United States Patent [19]

Flowers

[11] **3,874,658**

[45] **Apr. 1, 1975**

[54] **ONE-MAN ADJUSTABLE BENCH PRESS RACK**

[76] Inventor: **Arthur M. Flowers,** 1108 Gayle St., Mobile, Ala. 36605

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[52] **U.S. Cl.** **272/58**

[51] **Int. Cl.** **A63b 21/00**

[58] **Field of Search** 272/58, 81, 84

[56] **References Cited**

UNITED STATES PATENTS

3,342,485	9/1967	Gaul	272/58
3,625,511	12/1971	Rennemann	272/58

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Marcy Gym Equipment Co., Catalog No. 71, 1971, pg. 18.

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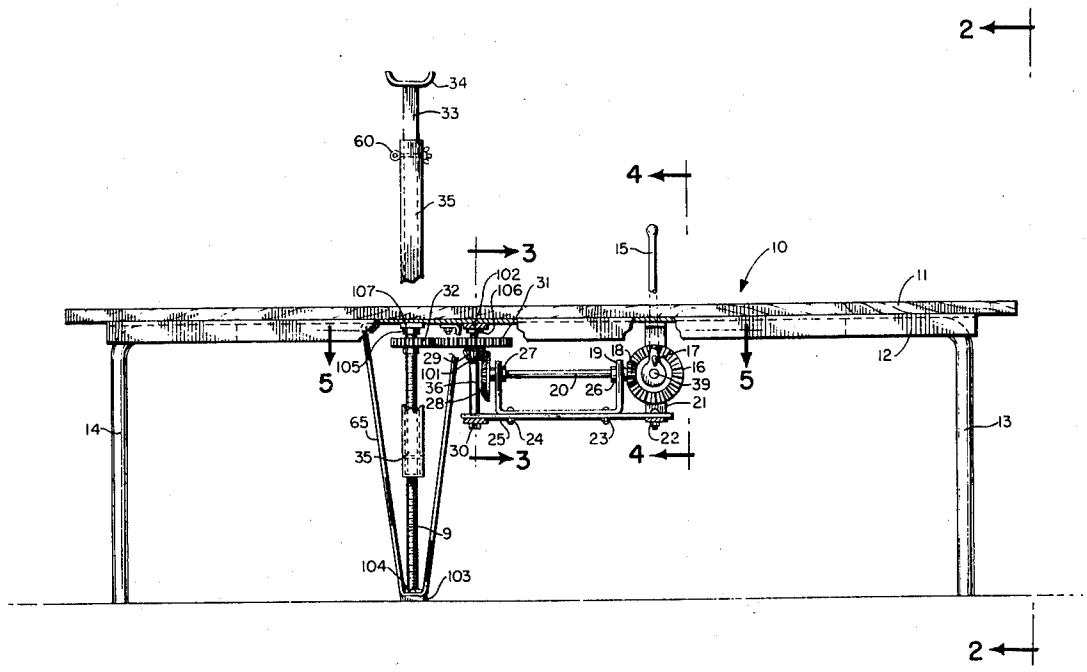
Strength and Health Magazine, May 1974, pg. 11.

Primary Examiner—Richard C. Pinkham
Assistant Examiner—Joseph R. Taylor
Attorney, Agent, or Firm—Pugh & Laiche

[57] **ABSTRACT**

A one-man operable bench press rack for weight lifting having a series of gears engaged in connection with a handle which in turn operates the gears adjusting the height of the arms on which the weights are placed. The handle is ratcheted so that the weight supporting arms may be adjusted upward and downward depending on what phase of the exercise the user is engaged in. In an alternate embodiment of the invention, the ratcheted handle may be replaced by a motor control in which the user merely pushes the up or down button depending on which phase of the exercise he is engaged in. The present invention allows the user to remove the weights after the exercising is complete with no physical strain and without the need of an attendant.

11 Claims, 6 Drawing Figures



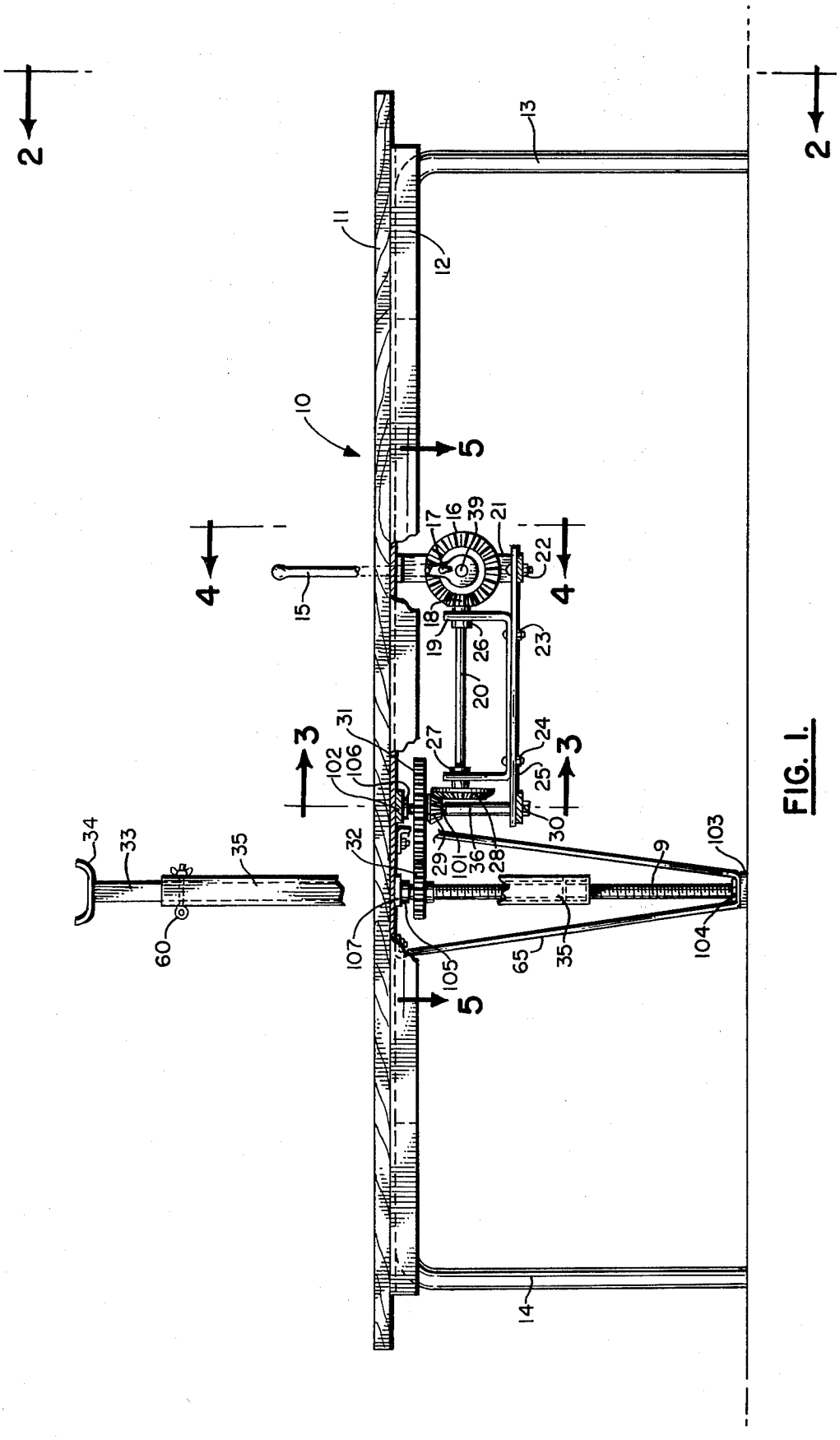

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26
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102
106
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101
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65
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104
5
14

FIG. 1.

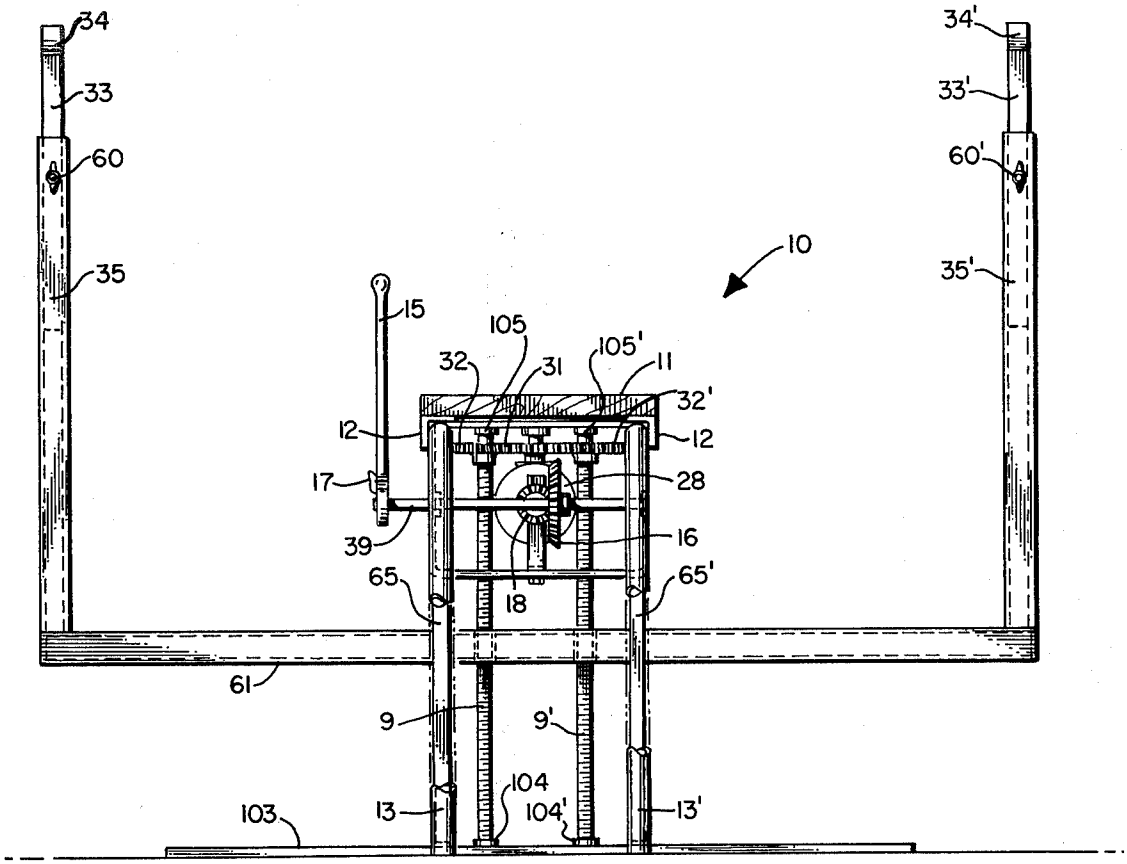

34
33
60
35
34'
33'
60'
35'
10
15
105
105'
11
32
31
32'
12
12
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28
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16
65
18
65'
61
9
9'
104
104'
103
13
13'

FIG. 2.

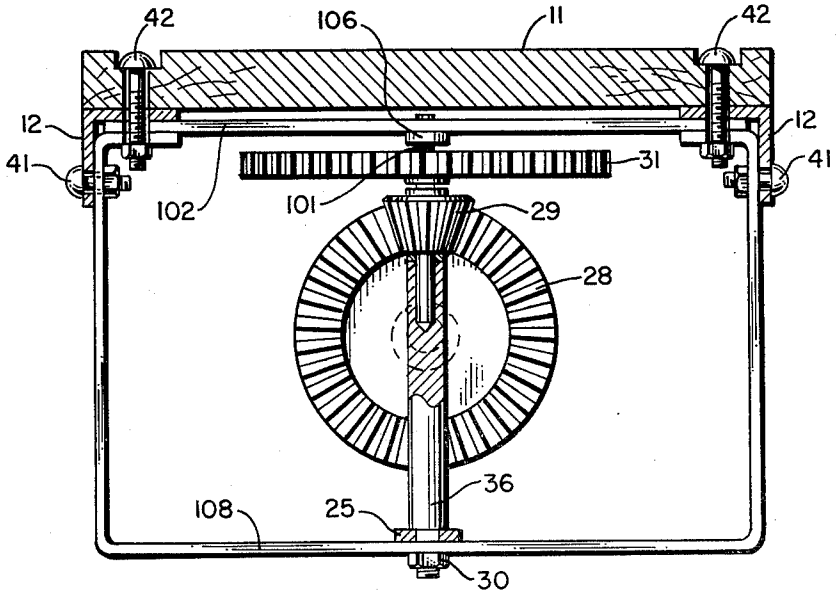

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106
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42
12
12
41
41
31
102
101
29
28
36
108
25
30

FIG. 3.

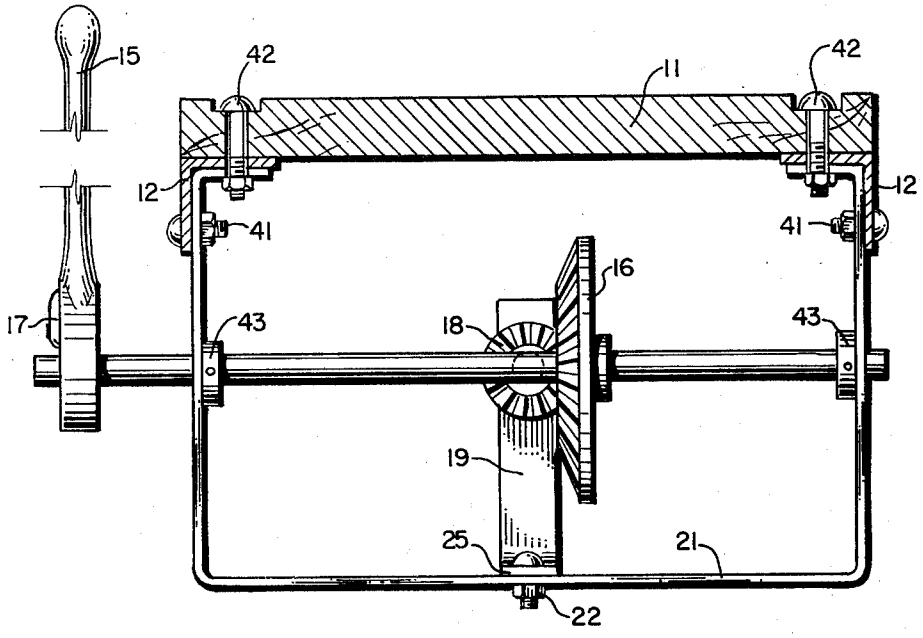

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42
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FIG. 4.

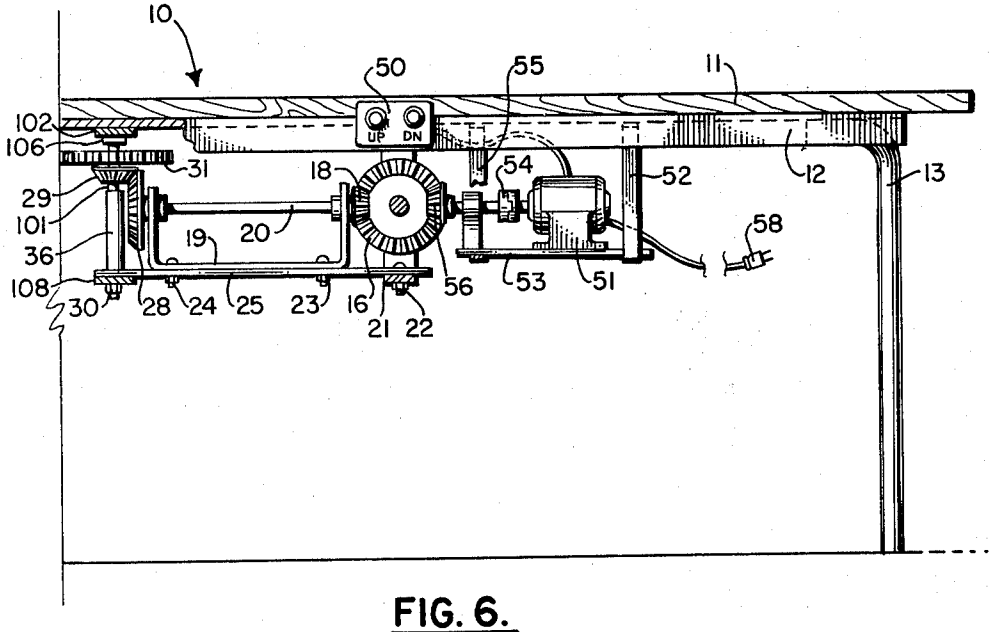

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11
102
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52
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101
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FIG. 6.

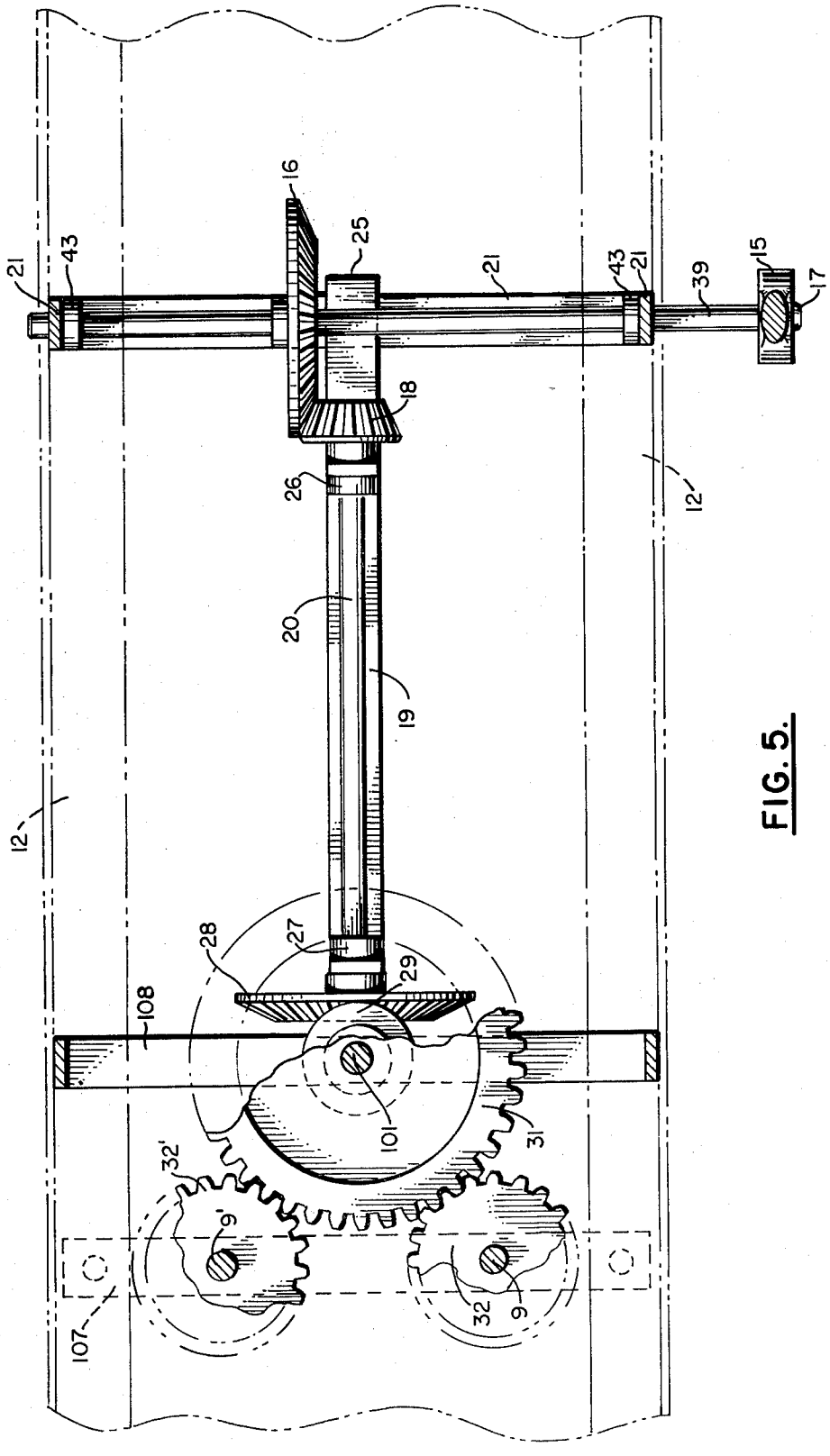

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43
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43
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39
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17
18
26
12
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19
12
28
27
29
108
101
31
32'
9'
107
32
9

FIG. 5.

ONE-MAN ADJUSTABLE BENCH PRESS RACK

BACKGROUND OF THE PRESENT INVENTION

The present invention relates to an exercising device and more particularly to a one-man operable bench press device for exercising utilizing mechanical means to adjust the weight holding arms up or down, the adjusting means being operable by the user.

In prior art bench press systems, the weights are placed about 15 inches above the exerciser's chest on two fixed vertical support arms attached to the sides of the bench. This allows the exerciser enough space to get under the weights and lay on the bench and lift the weights off the vertical arms, and then he does his exercise. After he has finished his exercise, he has to put the weights back on the two arms, so he can get out from under the weights and off the bench.

Typical examples of prior art bench exercising devices which can be used as a bench press device are shown in the patents to Gaul (U.S. Pat. No. 3,342,485, issued Sept. 19, 1967) and Rennemann (U.S. Pat. No. 3,625,511, issued Dec. 7, 1971).

As is the customary practice, the weights used in bench press exercises are relatively heavy weights, often being of the order of 100 to 300 pounds, usually in the form of a bar bell. The particular weights used depend on the characteristics of the user, in particular the user's age, weight, and physical condition, and the stage of the body building program the user is in. Thus in the beginning a relatively small person may begin his program with as little as a 50 pound weight, while a medium size person may begin with a 75 pound weight, then working up as their conditions and programs permit to weights in excess of a hundred pounds.

In the prior art, if an exerciser has exhausted his energy before he puts the weights back on the vertical arms, he would become trapped under the weights. The prior art system of bench press exercise is thus extremely dangerous for a person to do exercises alone. It therefore usually necessitates another person to assist the exerciser to put the weights back on the vertical arms.

The present invention allows a person to do exercises alone and with safety. It does this by giving the exerciser himself a means of easily controlling without great effort the height of the support arms on which the weights are placed. The present invention further provides the necessary power to lift the weights off an exhausted exerciser's chest and allows him to get off the bench and out from under the weights without additional, substantial physical strain and without the need for an assistant.

"Great effort" or "substantial physical strain" as used herein means an effort or strain level substantially less than the effort or strain required to directly move the relatively heavy weights themselves. The present invention does this by providing an adjustment means for raising and lowering the support arms which provides the user a substantial mechanical advantage in its operation in moving the support arms. In the preferred embodiments described in detail herein, this mechanical advantage is achieved by means of a gear drive train, although many other systems are readily available and known to those skilled in the mechanical arts.

It is therefore an object of the present invention to provide a simply operable, easy, and inexpensive to manufacture bench press system which allows the exerciser alone to mechanically raise and lower the weights.

It is another object of the present invention to provide a one-man operable bench press device which in the preferred embodiment uses a series of gears which is operated manually by a ratchet handle or electrically by means of a motor to raise and lower the weight support arms.

BRIEF DESCRIPTION OF THE DRAWINGS

The above-mentioned and other features and objects of this invention and the manner of obtaining them will become more apparent and the invention itself will be best understood by a reference to the following description of the preferred embodiments of the invention taken in conjunction with the accompanying drawings wherein:

FIG. **1** is side-elevation view of a first preferred embodiment of the present invention, with some of the elements partially cut-away;

FIG. **2** is an end view of the embodiment depicted in FIG. **1** taken from the foot of the device in the direction of lines **2—2** of FIG. **1**;

FIG. **3** is a cross-sectional view taken along section lines **3—3** of FIG. **1**;

FIG. **4** is a cross-sectional view taken along section lines **4—4** of FIG. **1**; while

FIG. **5** is a top, cross-sectional view taken along section lines **5—5** of FIG. **1**.

FIG. **6** is a side-elevation view of an alternate embodiment using a motor to lift the weight support arms up and down.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

A bench press device is used for exercising by the user lying down on the bench portion of the device which is disposed either horizontally or at an angle and lifting weights in the form of "dumbbells" in a vertical direction, to thereby "press" the weights. In describing below the preferred embodiments of the present invention, a first embodiments using a gear train mechanically hand-driven by a ratcheted handle (FIGS. **1–5**) will be described and then a second similar embodiment (FIG. **6**) will be described using an electric motor drive.

STRUCTURE

Referring to the drawings, there is shown a one-man bench press exercising device **10** comprised of a bench board **11** upon which the exerciser lays down in order to get into a position whereby he can lift the weights placed in and across U-shaped member **34** and **34'**. Weight support arms **33, 33'** are attached below the U-shaped members **34, 34'** and are telescopically inserted into tubular sleeve members **35, 35'**. Wing nut/pin assemblies **60, 60'** are used to fasten weight support arm **33, 33'** into any given vertical position with respect to the sleeve members **35, 35'** as required, depending upon the arm length of the exerciser. The pins of wing nut/pin assemblies **60, 60'** mate with a series of holes (not seen in the illustrations) placed along the length of the arms **33, 33'**.

Legs **13, 13', 14** and **14'** support the bench press apparatus. (Leg **14'** is not shown but would be the counterpart to leg **14.**) Two, parallel angle iron side members **12** serve as a basic frame and as a molding, thereby hiding a portion of the inner workings of the gear train

as well as serving as a safety shield to prevent the exerciser from getting caught in the gear train.

Lever handle **15** is attached to lateral axial rod or shaft **39.** Longitudinally disposed bevel gear **16** is fixedly attached to axial rod **39** so as to be rotated when axial rod **39** turns by use of lever handle **15.** Lever handle **15** is ratcheted by means of ratchet key **17** which allows rotation of the axial rod in only one direction, depending on the position of racket key **17,** in a well known way.

Referring to FIGS. **4** and **5** of the drawings, there is shown in more particularity the structure by which axial rod **39** is supported by bracket **21.** A set of sleeve collars **43,** which include sets of ball bearings journaled within them, rotatably support axial rod **39.**

Lateral bevel gear **18** is meshed together with bevel gear **16,** and is mounted on longitudinal axial rod or shaft **20.** Axial rod **20** has mounted on its other end lateral bevel gear **28,** while collars **26** and **27** serve as support sleeves for axial rod **20.** Collars **26** and **27** have mounted within them a set of ball bearings for ease in turning of the axial rod **20.**

Longitudinally disposed C-shaped support means **19** supports collars **26** and **27,** while longitudinal strip **108** supports C-shaped means **19** and is fastened thereto by nuts and bolts **23** and **24.** As best seen in FIGS. **1, 2, 3** and **4,** longitudinal strip **25** is fixedly suspended between two, opposed, lateral U-brackets **21** and **108** which are in turn fixedly attached to the bench board **11** and angle iron frame members **12.**

The manner in which bracket **108** is attached to the bench board **11** is best seen in FIG. **3.** The bracket **108** is fastened by nuts and bolts **41** and **42** to side angle iron strips **12** and the bench board **11.**

The manner in which U-bracket **21** is attached to the bench board **11** is best seen in FIG. **4.** Angle iron members **12** separates bracket **21** from bench board **11** and is connected thereto by a set of nuts and bolts **41** and **42.**

A vertical sleeve **36** for journaling the vertical shaft **101** is attached to strip **25** by means of a nut and bolt arrangement **30** (note FIG. **3**). Bevel gear **29** is attached to the common shaft **101** with spur gear **31,** with the common shaft **101** riding in sleeve **36.** The other end of the vertical, common shaft **101** is journaled into thrust bearing **106** mounted on lateral strip **102** which is attached to the bench board **11.** Spur gear **31** in turn is meshed in with the smaller, planetary gears **32** and **32'** (note FIG. **5**), the latter of these gears being attached to a screw jack arrangement formed of central sleeves upon which the planetary gears are fixedly mounted and the vertical, threaded posts **9** and **9'** to which the central sleeves are fixedly mounted.

The vertical, threaded posts **9, 9'** are rotatably mounted between lateral brace arm **103** and lateral strip **107,** which is attached to bench board **11,** by means of thrust bearings **104, 104',** and **105, 105',** respectively. V-shaped braces **65, 65'** in conjunction with lateral stabilizing arm **103** balance the bench. Thrust bearings **104, 104' 105, 105'** permit screw jack arrangement **9, 9'** to turn relative to the bench board.

Riding on the threaded posts **9, 9'** is lateral weight support arm **61** which mates with the male posts **9, 9'** by means of threaded female orifices or sockets. Because the lateral arm **61** cannot rotate with respect to the posts **9, 9',** when the posts **9, 9'** rotate, the arm **61** moves up or down, depending on the direction of rotation of the posts **9, 9'.** Hence, ultimately, the weight support brackets **34, 34'** are moved up or down by the back-and-forth movement of handle **15,** depending on the direction of rotation of the elements of the system, which in turn depends on the position of racket key **17.**

OPERATION

In preparation for use, the weight support arms **33,** 33' are appropriately positioned with respect to the tubular sleeve members **34, 34'** by means of wing nut/pin assemblies **60, 60',** taking into account the arm length of the exerciser. The "dumbbell" weights are positioned across the U-shaped brackets **34, 34'** and the rachet key **17** positioned in the "up" position. The weights are then raised to a suitable height by means of a back-and-forth pumping of the racheted handle **15.**

The user then positions himself on the bench board **11** under the weights and moves them off the supports to begin exercising by "pressing" the weights. The user may, if he so desires, lower the support arms **33**/35 and **33'/35'** down and out of the way by means of repositioning the rachet key **17** and pumping the handle **15.**

Upon completion of the exercises, the user merely appropriately positions the support arm **33**/35 and **33'/35'** to support the weights and raises the supported weights off and away from him to allow him freedom of movement.

When ratcheted handle **15** is moved back and forth, the series of right angle bevel gears **16, 18, 28** and **29,** discussed in more detail hereinabove, turns intermediate spur gear **31** which in turn drives planetary gears **32** and **32'.** It is this transalated motion caused by the initial movement of the ratcheted handle **15** which in turn moves bevel gear **16** and at the end of the gear train transalates this motion to a movement of planetary gears **32** and **32'.** The movement of planetary gears **32** and **32'** causes screw jack members **9** and **9'** to turn in the threaded sockets of lateral weight support arm **61,** moving it up and down, depending on the position of ratchet key **17.**

ALTERNATE/MOTORIZED EMBODIMENT

FIG. **6** shows a second, alternate embodiment of the present invention utilizing a motor arrangement to raise and lower the weight support arms **35** and **35'.** Basically this second, alternate embodiment is the same as the previously discussed first embodiment of FIGS. **1–5** above with the difference being that ratcheted handle **15** and its associated drive elements have been replaced by a bevel gear arrangement **56** connected to an electric motor **51** which is coupled thereto by coupling means **54.** If desired, the right angle bevel gears **16** and **18** could be eliminated and the motor directly coupled to shaft **20.**

The motor **51** is positioned on strip **53** which in turn is supported by U-brackets **52** and **55.** A panel with "up" and "down" buttons is positioned along the side of the bench **11** so that the exerciser can merely push the button one way or the other to raise or lower the weights accordingly. Electric cord **58** may be plugged into any receptable for supplying power to the electric motor **51.**

As is true with most mechanical systems, the possible modifications to the preferred embodiments described above are nearly limitless. For example, many different gear train systems are possible, although the one described is considered preferrable. Indeed, rather than

a mechanical gear train drive system, it is possible to use other mechanical drive systems such as for example a rack-and-pinion system, or rather than a mechanical drive a hydraulic one could be used. Moreover, as an initiating element, rather than a racheted pumping handle, a rotary wheel could be used, or a foot treadle rather than an arm handle could be used. Additionally, the support system could include a safety stop system to prevent excessive lowering of the weights. Likewise the vertical and lateral support elements could be varied and mounted differently in many different ways. Finally, the figures are intended to be only generally illustrative of the principles of the present invention, and, for example, the gearing ratios should be those appropriate for a particular application, taking into consideration the amount of effort desirable or electric motor torque available. The above are merely exemplary of the possible changes.

Because many varying and different embodiments may be made within the scope of the inventive concept herein taught, and because many modifications may be made in the embodiments herein detailed in accordance with the descriptive requirements of the law, it is to be understood that the details herein are to be interpreted as illustrative and not in a limiting sense.

What is claimed as invention is:

1. A one-man adjustable bench press device designed for use in connection with weight lifting exercises utilizing relatively heavy weights such as for example barbells comprising:

bench board means for supporting the exerciser in at least a generally supine position;

a multiplicity of support legs attached to said bench board means to form a bench;

a mechanical weight support means adjustable vertically and associated with said bench board means for supporting the heavy weights when not being used in exercising; and

adjustable means associated with said bench board means and said weight support means and operable by the user with no substantial physical exertion when lying supine on said bench board means for raising and lowering said weight support means relative to said bench without substantial physical strain even when said relatively heavy weights are being supported by said weight support means, said adjustable means providing the user with a substantial mechanical advantage in moving said weight support means, whereby the relatively heavy weights can be moved by the user with respect to the user without substantial physical strain or the need for an assistant.

2. The device as defined in claim **1** wherein:

said mechanical weight support means includes two vertical arms on opposite sides of said bench board and a lateral, horizontally disposed arm connected across said vertical arm, said vertical arms having at their distal ends means to support the weights across said vertical arms, said adjustable means operating on said lateral arm to raise and lower said weight support means.

3. The device as defined in claim **1** wherein said adjustable means is comprised of a manually or an electrical motor operable gear drive train.

4. A one-man adjustable bench press device designed for use in connection with weight lifting exercises comprising:

a bench board;

a multiplicity of support legs attached to said bench board to form a bench;

a mechanical weight support means adjustable vertically and associated with said bench board for supporting exercising weights when not being used in exercising; and

adjustable means associated with said bench board and said weight support means and operable by the user with no substantial physical exertion when lying prone on said bench board for raising and lowering said weight support means relative to said bench, said adjustable means being comprised of a manually operable gear drive train; whereby the weights can be moved by the user with respect to the user without substantial physical strain or the need for an assistant.

5. The device as defined in claim **4** further comprising a ratcheted arm mounted on said bench board, said ratcheted arm being used to turn said gear train to raise and lower said arms relative to said bench board by pumping action.

6. The device as defined in claim **5** wherein:

said ratcheted arm is connected to said bench board by means of a first axial shaft, said first axial shaft being rotatably mounted laterally on said bench board.

7. The device as defined in claim **6** wherein:

said first axial rod has a first bevel gear fixedly mounted thereon; and there is further included -

second axial means perpendicular to said first axial means being rotatably mounted longitudinally relative to said bench board;

a second beveled gear mounted on one end of said second axial means for meshing with said first beveled gear;

a third beveled gear mounted on the other end of said second axial shaft;

a third axial shaft perpendicular to said second axial shaft and being rotatably mounted vertically relative to said bench board;

a fourth beveled gear mounted on said third axial shaft, said fourth beveled gear meshed together with said third beveled gear;

a spur gear mounted on said third axial shaft; and

two planetary gears mounted on fourth axial shafts, respectively so as to render said weight support means adjustably mounted relative to said bench board.

8. The device as defined in claim **7** wherein:

said weight support means includes two vertical support arms positioned on opposite sides of said bench board.

9. The device as defined in claim **8** wherein:

said vertical arms are adjoined one to the other by means of a lateral, horizontally disposed arm, said lateral arm having a first and second threaded hole therein; and

said fourth and fifth axial shafts being threaded within said threaded holes of said lateral arm, the combination forming a screw jack arrangement.

10. A one-man adjustable bench press device designed for use in connection with weight lifting exercises comprising:

a bench board;

a multiplicity of support legs attached to said bench board to form a bench;

a mechanical weight support means adjustable vertically and associated with said bench board for supporting exercising weights when not being used in exercising; and

adjustable means associated with said bench board and said weight support means and operable by the user with no substantial physical exertion when lying prone on said bench board for raising and lowering said weight support means relative to said bench, said adjustable means for raising and lowering said weight support means relative to said bench board being comprised of an electrical motor operable gear drive train; whereby the weights can be moved by the user with respect to the user without substantial physical strain or the need for an assistant.

11. The device as defined in claim **10** wherein:

said electrical motor operable gear drive train is comprised of -

a first axial rod being rotatably mounted on said bench board;

a first bevel gear fixedly mounted on said first axial rod;

a second axial means perpendicular to said first axial means being rotatably mounted vertically relative to said bench board;

a second beveled gear mounted on one end of said second axial means for meshing with said first beveled gear;

a third axial shaft perpendicular to said first axial shaft and parallel to said second axial shaft and being rotatably mounted relative to said bench board;

a spur gear mounted on said third axial shaft;

two planetary gears meshing with said spur gear and mounted on a fourth and fifth respective axial shaft so as to render said weight support means adjustably mounted relative to said bench board;

said first axial shaft being driven by said electric motor; and wherein:

said weight support means includes two vertical support arms adjoined one to the other by means of a lateral, horizontally disposed arm; said horizontal lateral arm having first and second threaded within the said threaded holes of said lateral arm to form a screw jack combination therewith.

* * * * *