means is provided with a pin 64 fixed thereon and having rollers 66 journaled on the pin 64. The rollers 66 engage in the respective slots 68 of bars 60 to control the movements of the swinging arms 54 of the representation 24. It will be obvious that upward and downward movement of the representation 24 on its support, while pin 64 remains stationary, will cause the arms 54 to swing from the generally lowered position shown in FIG. 5 to the upwardly extending position shown in dotted lines in FIG. 1, thus simulating the manner in which a defensive player swings his arms while jumping upwardly in front of a player seeking to shoot a basket.

Tension springs 70 are secured at one end to the frame 26 and at their other ends to the brackets 56 to thus counterbalance the weight of the arms 54. These springs thus hold arms 54 in their upper position against stops 90 when the slotted bars 60 are disconnected from the brackets 56. Obviously, either or both of the bars 60 may be so disconnected.

Suitable counterbalancing spring means 72 (see FIG. 1) are provided between the guiding support 19 and the movable representation 24 to thus relieve the motor 34 of excessive loads when moving the representation upwardly. As shown in FIG. 1, the springs 72 are secured at their ends to the upper ends of the legs 18, and their lower ends are secured to pulleys 74 over which suitable cables 76 are trained. One end of each

cable 76 is fixed to a leg 18 from which it passes upwardly over a pulley 74, then downwardly to where it is secured at its other end to the lower brackets 28 carrying the rollers 30.

Referring again to FIGS. 5 and 6, it will be apparent that the slotted bars 60 may be removed from the brackets 56, thus leaving the pivoted arms 54 free to swing without being controlled by the vertical movements of the representation 24.

The brackets designated generally at 56 consist of an outer arm 80 on the opposite side of pins 52 from the inner arms 58 and which outer arms are provided with clamping blocks 82 and thumb screws 84 adapted to releasably clamp reinforcing tubes 86. The reinforcing tubes are secured to the rear face of the arms 54 and serve not only to reinforce those arms but also to provide a releasable mounting whereby the arms may be removed for replacement or repair, if necessary. Additional reinforcement or stiffening may be provided for the hand and finger portions of the arms 54. As shown in FIG. 6, the pivots 52, bar 50 and brackets 56 are rearwardly of the representation 24, whereas the lower end portions of the arms 54 extend downwardly in front of the ends of the bar 50 to conceal the same and render the device more lifelike (see also FIG. 3). As also shown in the drawings, the bar 50 is provided with stop abutments 88 and 90 for engagement by bracket portion 80 to limit upward and downward movement of the arms 54.

Referring now particularly to FIG. 7, it will be seen that the bracket structure 56 comprises several parts. The inner arm portion 58 of the bracket 56 is provided with a pivot opening 92 by which it is pivoted on the pivot pin 52 separately from the outer arm portion 80 of the bracket 56. The outer arm portion 80 of the bracket 56 is offset as at 94 and terminates in a laterally extending, arcuately curved flange 96 having an opening 98 therethrough. The offset portion of the bracket arm 80 has fixed thereto a sleeve 100 functioning as a bearing for the bracket structure. A solenoid 102 is mounted on the inner arm portion 58 of the bracket 56, and its armature 104 is normally projected outwardly therefrom. When the parts are assembled, as shown in FIGS. 5 and 6, the armature 104 of the solenoid 102 projects through the opening 98 in flange 96 to lock the bracket arm portions 58 and 80 relative to each other and to cause them to pivot about pin 52 as a single unitary structure. Means to be described later provide for selective control of the solenoids 102 whereby either or both of them may be energized to retract their armature 104 and thus release the swinging arms 54 for freely swinging movement. When the arms 58 and 80 are thus disconnected, the springs 70 are sufficiently strong to hold the arms 54 in their uppermost position, and even though the solenoids 102 may then be deenergized their armatures 104 merely engage the unperforated portion of curved flanges 96. If the representation 24 is then caused to jump upwardly, the action of slotted bar 60 and pin 64 will bring armature 104 back into alignment with opening 98, at the top of the jump, and will enter the same to relock the bracket parts together.

FIGS. 8 and 9 illustrate an alternative arrangement, providing for additional simulative movements of the representation 24. In this form, the plate 32 is provided with a guide tube 106 fixed thereon and extending downwardly toward the floor. A slide rod 108 is slidably guided by the tube 106 for vertical movement, and a pin 110 thereon extends outwardly through a guiding slot 112. The outer end of the pin 110 is secured to a tension spring 114, the other end of which is secured to the guide tube 106. The upper end of slide rod 108 is provided with a cam following roller 116 engageable with the periphery of a cam 118 fixed to the output shaft 42 of gear box 40. The cam 118 is so positioned and shaped that as the shaft 42 rotates to cause the representation 24 to move upwardly and downwardly, the cam 118 pushes the slide rod 108 downwardly, and in view of the location thereof adjacent the rear of the base structure causes the entire base and device to tilt forwardly in synchronism with upward movement of the representation 24. This action simulates upward and forward jumping movements of a defensive basketball player. As previously described, the support and its legs 18, to which the plat-

form 32 is fixed, can be adjusted vertically to simulate players of different height. To accommodate such adjustment the slide rod 108 is provided with a threaded extension 120 by which its length can be changed so as to engage the floor and cause the described tilting movement irrespective of the vertical position of adjustment of the platform 32.

As will be described in greater detail later, the platform 32 also supports a limit switch 122 having an actuating lever 124 in the path of movement of the crank 44. When the crank 44 is in its lowermost position, as shown in FIGS. 1 and 9, the switch 122 is open to thereby stop cyclic movement of the representation 24. Control means will be described for disabling the limit switch 122 whereupon the apparatus may be caused to operate to continuously move the representation 24 up and down without cessation. Normally, the limit switch operates to permit the crank to drive the representation upwardly once then downwardly to the lower position, and it is then stopped until further control means are again activated. The magnetic clutch 38, previously referred to, is under the control of the limit switch 122.

Referring now to FIG. 10, the control box 36 is schematically indicated by the broken line square, also numbered 36. A power cord 126 may be plugged into any suitable source of alternating electric power for operating the device. The power cord 126 is also connected by conductors 127 to a connector receptacle 128 into which a control plug 130 may be plugged. Conductors leading from the plug 130 are connected to the solenoids 102 in series with manually operable switches 132, which may be selectively connected to the solenoids 102 by suitable connectors generally indicated at 134. Thus, by connecting plug 130 into receptacle 128 and manual switches 132 to the solenoids, a remotely positioned coach or operator may at any time activate either or both solenoids 102 to disconnect their respective arms from the arm swinging mechanism previously described.

The power cord 126 is also connected to an on-off switch 136 by which the entire operation of the apparatus can be initiated or discontinued. From switch 136 conductors lead to and from the motor 34 to opposite sides of the line whereby closing of switch 136 will cause the motor 34 to rotate, and it will continue to rotate as long as switch 136 is closed. If the motor 34 were to be started and stopped each time it was desired to cause the representation 24 to jump upwardly, this would result in damage to the motor from such frequent starting and stopping operations, hence the arrangement whereby the motor rotates constantly. The power leads from switch 136 are also connected to the input terminals of a rectifier 138, connected in parallel with the motor 34. The positive output terminal of the rectifier 138 is connected to an input terminal of the magnetic clutch 38, the other terminal of which is connected to the negative output terminal of the rectifier through a relay switch 140. The negative terminal of the rectifier is also connected to a conductor for directing current through relay coil 142, and when current flows through this coil, the switch 140 is caused to close. Switch 140 is normally open. From the relay coil 142, a conductor leads to the limit switch 122, and a further conductor leads from the switch 122 to the positive terminal of the rectifier 138 through a resistor 144. Another connector receptacle 146 is connected in parallel with the leads to the limit switch 122 and also in parallel with conductors leading to a mat control switch 148. The receptacle 146 is adapted to selectively receive a plug connector 150 for a control mat 152 or a plug connector 154 connected to a manually operable remote switch 156. From the circuit arrangements thus far described, it will be apparent that mat control switch 148 may be opened or closed as desired. When opened as shown, the limit switch 122 is in control. The switch 122 is normally closed and is opened only when the crank arm and representation 24 are in the lowermost position. Thus, in the position shown in FIG. 10, the switch 122 is open. Assuming that the mat 152 is connected to the receptacle 146, the mat 152 is preferably placed on the floor in front of the training apparatus described as suggested

in FIG. 3. A basketball player approaching the training device would normally step on the mat 152 to position himself for an attempt to shoot a basket. When he steps on the mat 152, its internal switch 158 is closed, thus completing a circuit from the negative terminal of the rectifier through the relay coil 142, mat switch 148, to the open limit switch 122. From the receptacle 146 current also flows through resistor 144 to the positive terminal of the rectifier. The resistor 144 permits enough current to flow through relay coil 142 to close relay switch 140, whereupon the full rectifier output is applied to the magnetic clutch 38 to engage the same and cause it to drive the crank 44. As soon as crank 44 pulls away from limit switch 122, the latter closes and maintains the clutch 38 engaged until a full cycle of operation has been completed, even though the player in the meantime steps off the mat 152. At the completion of a cycle, switch 122 is again opened by crank 44, and the relay switch 140 is thus opened to disengage clutch 38. The remote control switch 156 may alternatively connect to the receptacle 146 in place of the mat 152. With this arrangement, a coach or other person, may, from a remote position, activate the apparatus to cause the representation to jump in the manner described at any desired time and irrespective of the position of the player attempting to shoot a basket. When neither the mat 152 nor switch 156 are connected to the receptacle 146, the mat control switch 148 may be closed. This switch is in parallel with the limit switch 122, and its closing disables the limit switch. When switch 148 is thus closed, a circuit is completed through the rectifier, the coil 142, switch 148, resistor 144, and back to the rectifier to hold the switch 140 closed and thus maintain the clutch 38 constantly in engagement, whereby the representation 24 is caused to jump up and down constantly without cessation. Obviously, the manual controls for the solenoids 102 may be connected to control the solenoids at any time irrespective of whether the clutch 38 is under control of switch 156, mat 152 or mat control switch 148.

For some particular training exercises, the on-off switch may be opened with the representation 24 and arms 54 in any of their desirable positions and the device used as a stationary training accessory. Also, it will be apparent to those skilled in the art that the described control circuitry may be readily adapted for use with storage batteries rather than the alternating current described.

While a limited number of specific embodiments have been shown and described herein, the same are merely illustrative of the principles involved, and other embodiments will become apparent to those skilled in the art.

I claim:

1. A basketball training device comprising:
  - A. a support means;
  - B. a substantially life-size representation of a basketball player mounted for vertical movement on said support means, said representation including arms pivotally mounted thereon for swinging movement from lowered positions to upwardly extending positions;
  - C. actuating means for moving said representation upwardly and downwardly on said support means to simulate a jumping basketball player;
  - D. means for swinging at least one of said arms upwardly to said upwardly extending position, including:
    - i. inwardly extending slotted levers releasably fixed to each said arm and interconnecting said arms and said support means to swing said arms upwardly in response to upward movement of said representation relative to said support means, the slot of each lever slidably embracing means fixed on said support means, said arms upon release from said levers being freely swingable, and
    - ii. spring means interacting between each arm and said representation for swinging said arms to said upwardly extending position.
2. A basketball training device as defined in claim 1 including:
  - a base adapted to rest on a supporting surface; and

means mounting said support means on said base for vertical adjustment thereon, whereby said representation may be selectively adjusted to different vertical positions to simulate persons of different height.

3. A basketball training device as defined in claim 1, including control means for selectively disabling said inter-connecting levers whereby to render either or both of said arms non-responsive to upward movement of said representation.

4. A basketball training device as defined in claim 1, wherein said actuating means comprises; a motor device on said support means drivingly connected to said representation; control means for initiating upward movement of said representation by said motor device; and means limiting movement of said representation to a single cycle of movement upwardly then downwardly.

5. A basketball training device comprising:

- A. a support means;
- B. a substantially life-size representation of a basketball player mounted for vertical movement on said support means, said representation including arms pivotally mounted thereon for swinging movement from lowered positions to upwardly extended positions;
- C. actuating means for moving said representation upwardly and downwardly on said support means to simulate a jumping basketball player;
- D. means interconnecting said arms and said support means to swing said arms upwardly in response to upward movement of said representation relative to said support means;
- E. control means for selectively disabling said interconnecting means whereby to render either or both of said arms non-responsive to upward movement of said representation; and

F. said control means including a remote, selectively operable control member for each arm.

6. A basketball training device comprising:

- A. a support means;
- B. a substantially life-size representation of a basketball player mounted for vertical movement on said support means, said representation including arms pivotally mounted thereon for swinging movement from lowered positions to upwardly extended positions;
- C. actuating means for moving said representation upwardly and downwardly on said support means to simulate a jumping basketball player including:
  - i. a motor device on said support means drivingly connected to said representation;
- D. control means for initiating upward movement of said representation by said motor device;
- E. means limiting movement of said representation to a single cycle of movement upwardly then downwardly;
- F. means for swinging at least one of said arms upwardly to said upwardly extending position; and
- G. said motor device comprising a rotary motor, a rotary crank drivingly connected to said representation, and a releasable clutch drivingly connected between said motor and crank, said control means being arranged to engage said clutch, and said limiting means comprising means responsive to movement of said representation to its lowermost position to disengage said clutch.

7. A basketball training device as defined in claim 6, wherein said control means comprises a floor mat adjacent said training device, a control element in said mat, responsive to the weight of a person thereon, and means operatively connecting said control element to said motor device.

8. A basketball training device as defined in claim 6, wherein said control means comprises a remote, manually operable member and means operatively connecting said member to said motor device.

9. A basketball training device comprising:

- A. a support means;
- B. a substantially life-size representation of a basketball player mounted for vertical movement on said support means, said representation including arms pivotally

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- mounted thereon for swinging movement from lowered positions to upwardly extended positions;
- C. actuating means for moving said representation upwardly and downwardly on said support means to simulate a jumping basketball player;
- D. means for swinging at least one of said arms upwardly to said upwardly extending position;
- E. said support means including a base adapted to rest on a supporting surface; and
- F. said actuating means including means movably mounted on said base and engageable with said supporting surface, rearwardly of said representation, and moveable downwardly in timed relation to upward movement of said representation to tilt said training device forwardly and thus simulate a player jumping upwardly and forwardly.
11. A basketball training device comprising:
- A. a support means;
- B. a substantially life-size representation of a basketball player mounted for vertical movement on said support means, said representation including arms pivotally

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- mounted thereon for swinging movement from lowered positions to upwardly extending positions;
- C. actuating means for moving said representation upwardly and downwardly on said support means to simulate a jumping basketball player including:
- i. a motor device on said support means drivingly connected to said representation;
- D. means for swinging at least one of said arms upwardly to said upwardly extending position;
- E. first control means normally limiting movement of said representation to a single cycle of movement upwardly then downwardly; and
- F. selectively operable further control means for disabling said first control means, whereby said representation may be made to jump continuously.
- 10: A basketball training device as defined in claim 9, including spring means reacting between said representation and said support means and arranged to counterbalance a substantial portion of the weight of said representation.

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