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(54) WEIGHT PLATE LIFTING EXERCISE APPARATUS

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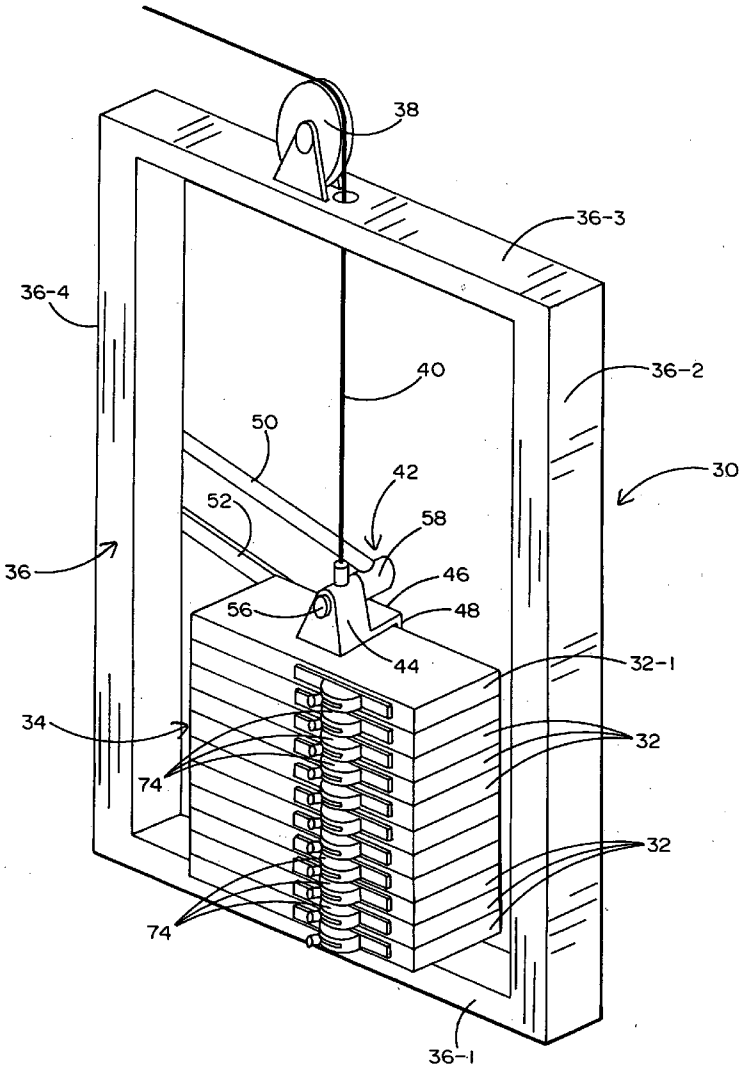
(57) **ABSTRACT**

A weight plate lifting exercise apparatus to enable any number of weight plates to be lifted off a stack of weight plates during an exercise. The weight plates are stacked in face-to-face alignment one above the other. A weight plate connector is affixed to the first weight plate atop the stack. The apparatus includes a frame and a pair of guide bars that are pivotally connected between a side of the frame and the weight plate connector. A cable communicates with the first weight plate atop the stack by way of the weight plate connector. A pulling force applied to the cable causes the first weight plate and any other weight plates that are detachably interconnected to the first weight plate to be displaced in a linear (i.e., vertical) lifting path. At the same time, the pair of guide bars will rotate relative to the frame through a circular path. The guide bars will at all times remain in spaced, parallel alignment with one another throughout their rotation to ensure that the weight plates are lifted smoothly and continuously from the stack.



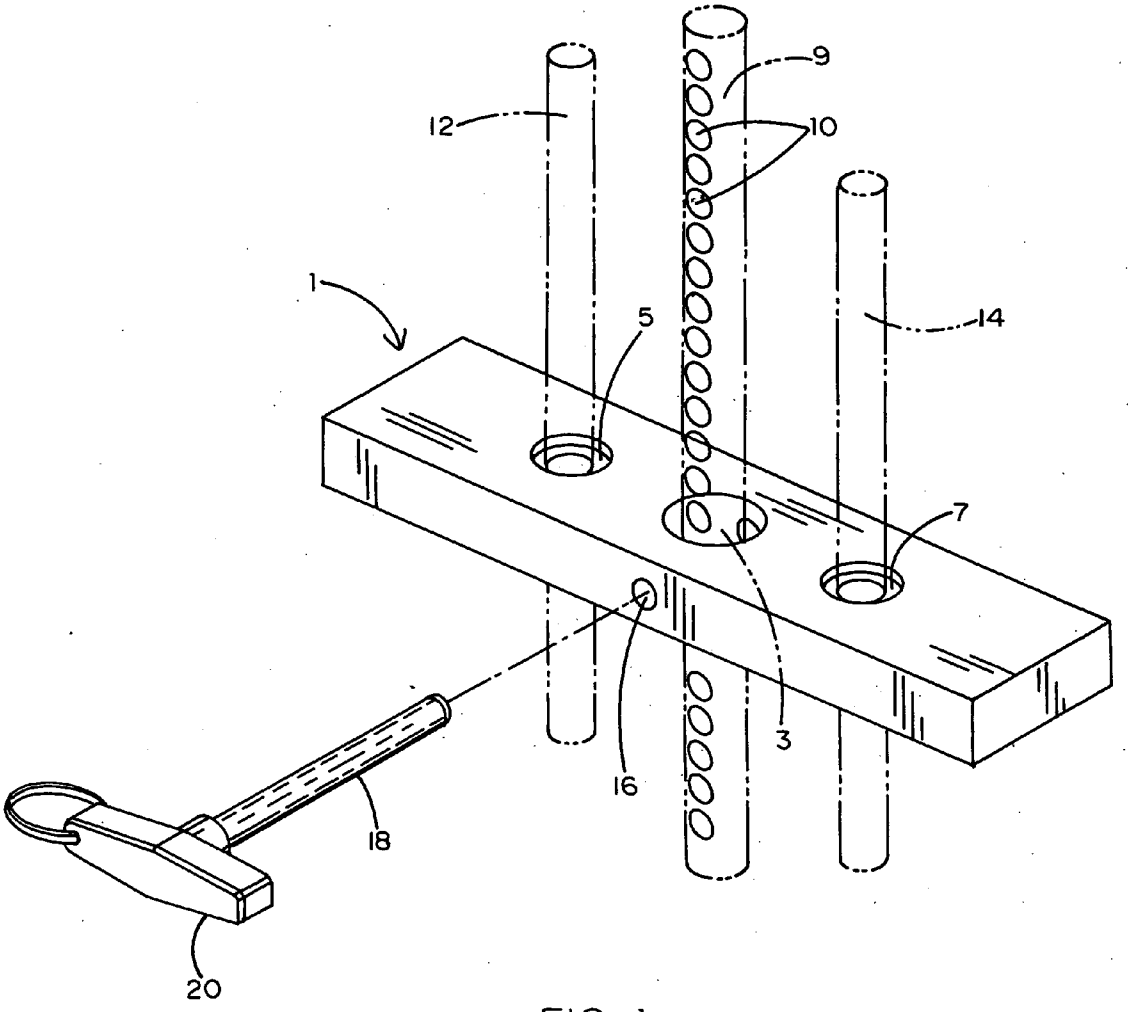


FIG. 1
(PRIOR ART)

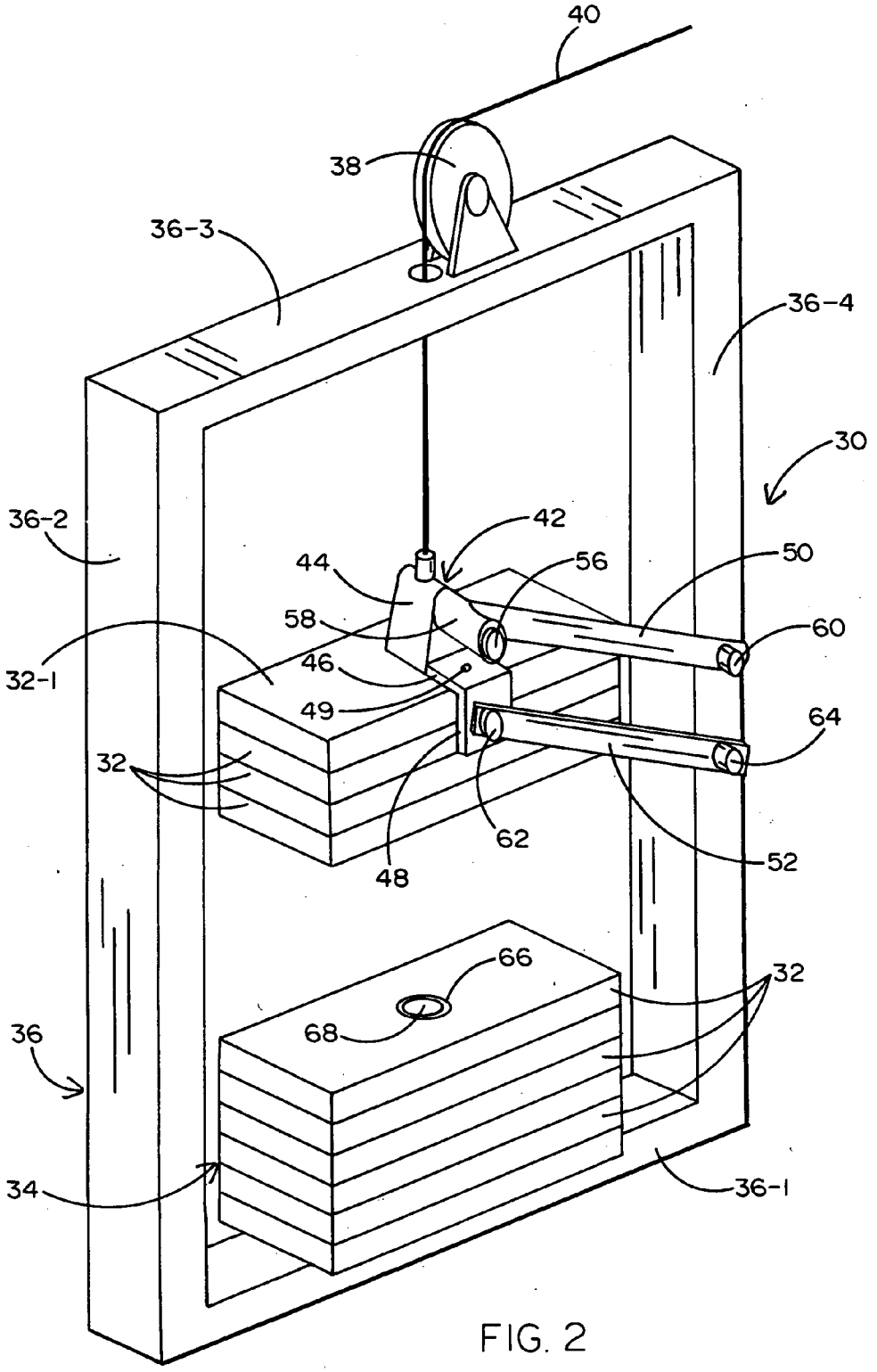

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FIG. 2

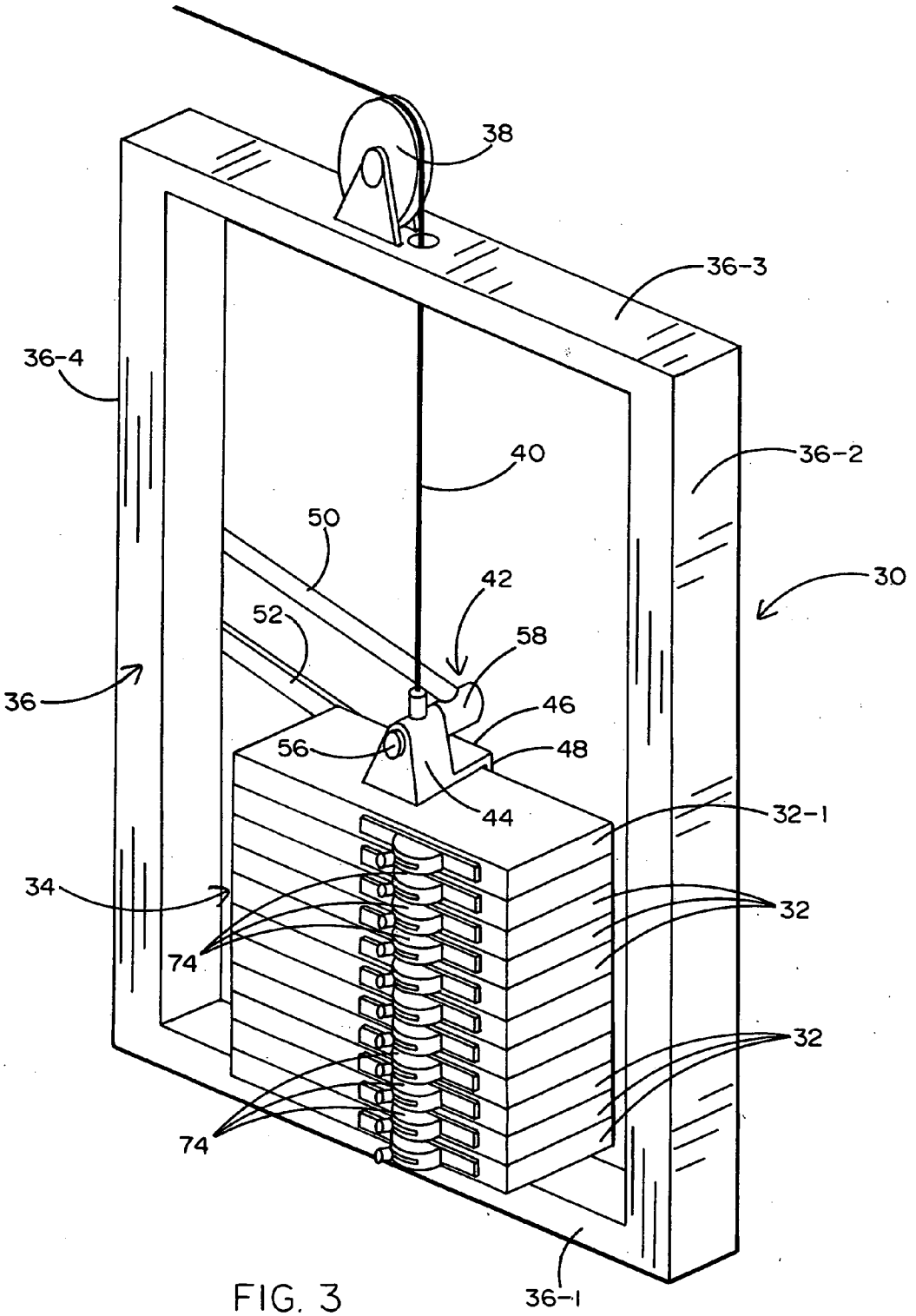

FIG. 3

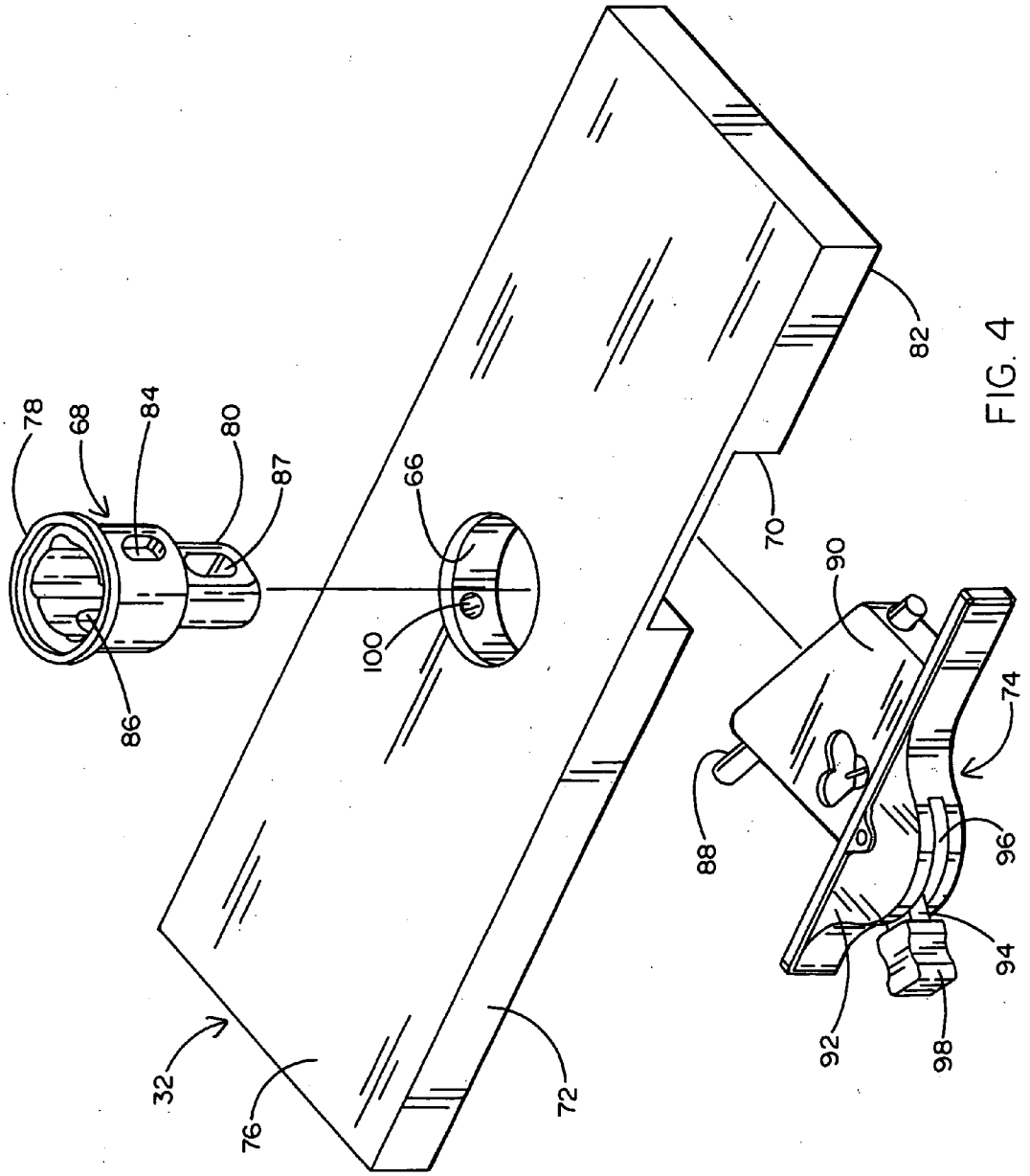

FIG. 4

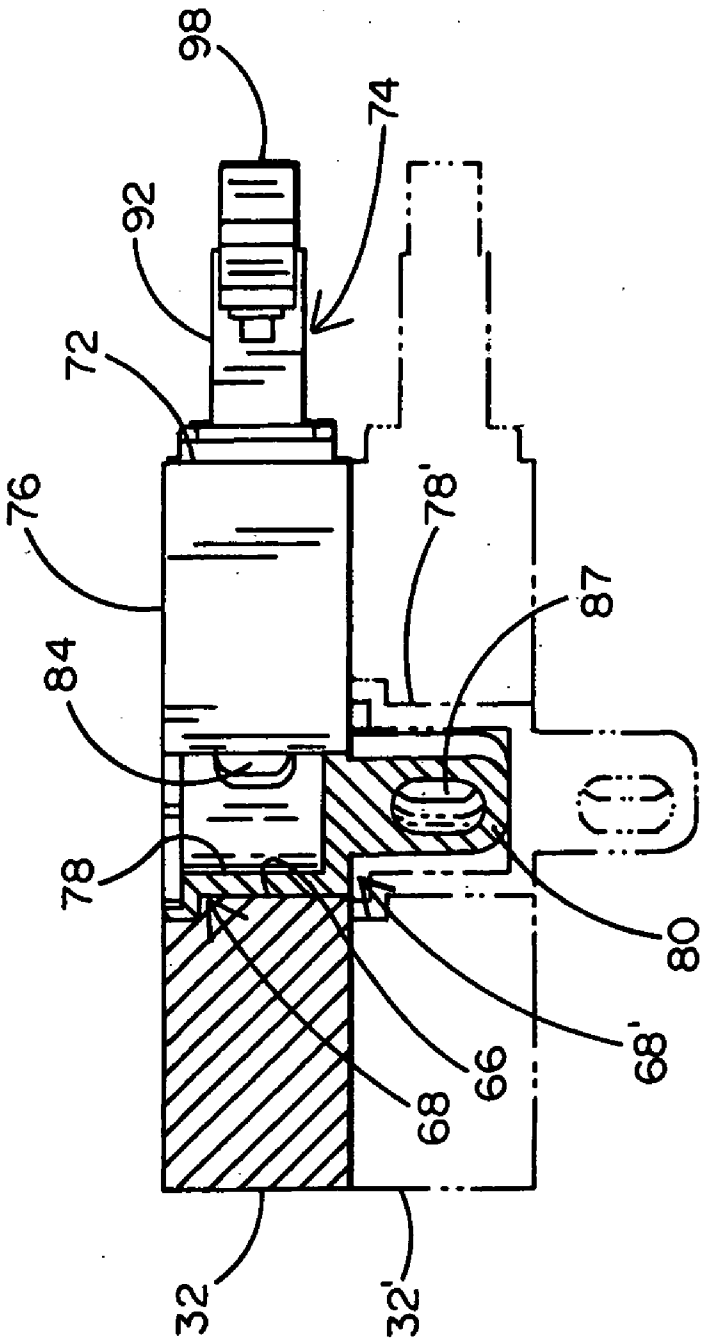

FIG. 5

WEIGHT PLATE LIFTING EXERCISE APPARATUS

BACKGROUND OF THE INVENTION

[0001] 1. Field of the Invention

[0002] This invention relates to a weight plate lifting exercise apparatus where any number of weight plates from a vertical stack of weight plates can be lifted during an exercise. A weight plate stabilizing guide assembly is included which reduces the maintenance required by the apparatus and ensures a continuous and smooth linear displacement of the weight plates from the stack in a vertical direction during the exercise.

[0003] 2. Background Art

[0004] Weight lifting exercise apparatus are increasing in popularity as a means to promote physical fitness. Such weight lifting exercise apparatus are now being used by both men and women in a gym and at home. A common weight lifting apparatus with which to exercise includes a stack of typically rectangular metal weight plates which can have an identical weight or interchangeable variable weights. By way of example, a conventional rectangular weight plate used for exercise is about 10 inches long and 4 inches wide. The conventional weight plate is also known to have three bore holes formed vertically therethrough and a fourth bore hole extending horizontally therewithin.

[0005] Turning in this regard to FIG. **1** of the drawings, a conventional rectangular weight plate **1** is shown having a center bore hole **3** and a pair of side bore holes **5** and **7**, each of which extending vertically and completely through the weight plate **1**. The center bore hole **3** is sized to accommodate a center post **9** from the usual upstanding weight plate lifting apparatus. The center post **9** extends axially through the center bore holes **3** from all of the weight plates **1** in the vertical stack. The center post **9** is provided with a series of spaced, axially-aligned pin holes **10** that correspond to the locations of weight plates in the stack thereof. The side bore holes **5** and **7** are located at opposite sides of the center bore hole **3** and sized to accommodate therethrough respective guide rods **12** and **14** from the weight plate lifting apparatus. The guide rods **12** and **14** provide vertical tracks along which one or more of the weight plates **1** from a stack will ride during the weight lifting exercise.

[0006] The fourth bore hole **16** extends horizontally through the front of the weight plate **1** so as to communicate with the center bore hole **3**. To tailor the weight plate lifting exercise to meet the needs of the user, the cylindrical shaft **18** of a weight selector pin **20** is inserted through the front bore hole **16** and into receipt by one of the pin holes **10** in the center post **9** of the weight plate lifting apparatus. The number of weight plates and the total weight to be lifted by the user during any exercise will depend upon the particular pin hole **10** along the center post **9** into which the shaft **18** of the selector pin **20** is inserted. A pulling force applied by the user to a cable (not shown) which communicates with the center post **9** will generate a lifting force which can be repeated a number of times to cause any number of weight plates **1** from the stack to be lifted depending upon the location of the selector pin **20** relative to center post **9**.

[0007] It can be appreciated that the aforementioned weight plate lifting exercise apparatus having a pair of guide rails to be received through the side bore holes **5** and **7** of each weight plate **1** will have relatively high maintenance costs. That is, it will be necessary from time-to-time to clean and lubricate the guide rails to ensure that the weight plates will slide easily therealong. Moreover, the selector pin **20** is removable from the center post **9** of the weight plate lifting exercise apparatus following a workout. Consequently, the selector pin **20** is known to be lost, stolen or damaged which can interfere with the ability to use the exercise apparatus on an as-needed basis. In cases where the selector pin **20** is not immediately available, substitutes have sometimes been used which may be functionally and/or structurally inadequate to ensure that the apparatus will be properly and safely used.

[0008] Accordingly, an improvement to the conventional weight plate lifting exercise apparatus is desirable in order to overcome the shortcomings described above by eliminating the requirement for a center post **9**, the guide rods **12** and **14**, and a selector pin **20** to cooperate with the center post.

SUMMARY OF THE INVENTION

[0009] In general terms, a weight plate lifting exercise apparatus is disclosed of the type which enables the user to lift a number of (e.g., rectangular) weight plates from a horizontal stack of such weight plates that are surrounded by a rectangular frame. The weight plates are located one above the other at the bottom of the frame. A weight plate connector is affixed to the first or top weight plate in the stack of weight plates. The weight plate connector includes a body that stands upwardly from the first weight plate in the stack to which the weight plate connector is affixed. A cable runs over a pulley mounted on the top of the frame of the weight plate lifting exercise apparatus for attachment to the weight plate connector at the upstanding body thereof. A horizontal seat of the weight plate connector extends laterally from the connector body over the first weight plate of the stack. A leg of the weight plate connector projects downwardly from the seat so as to overlap a side of the first weight plate and a side of at least the next or second weight plate in the stack.

[0010] The weight plate lifting exercise apparatus includes a weight plate stabilizing guide assembly that is coupled to the frame to facilitate a smooth vertical displacement of the weight plates off the stack in response to a pulling force applied by the user to the cable that is attached to the weight plate connector at the top of the stack of weight plates. The weight plate stabilizing guide assembly includes a pair of spaced, parallel-aligned guide bars that are pivotally connected between one side of the frame and the weight plate connector. As an important detail of this invention, the pair of guide bars are adapted to rotate in response to a pulling force applied to the cable and transferred to first ends of the guide bars by way of the weight plate connector so that the guide bars will at all times remain in spaced, parallel alignment with respect to one another regardless of the number of weight plates that are being lifted off the stack. Thus, the weight plates being lifted will move together in a continuous linear lifting path as the guide bars rotate with one another through a circular path.

[0011] Each weight plate from the stack of weight plates has a center bore hole formed therethrough, and an insert is located in each center bore hole. The insert has a hollow upper body that is retained within the center bore hole and a lower interconnection tail that extends downwardly from the bottom of a first weight plate to be received in the hollow upper body of the insert that is carried by a succeeding weight plate lying adjacent the bottom of the first weight plate. A locking cartridge is located within an internal cavity formed through the front of each weight plate. The locking cartridge of the first weight plate has a locking pin and a lock control arm that is coupled to the locking pin. The lock control arm is rotatable along the locking cartridge in response to a pushing force applied to a knob thereof to cause the locking pin to ride through a locking channel formed in the first weight plate. The locking pin is thusly caused to slide through a pair of

axially-aligned apertures formed in the upper body of the insert retained by the first weight plate as well as a coupling slot in the lower coupling tail of the insert that is carried by and projects downwardly from a preceding weight plate lying adjacent the top of the first weight plate. Accordingly, the first and preceding weight plates will be connected to one another by means of the locking pin of the locking cartridge of the first weight plate. Hence, the first and preceding weight plates will be lifted together when the user applies a pulling force to the cable of the weight plate lifting exercise apparatus that is attached to the weight plate connector at the top of the stack.

BRIEF DESCRIPTION OF THE DRAWINGS

[0012] FIG. **1** shows an example of a typical weight plate from a conventional weight plate lifting exercise apparatus where the weight plate has center and side bore holes for receipt therethrough of a center post and a pair of guide rails;

[0013] FIGS. **2** and **3** show a weight plate lifting apparatus according to a preferred embodiment of this invention where the side bore holes formed in the weight plate of FIG. **1** and the pair of guide rails of FIG. **1** for receipt through the bore holes are advantageously eliminated;

[0014] FIG. **4** is an exploded view of a weight plate from a stack of weight plates of the weight plate lifting exercise apparatus of FIGS. **2** and **3** including an insert to be retained within a center bore hole formed in the weight plate and a locking cartridge to be received at an internal cavity of the weight plate; and

[0015] FIG. **5** shows the weight plate of FIG. **4** lying above and connected in face-to-face alignment with an adjacent weight plate.

DESCRIPTION OF THE PREFERRED EMBODIMENT

[0016] A preferred embodiment for a weight plate lifting exercise apparatus **30** which forms the present improvement is initially disclosed while referring to FIGS. **2** and **3** of the drawings. The apparatus **30** enables a user to selectively lift a number of weight plates **32** from a stack **34** of rectangular weight plates that are disposed in face-to-face alignment one above the other. Each weight plate **32** from the stack **34** is preferably manufactured from steel, urethane, or a plastic shell that is filled with steel or surrounds a steel core. However, the material from which the weight plate **32** is manufactured is not to be regarded as a limitation of this invention. By virtue of the exercise apparatus **30** herein disclosed, the costs to service and maintain the apparatus **30** can be advantageously reduced relative to the costs associated with conventional weight plate lifting exercise apparatus.

[0017] The weight plate exercise apparatus **30** includes a rectangular frame **36** that is preferably manufactured from an impact-resistant material. The frame **30** may include an optional stand (not shown) to increase the stability thereof during a workout. A pulley **38** is mounted at the top **36-3** of the frame **36** to receive a cable **40** thereover. One end of the cable **40** is attached to a weight plate connector **42** and the opposite end is attached to a handle (not shown) or similar gripping element to be grasped by the user. A pulling force applied by the user to the handle is transferred to the weight plates **32** by way of the cable **40** and the weight plate connector **42** to enable any desired number of weight plates **32** from the stack **34** to be lifted. It is within the scope of this invention to replace the cable **40** with either a flexible or rigid force transferring means, such as a chain or a rod.

[0018] In the example shown, the weight plate stack **34** is initially laid on the bottom **36-1** of the frame **36** of the weight plate lifting exercise apparatus **30**. Each weight plate **32** in the stack **34** other than the first plate **32-1** is an independent weight plate that can be carried to or from the frame **36** on an as-needed basis depending upon the exercise requirements of the user. However, the first or top weight plate **32-1** is fixedly attached to the weight plate connector **42**, such that a pulling force applied by the user to the cable **40** will always cause at least the first weight plate **32-1** to be lifted.

[0019] The weight plate connector **42** is preferably manufactured from metal and has a generally S-shape configuration. The connector **42** includes a body **44** that stands upwardly from the first or top-most weight plate **32-1** in any stack **34** of weight plates. The cable **40** to which a pulling force is applied is attached to the weight plate connector **42** at the body **44** thereof. A horizontal seat **46** of connector **42** is attached to and extends laterally from the connector body **44**, and a vertical leg **48** is attached to and extends downwardly from the seat **46**. The horizontal seat **46** and the vertical leg **48** extend in perpendicular alignment with one another, such that the seat **46** lays on top of the first weight plate **32-1** and the leg **48** overlaps a side of at least the first weight plate **32** in the stack **34**. A bolt **49** extends through the seat **46** of the weight plate connector **42** so that the connector **42** will be fixedly attached to the first weight plate **32-1**.

[0020] As an important advantage afforded by this invention, the weight plate lifting exercise apparatus **30** includes a weight plate stabilizing guide assembly that is coupled to the frame **36** to facilitate a smooth and continuous linear displacement of the weight plates **32** off the stack **34** in a vertical direction in response to a pulling force applied to the cable **40**. The stabilizing guide assembly includes a pair of guide bars **50** and **52** that are linked between a side **36-4** of the frame **30** and the weight plate connector **42** of weight plate lifting exercise apparatus **30**. The guide bars **50** and **52** may be either cylindrical or flat or have any other suitable shape.

[0021] More particularly, a cylindrical post **56** extends through the body **44** of weight plate connector **42** and horizontally outward therefrom so as to lie above the seat **46**. A sleeve **58** is coupled in surrounding engagement with the post **56** and adapted to rotate therearound. One end of the first guide bar **50** of the pair of guide bars of the stabilizing guide assembly is attached to the sleeve **58** surrounding the post **56**. The opposite end of the first guide bar **50** is coupled to the side **36-4** of the frame **30** by means of a pivot having a relatively wide pivot head **60** (best shown in FIG. **2**). One end of the second guide bar **52** is coupled to the vertically-extending leg **48** of the weight plate connector **42** by means of a pivot having a relatively wide pivot head **62**. The opposite end of the second guide bar **52** is coupled to the side **36-4** of frame **30** by means of a pivot having a relatively wide pivot head **64** (also best shown in FIG. **2**).

[0022] In the ready-to-use configuration of the weight plate lifting exercise apparatus **30**, the pair of guide bars **50** and **52** are held in spaced, parallel alignment one above the other between the weight plate connector **42** and the side **36-4** of frame **36**. In this same regard, the pair of guide bars **50** and **52** will at all times remain in spaced, parallel alignment with respect to one another regardless of the number of weight plates **32** that are lifted from or lowered towards the stack **34**. That is, as the desired number of weight plates is lifted in response to a pulling force applied to the cable **40**, the first guide bar **50** will rotate relative to the frame **36** around pivot **60** (of FIG. **2**) to cause a corresponding rotation of the sleeve **58** around the post **56** projecting from the connector body **44**. At the same time, the second guide bar **52** will rotate relative to the frame **30** at its opposite ends around respective ones of the pivots **62** and **64**.

[0023] Accordingly, the spaced, parallel alignment of the guide bars **50** and **52** of the weight plate stabilizing guide assembly of the weight plate lifting exercise apparatus **30** will be maintained throughout their rotation during an exercise. Thus, the weight plates **32** being lifted (or lowered) will remain horizontal and parallel relative to one another to enable the plates to be moved together through a continuous linear (i.e., vertical) lifting path as the guide bars **50** and **52** rotate with one another relative to the frame **30** through a circular path. By virtue of the foregoing, the parallel aligned center and side bars or guide rails (designated **9**, **12** and **14** in FIG. **1**) which commonly extend through the weight plates of most weight plate lifting apparatus are eliminated. Without center and side bars, the requirement that such bars be periodically cleaned and lubricated is also eliminated, whereby the cost to service and maintain the weight plate lifting exercise apparatus **30** of this invention is minimized. Similarly, the weight plates **32** need only have a center bore hole **66** at which to be detachably connected to one another as opposed to the usual center bore hole and pair of side bore holes (designated **3**, **5** and **7** in FIG. **1**) that are necessary to accommodate the aforementioned center and side bars or rails.

[0024] To this end, and referring concurrently to FIGS. **2-5** of the drawings, one example is now described by which any number of weight plates **32** from a stack **34** of weight plates like that shown in FIG. **4** are selectively and detachably connected together depending upon the exercise requirements of the user. To facilitate a fast and reliable connection of one weight plate to the next without having to have available and accepting the risks associated with using a selector pin (designated **20** in FIG. **1**), each weight plate **32** has a center hole **66** (also best shown in FIG. **4**). Located within the center hole **66** of each weight plate **32** is an insert **68**. Such an insert **68** for receipt by the center hole **66** of each weight plate **32** in the stack **34** is preferably a locking pin-receiving connector union, the details of which are disclosed in my co-pending patent application Ser. No. 11/349,101 filed Feb. 8, 2006, the teachings of which are incorporated herein by reference.

[0025] Each weight plate **32** from the stack of weight plates **34** includes an internal cavity **70** formed inwardly of the front **72** thereof. The internal cavity **70** is sized so as to receive therewithin a locking cartridge **74**. Like the pin-receiving connector union insert **68**, the details of locking cartridge **70** are also disclosed in my co-pending patent application Ser. No. 11/349,101, the teachings of which are incorporated herein by reference. Therefore, only brief descriptions of the insert **68** and the locking cartridge **74** to be mated to each weight plate **32** will be provided below.

[0026] The insert **68** includes a hollow upper body **78** and a lower interconnection tail **80**. A pair of axially-aligned apertures **84** and **86** are formed through the upper body **78** of insert **68**, and a coupling slot **87** is formed through the lower tail **80** of insert **68**. The upper body **78** of insert **68** is located and held in place (by means of a force fit) inwardly of the center hole **66** through the weight plate **32**, such that the upper body **78** of the insert **68** will lie flush with the top **76** of the weight plate **32** and the lower tail **80** of the insert projects downwardly from the bottom **82** of the weight plate. As is best shown in FIG. **5**, the downwardly projecting lower interconnection tail **80** of the insert **68** of a first weight plate **32** is dimensioned so as to fit within the hollow upper body **78'** from an identical insert **68'** that is carried by an adjacent weight plate **32'** which lies in the stack below the first weight plate **32**.

[0027] As is best shown in FIG. **5**, the locking cartridge **74** includes a locking pin **88** that is slidable through a housing **90** of the locking cartridge. In the ready-to-use configuration (best shown in FIGS. **3** and **4**), the housing **90** of locking cartridge **74** is received inwardly of the internal cavity **70** of weight plate **32**. A horizontal switch base **92** below which the housing **90** of locking cartridge **74** depends lays upon the front **72** of weight plate **32** outside the internal cavity **70** thereof.

[0028] The locking cartridge **74** includes a lock control arm **94** that communicates at one end thereof with the locking pin **88** by way of a guide slot **96** that is formed in the switch base **92** and the housing **90** of cartridge **74**. A locking knob **98** is affixed to the opposite end of lock control arm **94**. A pushing or pulling force applied to the lock control knob **98** is transferred to the locking pin **88** by way of the lock control arm **94** in order to cause the locking pin **88** to slide through the housing **90** of the locking cartridge **74** between locked or unlocked positions relative to the weight plate **32** depending upon the direction in which the locking knob **98** is pushed or pulled.

[0029] When it is desirable to detachably connect the weight plate **32** to another weight plate from the stack, the lock control knob **98** is pushed to cause the lock control arm **94** to ride through the guide slot **96** in the switch base **92** of locking cartridge **74**. The locking pin **88** is, in turn, caused to slide through a locking channel **100** (some of which being shown in FIG. **4**) that is formed in the bottom **82** of the weight plate **32**. The locking pin **88** slides to its locked position along the locking channel **100** and through the center hole **66** of the weight plate **32**. In the locked position (not shown), the locking pin **88** from the locking cartridge **74** of the weight plate **32** will pass through the axially-aligned apertures **84** and **86** in the hollow upper body **78** of the insert **68** that is retained within the center hole **66**. At the same time, the locking pin **88** will also pass through the coupling slot **87** in the lower interconnection tail **80** of the insert **68** which projects downwardly from the preceding weight plate of the stack (also not shown) that lies above the weight plate **32** in face-to-face alignment against the top **76** thereof.

[0030] Accordingly, after moving to the locked position through locking channel **100**, the locking pin **88** will capture and retain the tail of the insert of the preceding weight plate within the hollow upper body **78** of the insert **68** being carried by the weight plate **32**. Thus, the preceding weight plate in the stack will be detachably connected to the weight plate **32** lying therebelow. Any number of weight plates **32** from the stack **34** of FIG. **3** may be selectively connected and lifted together or separated from one another by simply pushing or pulling the lock control knob **98** of each lock control cartridge **74** to cause the locking pin **88** thereof to move to either the locked or unlocked position. That is to say, with a pulling force applied to the lock control knob **98**, the locking pin **88** will slide in an opposite direction through locking channel **100** to the unlocked position, whereby the preceding weight plate can be separated and lifted independently from the weight plate **32** lying therebelow.

1. Weight lifting exercise apparatus and a stack of weight to be lifted including at least first and second weights laying face-to-face one above the other, said weight lifting exercise apparatus comprising:

a frame;

at least one guide bar having a first end pivotally coupled to said frame and an opposite end pivotally coupled to said first weight;

an attachment by which said first weight is connected to said second weight from said stack of weights; and

lifting force generating means communicating with said first weight such that a pulling force applied to said lifting force generating means is transferred to said first weight to simultaneously cause said first weight and said

second weight connected to said first weight to be lifted together in a linear path and said guide bar to rotate at said opposite end thereof relative to said frame through a circular path.

2. The weight lifting exercise apparatus and stack of weights as recited in claim **1**, wherein each of said first and second weights is a weight plate.

3. The weight lifting exercise apparatus and stack of weights as recited in claim **1**, wherein said lifting force generating means is a cable.

4. The weight lifting exercise apparatus and stack of weights as recited in claim **1**, wherein said frame includes a top, a bottom, and a side extending between said top and said bottom, said at least one guide bar pivotally coupled at said opposite end thereof to the side of said frame so as to rotate relative to said side through said circular path in response to the pulling force applied to said lifting force generating means.

5. The weight lifting exercise apparatus and stack of weights as recited in claim **4**, wherein said weight lifting exercise apparatus also comprises a pulley mounted on the top of said frame and an opening formed through said top, said lifting force generating means extending from the first weight of the stack, through the opening in said top, and over the pulley mounted on said top.

6. The weight lifting exercise apparatus and stack of weights as recited in claim **4**, wherein said weight lifting exercise apparatus also comprises a connector affixed to said first weight from said stack, said lifting force generating means communicating with said first weight by way of said connector.

7. The weight lifting exercise apparatus and stack of weights as recited in claim **6**, wherein said connector includes a post projecting therefrom and lying above said first weight and a sleeve surrounding said post, the first end of said at least one guide bar being connected to said sleeve and causing said sleeve to rotate around said post when said guide bar rotates at said opposite end thereof through said circular path in response to the pulling force applied to said force generating means.

8. The weight lifting exercise apparatus and stack of weights as recited in claim **7**, wherein said connector also includes a leg lying against at least one side of the first weight, said weight lifting exercise apparatus further comprising an additional guide bar having a first end pivotally coupled to the side of said frame and an opposite end pivotally coupled to the leg of said connector, said additional guide bar rotating at said opposite end thereof relative to the side of said frame through a circular path in response to the pulling force applied to said lifting force generating means.

9. The weight lifting exercise apparatus and stack of weights as recited in claim **8**, wherein said first and additional guide bars are at all times arranged in spaced parallel alignment with one another when said guide bars rotate relative to the side of said frame in response to the pulling force applied to said lifting force generating means.

10. The weight lifting exercise apparatus and stack of weights as recited in claim **1**, wherein said first weight is located at the top of the stack of weights to be lifted.

11. The weight lifting exercise apparatus and stack of weights as recited in claim **1**, wherein each of the first and second weights has a bore hole formed therethrough, said attachment including a first insert located within the bore hole of said first weight and a second insert located within the bore hole of said second weight, a portion of said first insert extending from said first weight for receipt by the second insert at the bore hole of said second weight by which said first weight is connected to said second weight.

12. The weight lifting exercise apparatus and stack of weights as recited in claim **11**, wherein each of said first and second weights has a locking cavity formed therewithin, said attachment also including a first locking cartridge located in the locking cavity of said first weight and a second locking cartridge located in the locking cavity of said second weight, each of said first and second locking cartridges having a respective locking pin that is slidable therethrough between unlocked and locked positions, the locking pin of said second locking cartridge sliding to the locked position so as to engage the second insert located within the bore hole of said second weight and the portion of said first insert extending from said first weight that is received by said second insert, whereby said first weight is connected to said second weight.

13. The weight lifting exercise apparatus and stack of weights as recited in claim **11**, wherein said first and second weights having said bore holes for receipt therewithin of respective ones of said first and second inserts are devoid of any other bore holes formed therethrough.

14. The combination, comprising:

weight lifting exercise apparatus; and

a stack of weights to be lifted by said weight lifting exercise apparatus, said stack including at least first and second weights adapted to be detachably connected in face-to-face alignment one above the other,

said weight lifting exercise apparatus including:

a frame;

first and second guide bars pivotally coupled at respective first ends thereof to said frame and pivotally coupled at respective opposite ends to said first weight; and

means for generating a lifting force communicating with said first weight such that a pulling force applied to said lifting force generating means is transferred to said first weight to simultaneously cause said first weight and said second weight detachably connected to said first weight to be lifted together in a linear path and said first and second guide bars to rotate at the respective opposite ends thereof relative to said frame through respective circular paths,

said first and second guide bars at all times being positioned in spaced parallel alignment with one another when said guide bars rotate relative to said frame in response to the pulling force applied to said lifting force generating means.

* * * * *