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(54) EXERCISE APPARATUS

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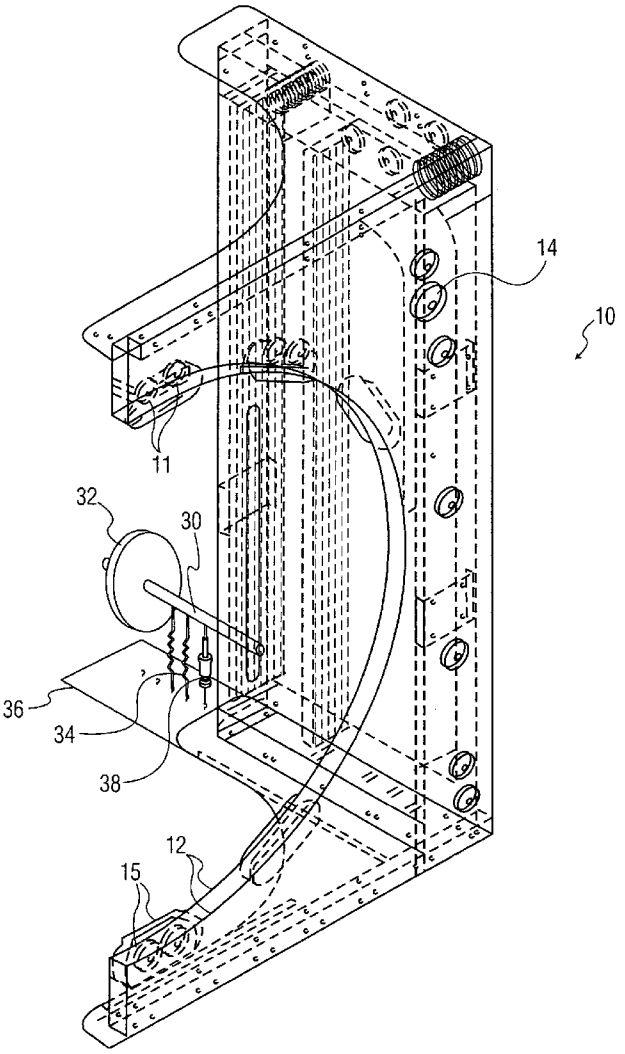
(52) **U.S. Cl.** **482/94**; 482/93

(57) **ABSTRACT**

Exercise apparatus, for example of the type disclosed in the U.S. Pat. No. 6,705,976, is provided with (a) a specially designed "force transfer device" which is coupled to a handle such that it is raised upward when the handle is pushed or pulled-by a user, and (b) means for exerting a counterforce resistance in the downward direction on the force transfer device when the force transfer device is lifted upward. According to the invention, this resistance exerting means includes at least one of (1) means, such as a substantially horizontal rod or the like, for removably holding one or more weights, (2) at least one hook or the like for removably attaching one or more springs, and (3) means for removably attaching one or more damping devices.



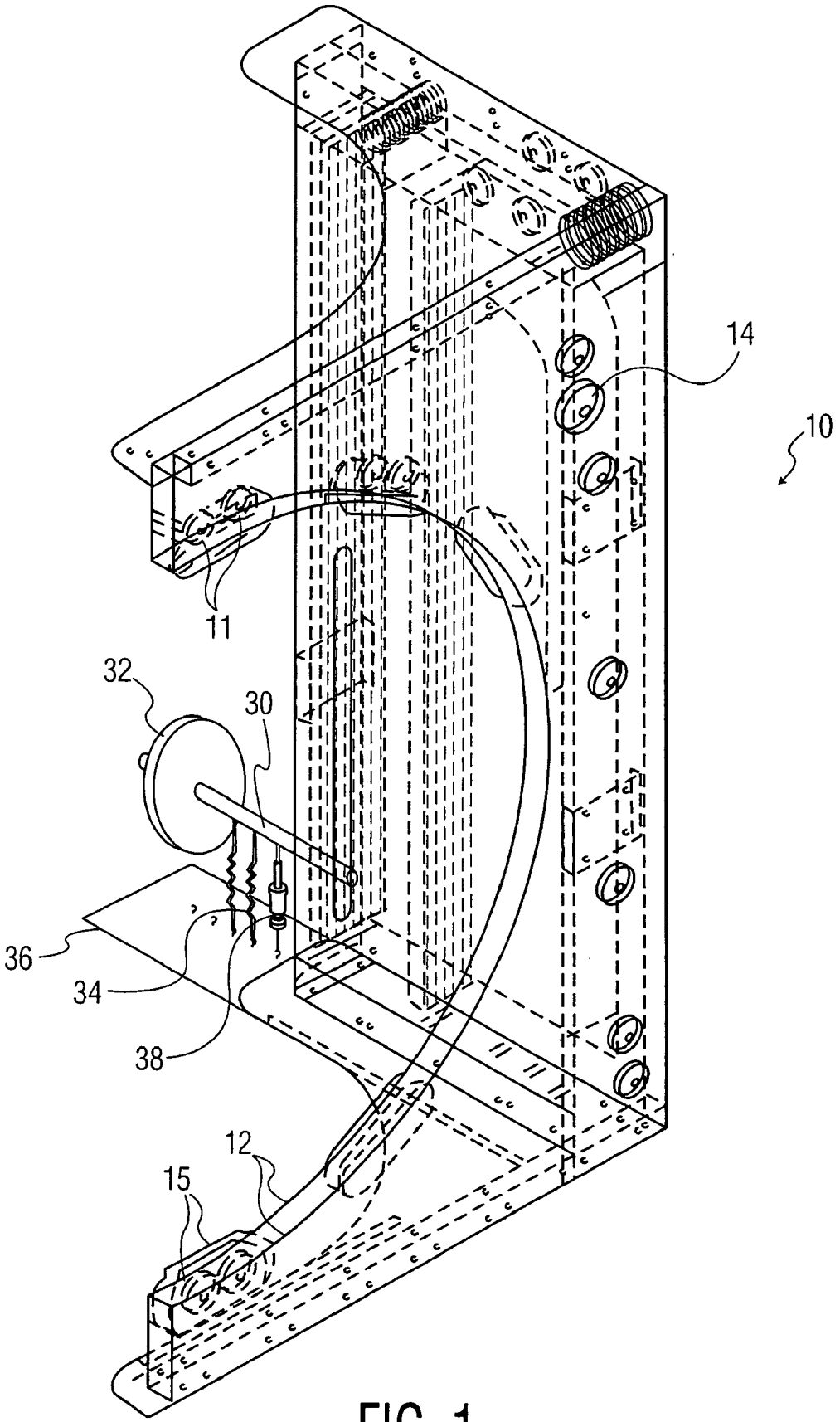


FIG. 1

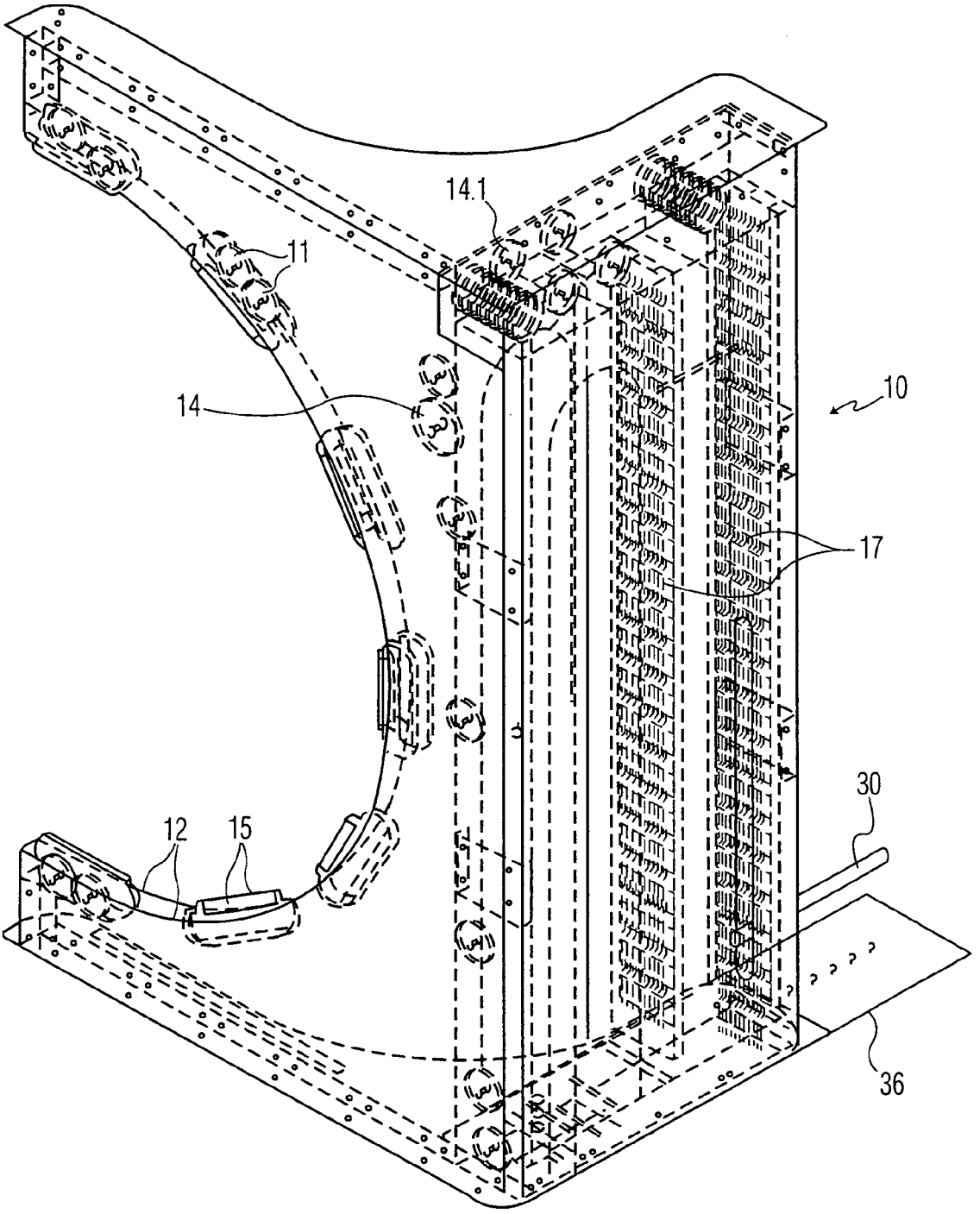


FIG. 2

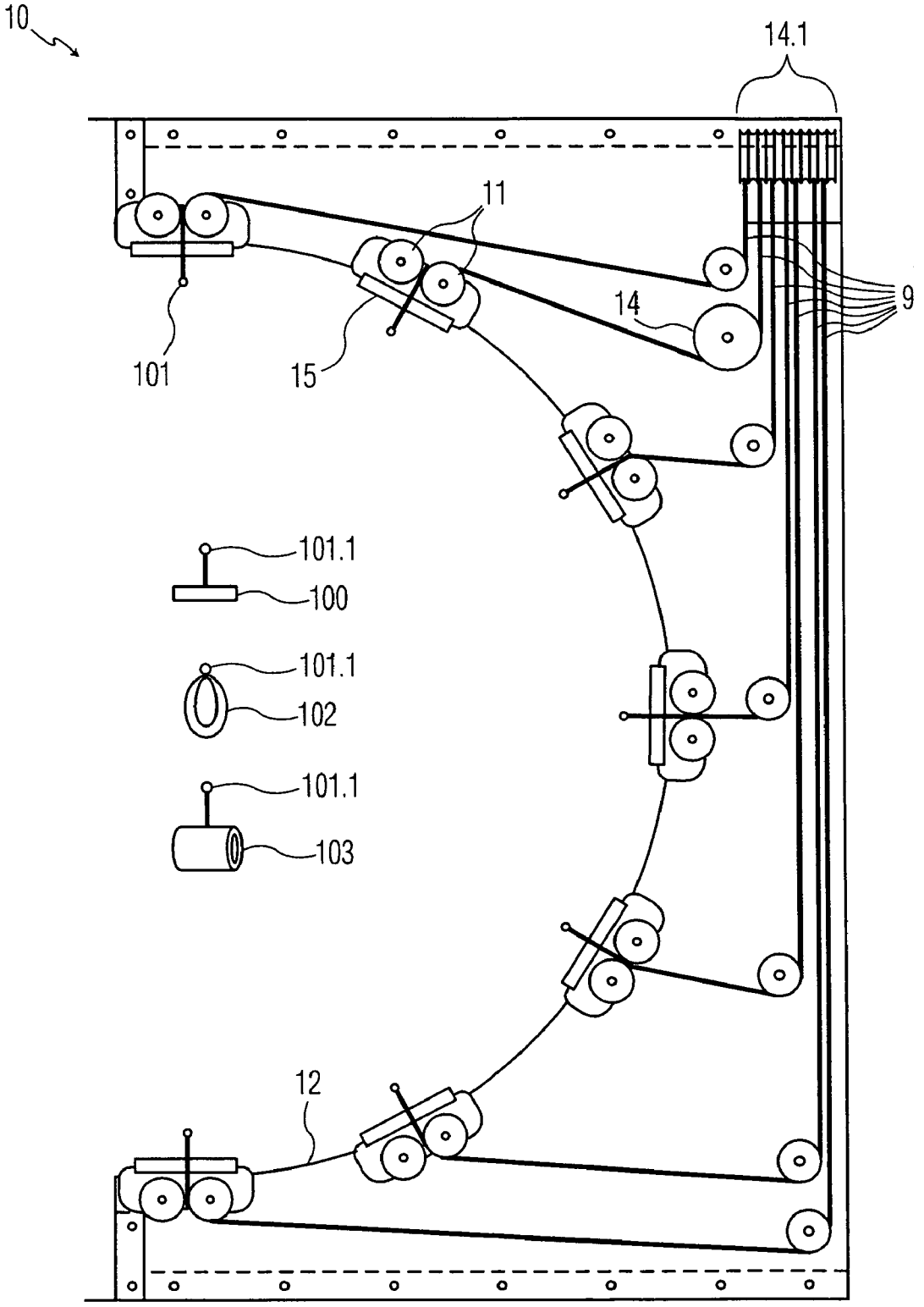


FIG. 3

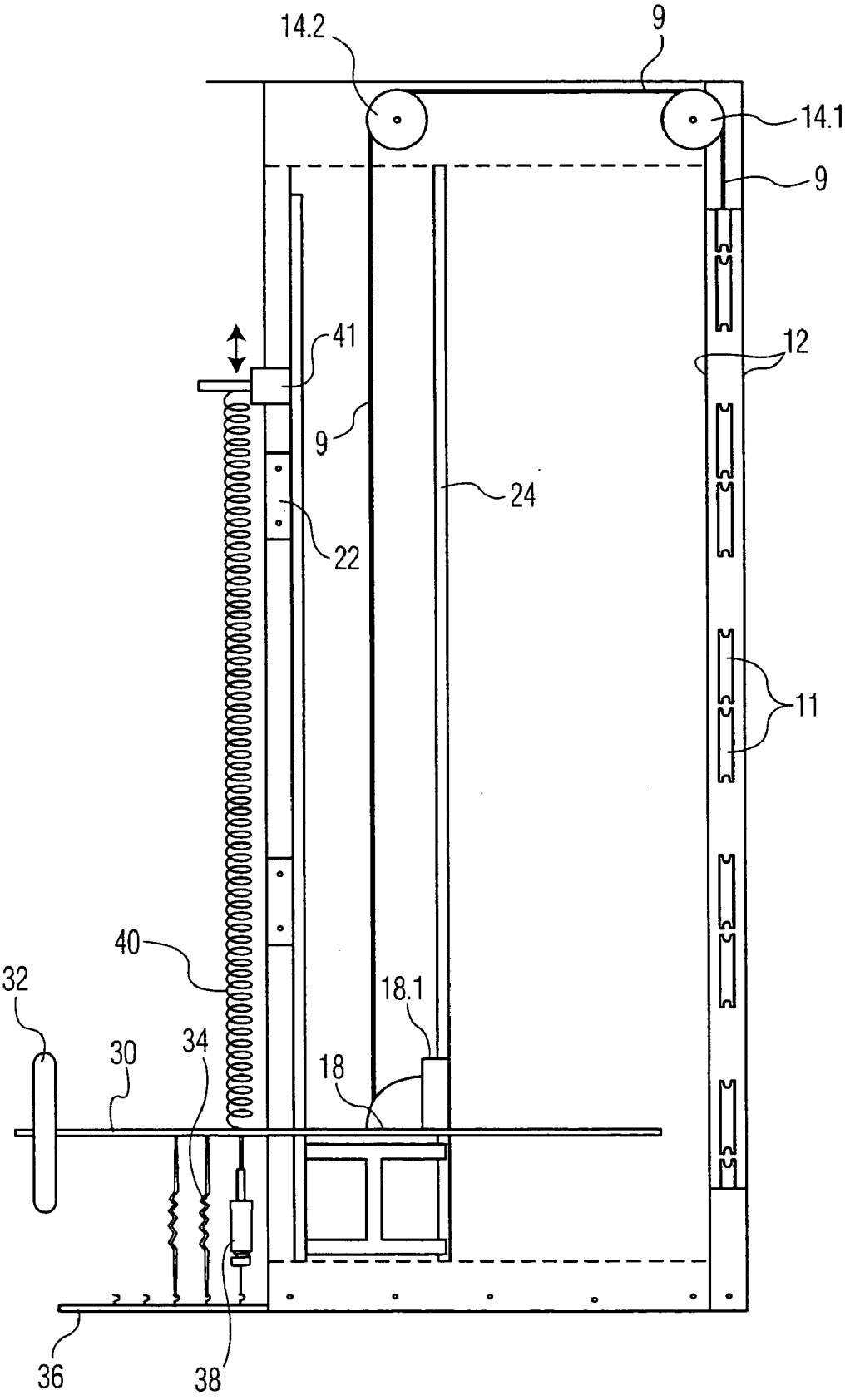


FIG. 4

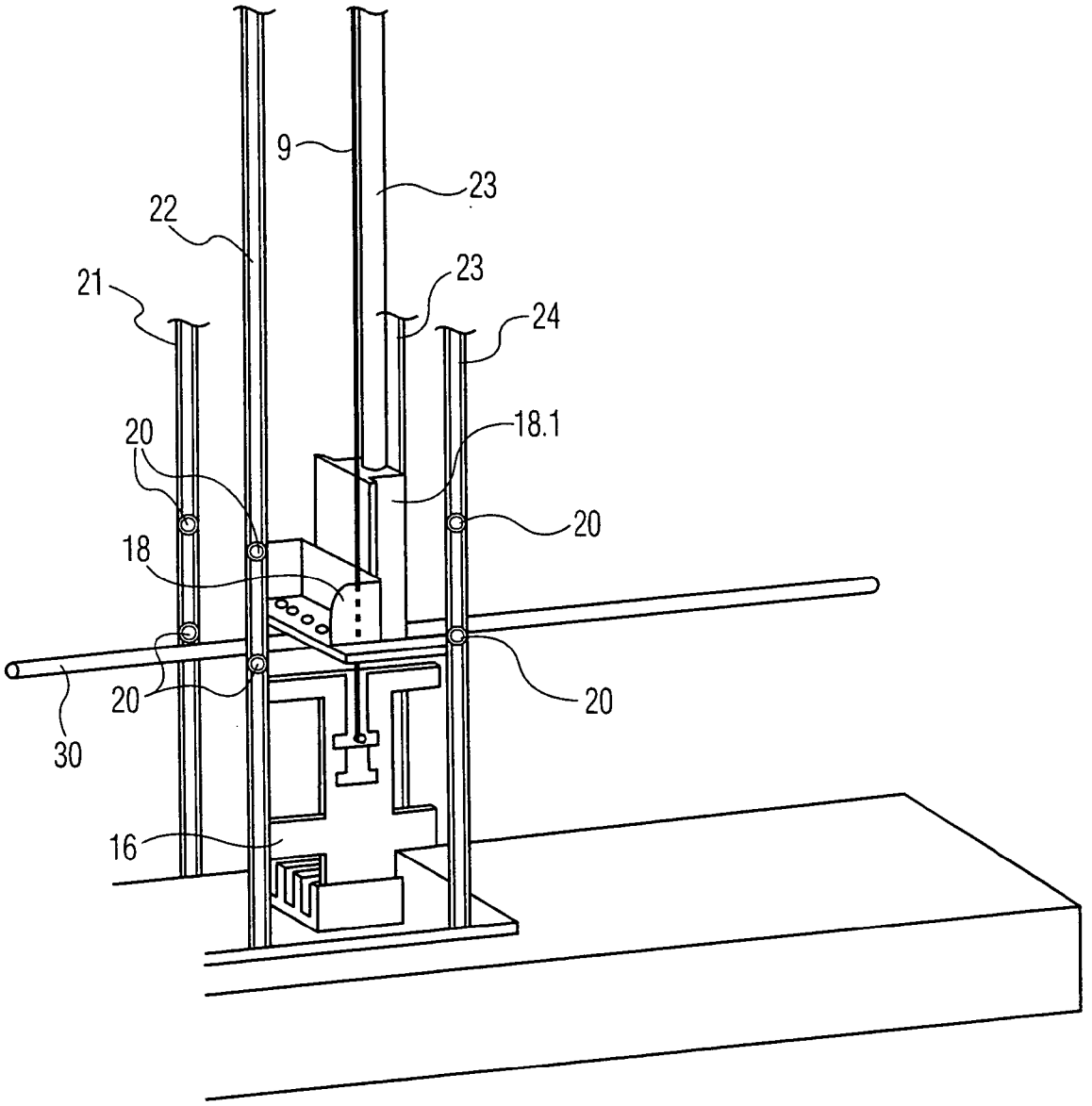


FIG. 5

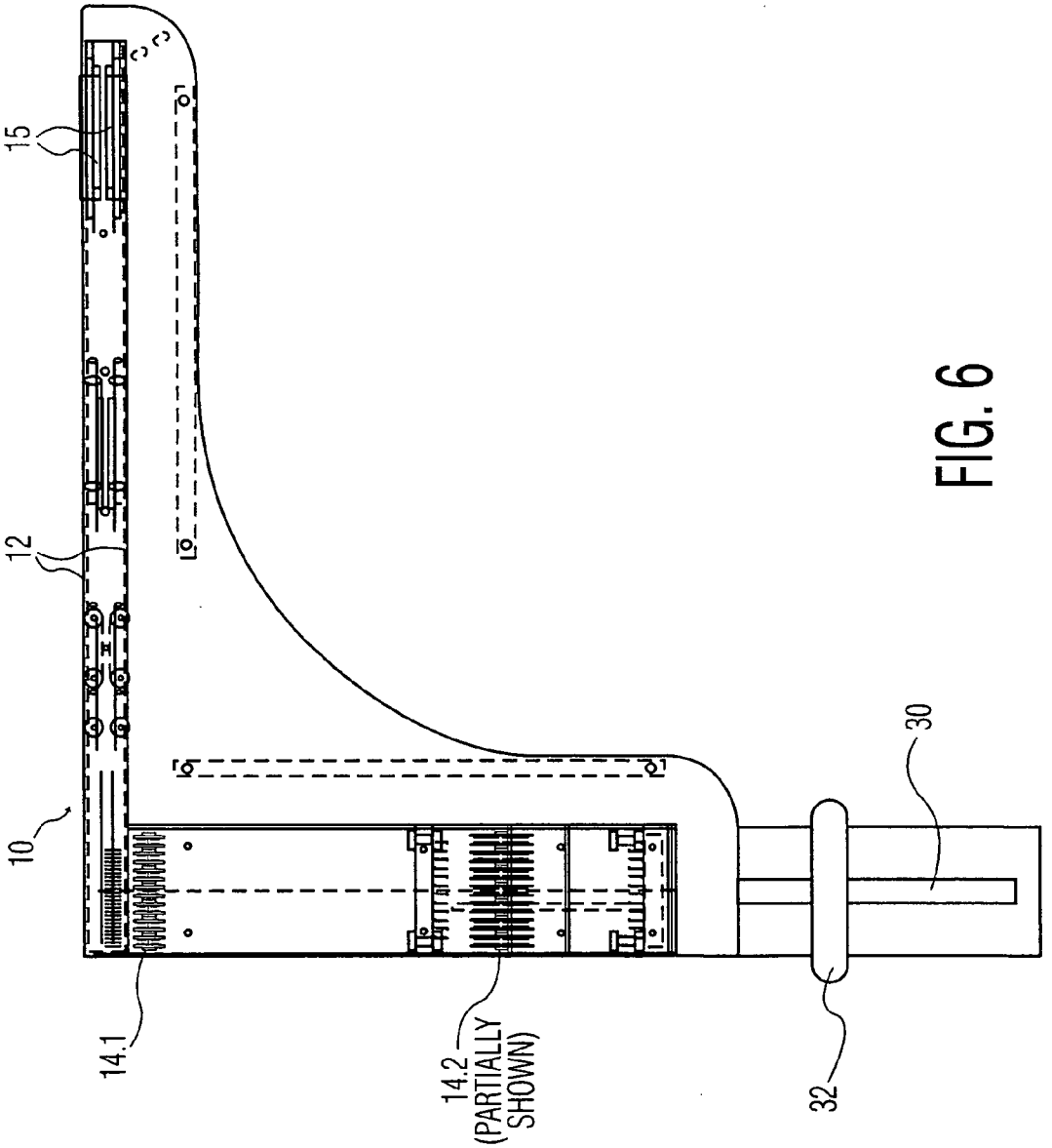
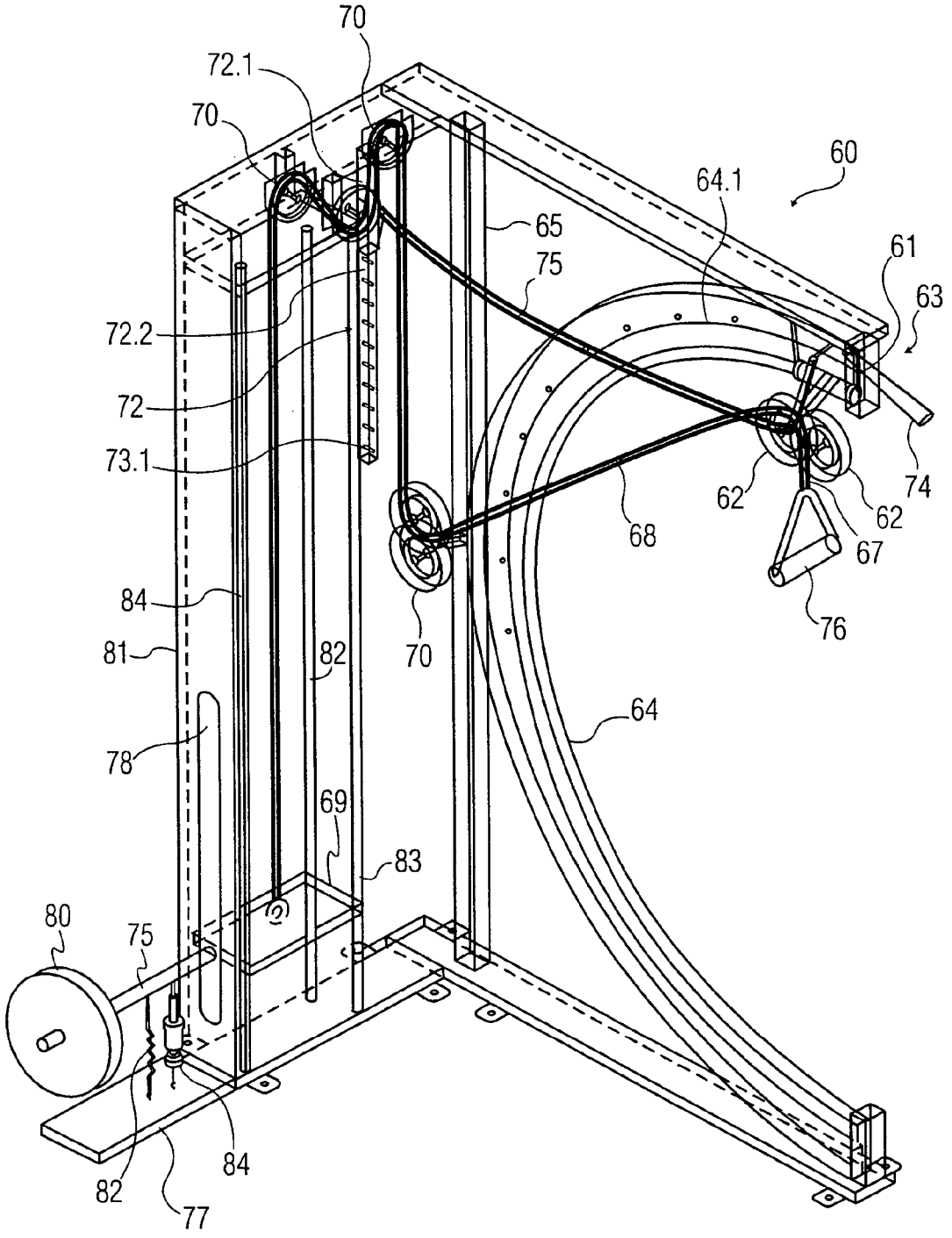


FIG. 6


70
72.1
70
60
64.1
65
75
61
63
72.2
72
73.1
62
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67
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FIG. 7

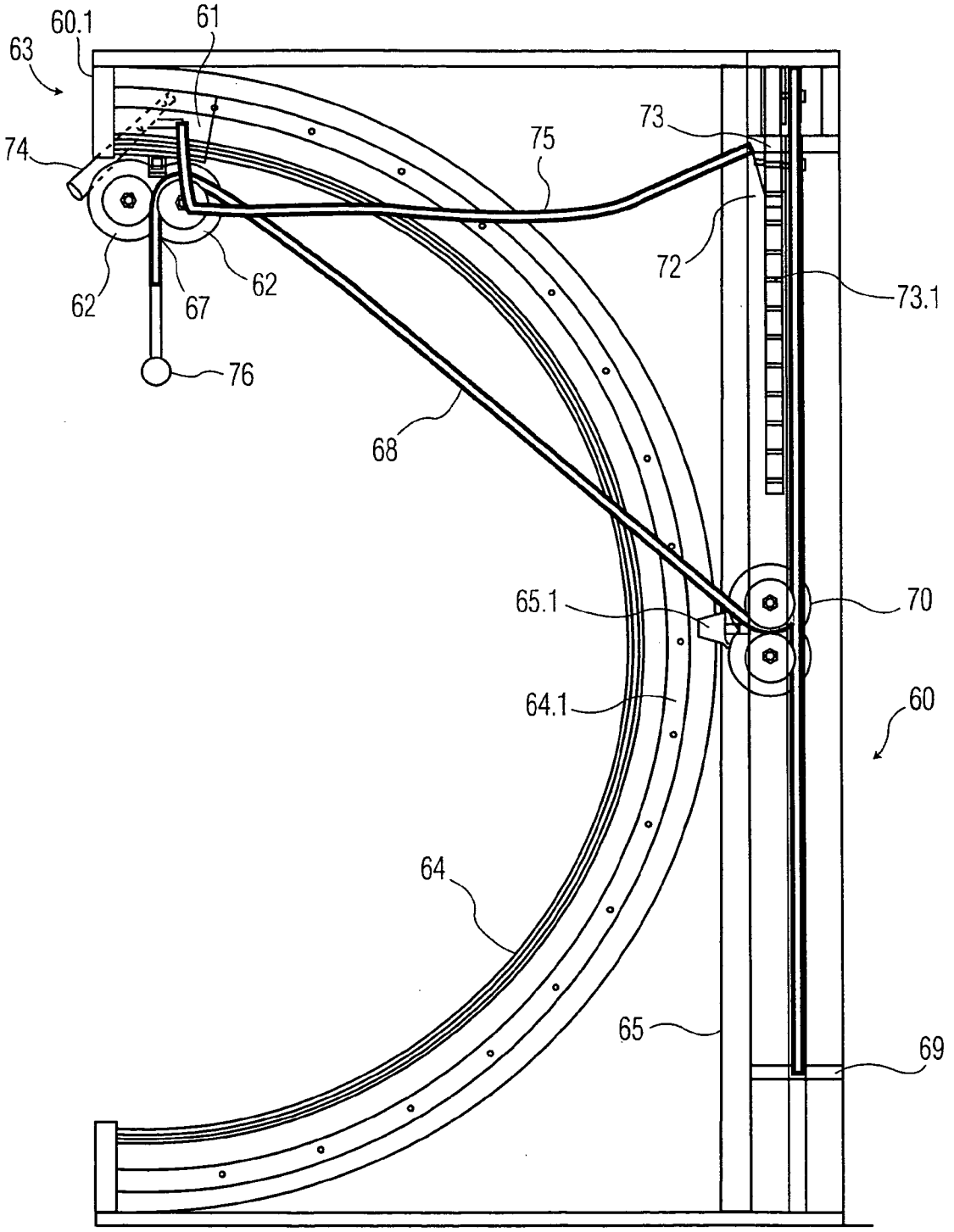

FIG. 8

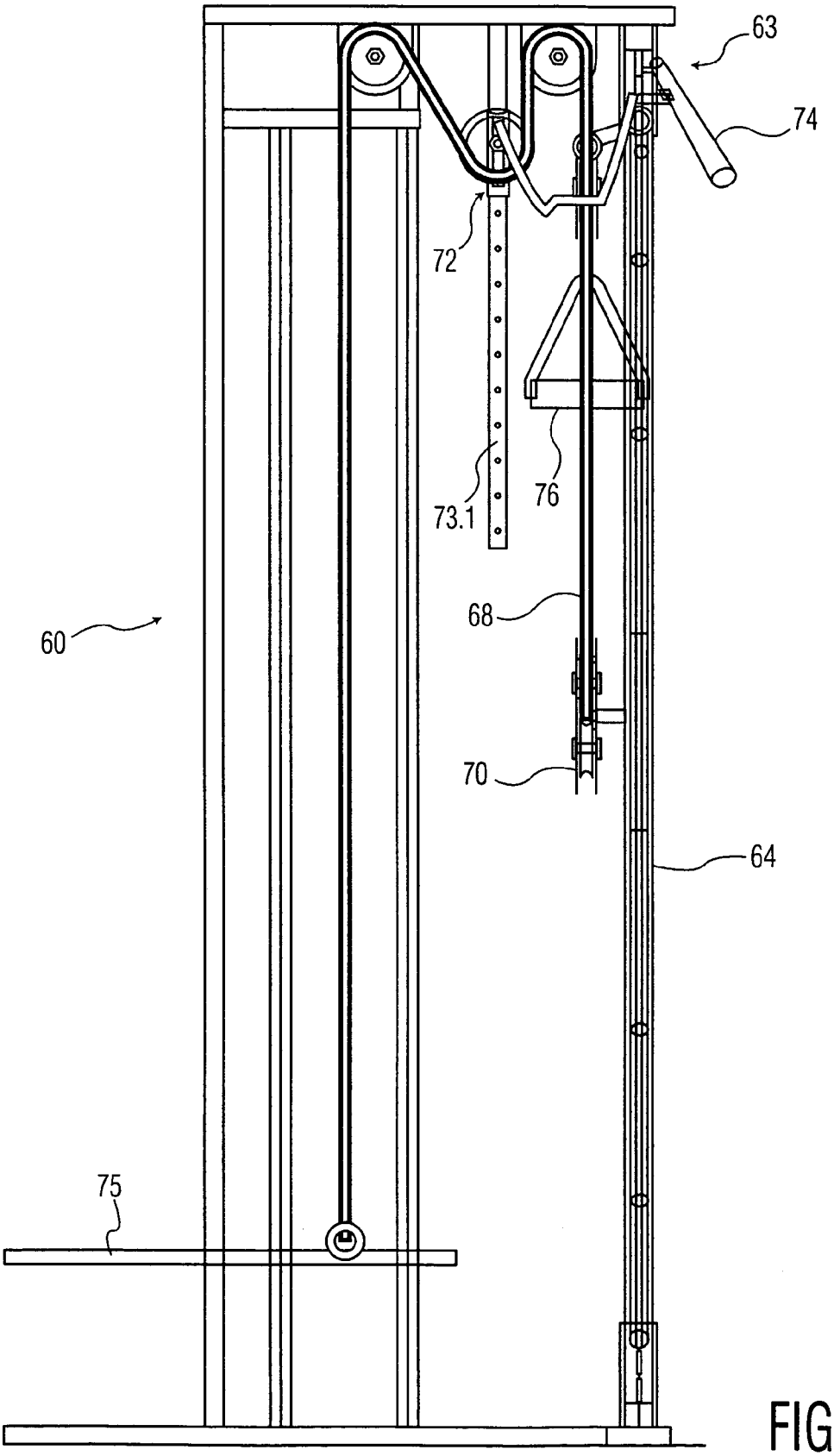

FIG. 9

FIG. 10a

FIG. 10b

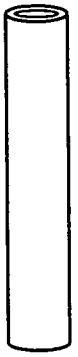

FIG. 10c

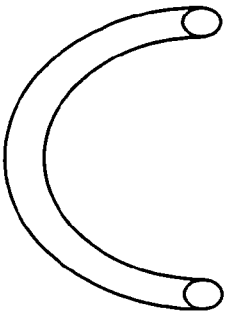

FIG. 10d

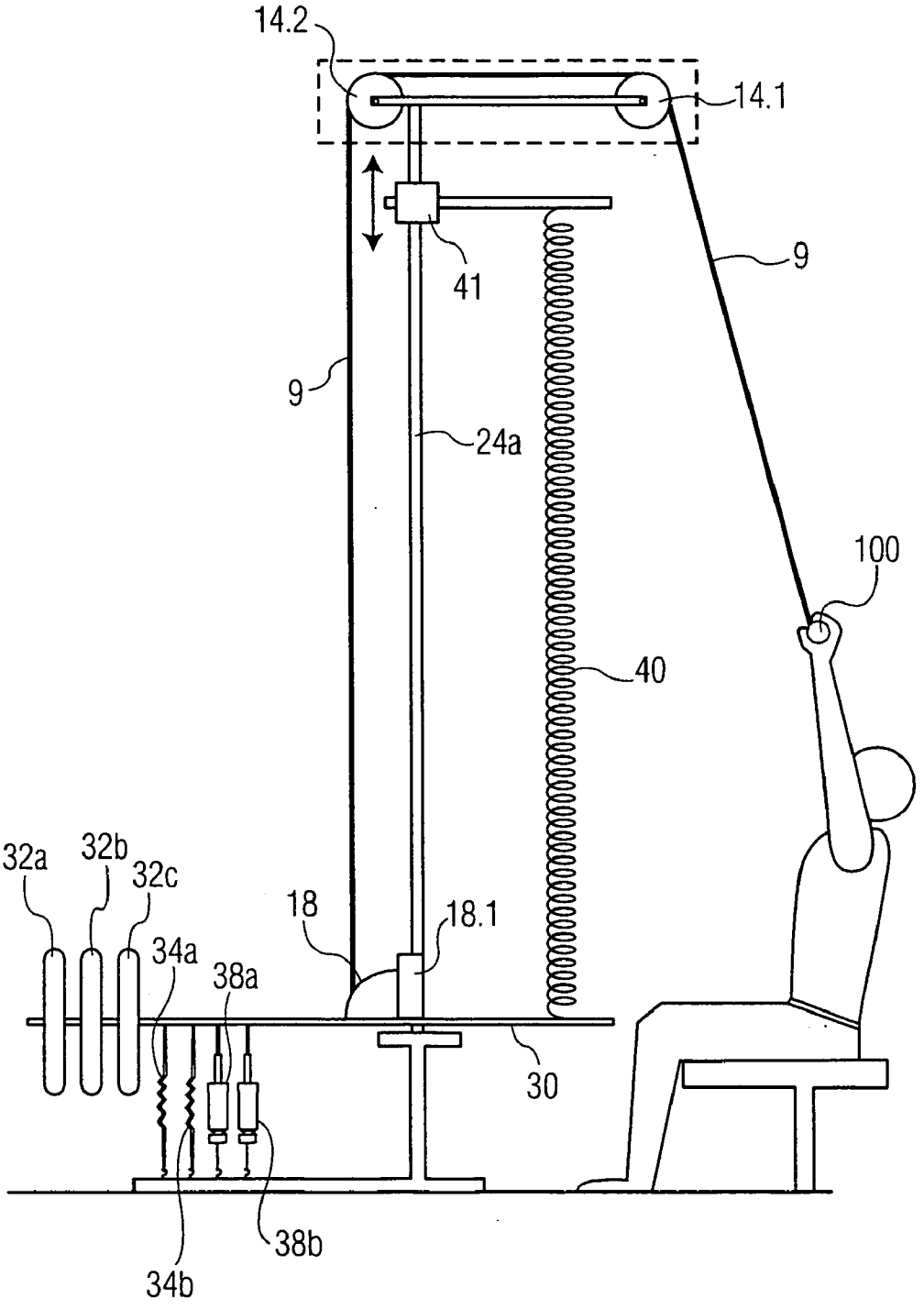

FIG. 11

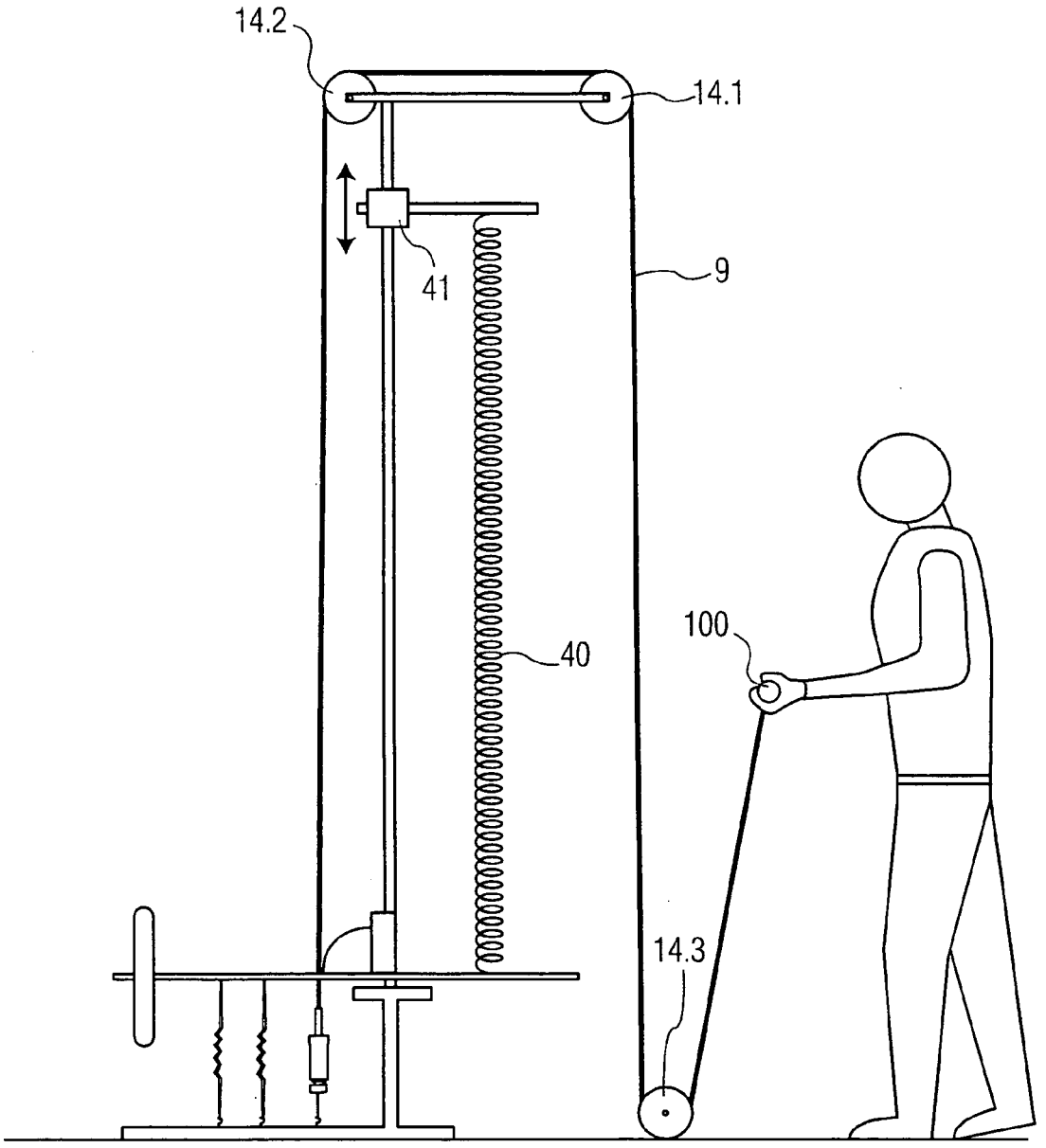

FIG. 12

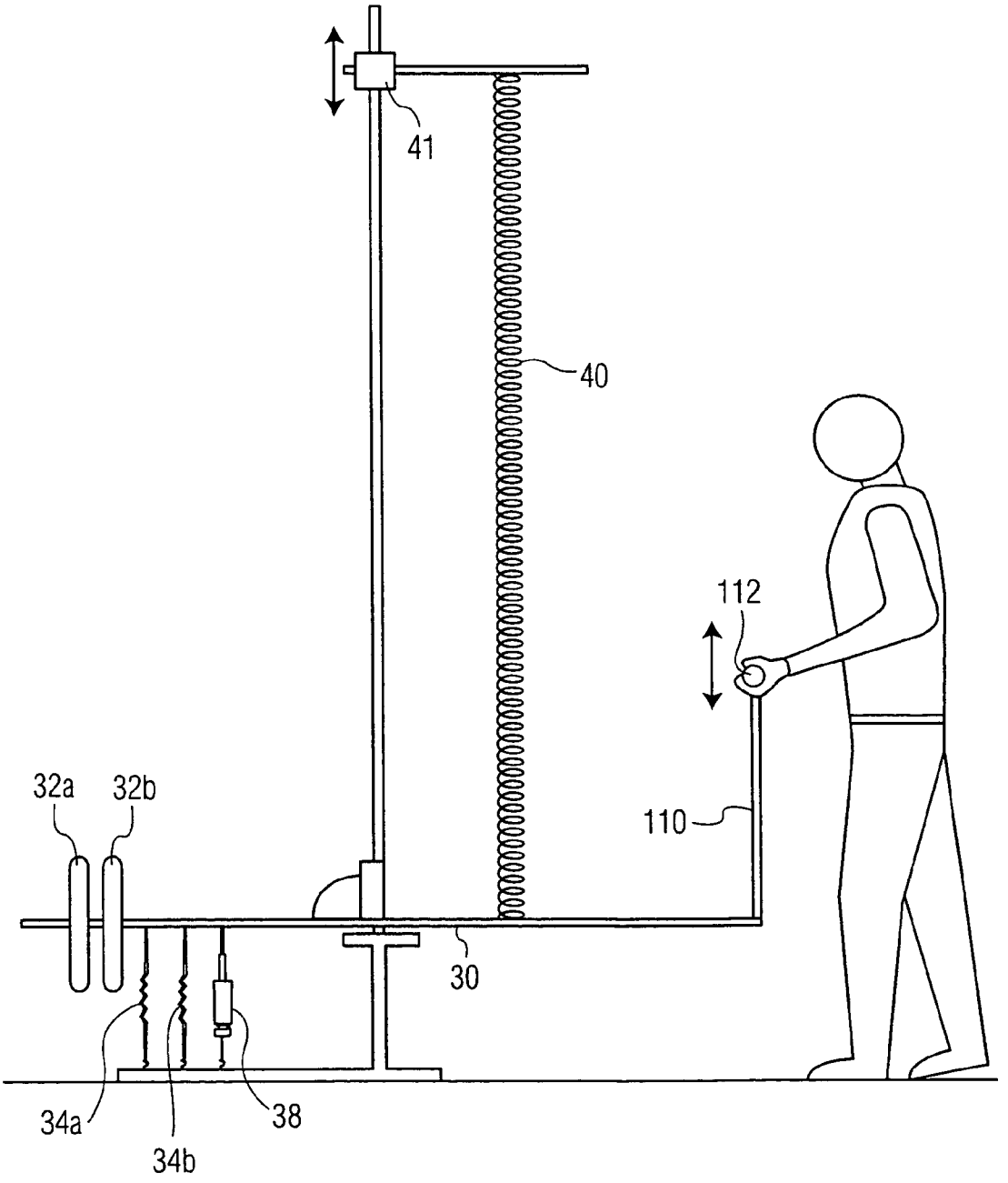

FIG. 13

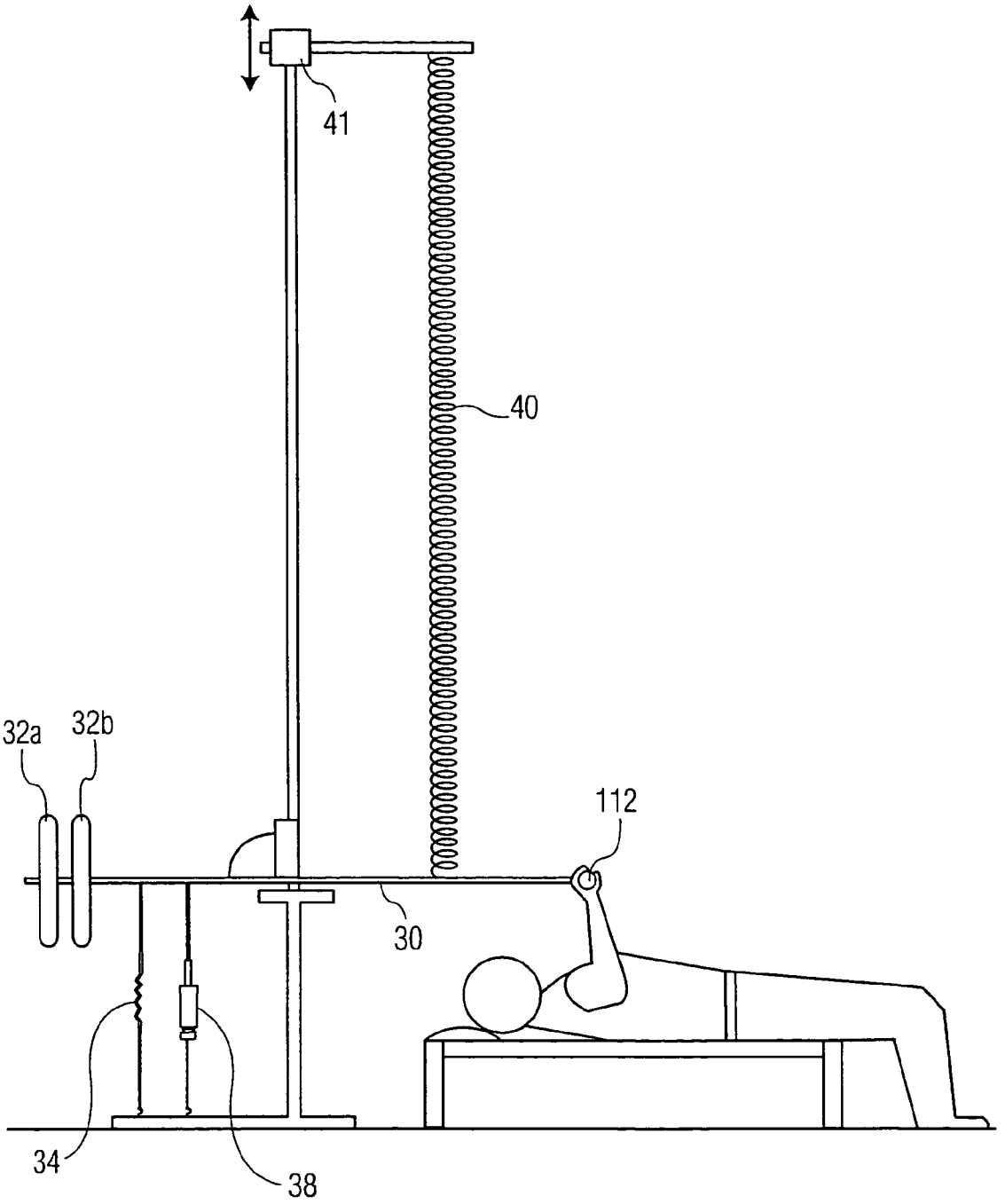

FIG. 14

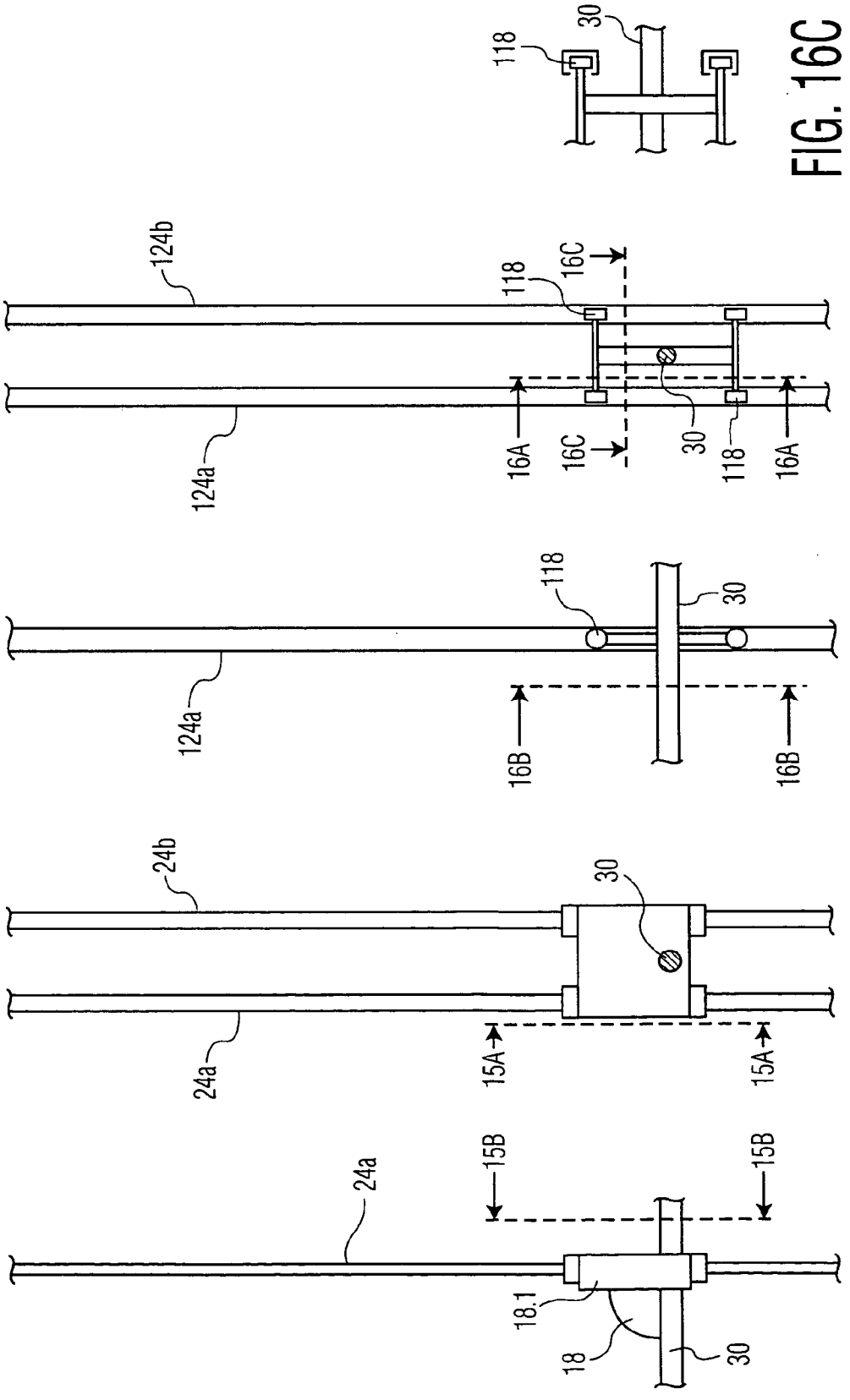

FIG. 16C

FIG. 16B

FIG. 16A

FIG. 15B

FIG. 15A

EXERCISE APPARATUS

CROSS-REFERENCE TO RELATED APPLICATION

[0001] This application is related to applicant's co-pending patent application Ser. No. 10/736,807, filed Dec. 15, 2003, entitled EXERCISE APPARATUS USING WEIGHTS FOR HIGH-SPEED TRAINING, and is a continuation-in-part of application Ser. No. 10/912,258, filed Aug. 5, 2004, entitled "EXERCISE APPARATUS".

BACKGROUND OF THE INVENTION

[0002] The present invention relates to body exercise equipment. More particularly, the present invention relates to exercise equipment such as that disclosed in the U.S. Pat. No. 6,705,976, the subject matter of which is incorporated herein by reference.

[0003] The human body moves primarily in circular or arcuate paths of motion, as evidenced by Leonardo Da Vinci's study of human proportions. From a biomedical standpoint, exercise equipment designed with resistance delivery systems oriented along an arced pathway are inherently more bio-mechanically optimized than those that are not. The aforesaid U.S. patent discloses two embodiments of exercise equipment of this type.

[0004] A first embodiment encloses a housing having a structural surface defining a prescribed concave arcuate contour having a number of cable exit points positioned along this surface. A number of cables, each having a proximal end and a distal end, are arranged such that the proximal end passes through one of the exit points and is attached to a gripping device, such as a handle, that enables the user to exert a tensile force in the cable by pulling the handle. The distal end of each cable is coupled to a common source of resistance such that, when the proximal end of each cable is pulled by a user, the source of resistance exerts a counterforce on the cable. Means are provided for retaining each cable in a retracted position when it is not being pulled by a user, even when one or more other cables is or are pulled by the user.

[0005] In a second embodiment, the exercise equipment comprises a frame having a track extending along a prescribed concave arcuate path. A moveable trolly, having an exit point for a cable, is repositionable to a number of fixed positions along the track. A single cable has a proximal end which extends through the exit point and is attached to a gripping device, such as a handle, that enables a user to exert a tensile force on the cable. The distal end of this cable is coupled to a source of resistance. Cable takeup means are provided, in the exercise equipment, for maintaining the length of the cable between its proximal end and the exit point through which it passes substantially constant, independent of the position of the trolley, and thus the exit point, along the track, when no tensile force is applied by the user.

[0006] While the exercise apparatus disclosed in the aforementioned U.S. Pat. No. 6,705,976 operates extremely well for the purpose for which it is intended, this and other exercise equipment of this type is relatively expensive to manufacture and to transport. One of the significant costs of this equipment involves the source of resistance applied to the cable or cables used in the machine. This source of resistance comprises, as a minimum, a plurality of weights which form a "weight stack" that is coupled to the distal end of the cable(s) and is lifted vertically when the proximal end of a cable is pulled by a user.

[0007] Weight stacks, which are normally guided by rods or rails to run vertically, include a device for selecting the number of weights in the stack that are to be lifted as a unit by the user. The weights that are not selected remain in the lower part of the stack while the selected weights are lifted upward.

[0008] With a mechanism of this type, it is difficult to obtain a "starting resistance" or minimum resistance of less than five pounds because, even if no weights are selected, the device for selecting the weights, itself, has a minimum weight. Particularly in the case of physical therapy applications, and for the severely de-conditioned or elderly persons, it is useful to be able to set the lowest resistance weight to zero, or near zero.

[0009] As noted above, a further disadvantage of this exercise equipment is that the weights incorporated into the weight stack present a significant cost to manufacture and transport. Also, the rods or rails, and the mechanism for selecting the weights to be lifted, add to the cost of the equipment. Furthermore, the cost of shipping the weights, rods, rails and mechanism for selecting the weights is not inconsiderable.

SUMMARY OF THE INVENTION

[0010] It is a principal object of the present invention to provide exercise apparatus of the type employing a weight stack which is considerably less expensive to manufacture and to transport.

[0011] It is a further object of the present invention to provide exercise apparatus of this type for which the resistance applied to the cable or cables may be reduced to zero, or near zero.

[0012] It is a still further object of the present invention to provide exercise apparatus of this type with easy-to-use means for adding or subtracting small measures of resistance.

[0013] It is a still further object of the present invention to provide exercise apparatus of this type which operates in essentially the same way as known exercise equipment, and provides essentially the same response to a user, but which avoids the requirement that a weight stack be incorporated into the machine.

[0014] These objects, as well as other objects which will become apparent from the discussion that follows, are achieved, in accordance with the present invention, by providing (a) a specially designed "force transfer device" which is coupled to a handle such that it is raised upward with the handle is pushed or pulled by a user, and (b) means for exerting a counterforce or resistance in the downward direction on the force transfer device when the force transfer device is lifted upward. According to the invention, this resistance exerting means includes (1) means for removably holding one or more weights, (2) means for removably attaching one or more springs, and/or (3) means for attaching one or more damping devices.

[0015] The means for coupling the handle to the force transfer device is preferably a cable, but any other mechanical means may also be used.

[0016] With the improvement of the exercise equipment according to the invention, it is no longer necessary to incorporate a stack of weights in the machine to provide a constant resistance force, independent of the distance or speed with which the handle is pushed or pulled. According to the invention, the equipment is provided with means for holding one or more weights, for example weights of the type that are readily available at any fitness center or physical therapy facility. These weights may be metal disks which have a central hole to permit attachment to a cylindrical rod or the like, or they may be sandbags, concrete blocks, concrete filled cans or the like which are placed upon a suitable platform on the exercise equipment to provide a source of constant resistance to the user.

[0017] In addition or alternatively, means are provided for removably attaching one or more springs to provide a distance-dependent resistance force. Such a spring may be a tension spring, such as a coil spring, an elastic elongate member in the shape of a rod, tube, band, strap or flat strip, or a bendable rod. Such a spring may also be a compression spring which may be in the form of a coil spring or a bendable rod.

[0018] In addition or alternatively, means may be provided for attaching at least one damping device, such as a hydraulic or pneumatic damper or an electromagnetic resistance device, to provide a speed-dependent resistance force to the cable(s).

[0019] For a full understanding of the present invention, reference should now be made to the following detailed description of the preferred embodiments of the invention as illustrated in the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0020] **FIG. 1** is an isometric, perspective front view of a first preferred embodiment of exercise apparatus which incorporates the present invention.

[0021] **FIG. 2** is a rear perspective view of the apparatus of **FIG. 1**.

[0022] **FIG. 3** is a cutaway side view of the apparatus of **FIG. 1**.

[0023] **FIG. 4** is a cutaway rear view of the apparatus of FIG. **FIG. 5** is a detailed view showing a portion of the apparatus of **FIG. 1**.

[0024] **FIG. 6** is a top view of the apparatus of **FIG. 1**.

[0025] **FIG. 7** is an isometric, perspective front view of a second embodiment of exercise apparatus which incorporates the present invention.

[0026] **FIG. 8** is a cutaway side view of the apparatus of **FIG. 7**.

[0027] **FIG. 9** is a cutaway rear view of the apparatus of **FIG. 7**.

[0028] **FIGS. 10***a*-**10***c* are side views of various types of springs which may be used in the exercise apparatus of **FIGS. 1-9**.

[0029] **FIG. 11** is a side view, similar to **FIG. 4**, showing a further embodiment of exercise apparatus incorporating the present invention.

[0030] **FIG. 12** is a side view showing a still further embodiment of exercise apparatus, similar to that of **FIG. 11**, incorporating the present invention.

[0031] **FIG. 13** is a side view showing a still further embodiment of exercise apparatus incorporating the present invention.

[0032] **FIG. 14** is a side view showing a still further embodiment of exercise apparatus, similar to that of **FIG. 13**, incorporating the present invention.

[0033] **FIGS. 15***a* and **15***b* are side and rear views, respectively, showing a detail of the exercise apparatus of **FIGS. 11-14**.

[0034] **FIGS. 16***a* and **16***b* are side and rear views, respectively, showing a detail of the exercise apparatus of **FIGS. 11-14**, in an alternative embodiment.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0035] The preferred embodiments of the present invention will now be described with reference to **FIGS. 1-16** of the drawings. Identical elements in the various figures are designated with the same reference numerals.

[0036] **FIGS. 1-6** illustrate a first preferred embodiment and **FIGS. 7-9** illustrate a second preferred embodiment of the exercise equipment to which the present invention relates. Both embodiments are based on exercise equipment which is fully disclosed in the aforementioned U.S. Pat. No. 6,705,976. The present invention is applicable, but is not exclusively limited to, this type of exercise equipment.

[0037] The first embodiment, shown in **FIGS. 1-6**, comprises exercise equipment **10** which incorporates a housing having a structural surface defining a concave arcuate contour. Disposed around this arcuate contour are seven pairs of pulleys, one pair of which is identified as **11**. These pulleys are placed in an arcuate slot formed by two side frames **12**. Each pair is spaced 30° away from its two neighbors, as is best seen in **FIG. 3**. A greater or smaller number of pairs of pulleys may be used.

[0038] Each pair of pulleys **11** defines, between them, a cable exit point positioned along the arcuate contour. Just outside each cable exit point is a pair of rollers **15** which retain the cable between them as it leaves the exit point so that it will not become dislodged from between the respective pair of pulleys **11**.

[0039] As shown in **FIG. 3**, a separate cable **9** is passed through each one of the pairs of pulleys **11** to a proximal end **101**. The proximal end of each cable **9**, outside the rollers **15**, is attached to a gripping device that enables a user to pull the cable away from the respective exit point. Examples of such devices are a bar **100**, a loop handle **102** and a cuff **103**, all of which have a fastener **101.1** that enables them to be attached to the proximal end **101** of each cable **9**.

[0040] The cables extend from their proximal ends **101** to a distal end which is coupled to a common source of resistance such that, when the proximal end of each cable is pulled by a user, the source of resistance exerts a counter

force on the cable. Starting from the proximal end, each cable extends through one of the pairs of pulleys **11** and then to a direction changing pulley **14**. From there, the cables are passed upward and over a parallel set of direction changing pulleys **14.1**. Then, as is best seen in **FIG. 4**, the cables **9** pass horizontally to a further parallel set of direction changing pulleys **14.2** and finally downward to a mechanism, best seen in **FIG. 5**, which provides a common source of resistance and includes means for retaining each cable in a retracted position, when it is not being pulled by a user, even when one or more other cables are pulled by a user.

[**0041**] As may be seen in **FIG. 5**, the distal end of each cable **9** is ultimately attached to a counterweight **16** which travels vertically through a slot mounted in a housing, with the slots and counterweights **16** positioned side by side at the ends of their respective cables **9** (one counterweight **16** for each cable **9** threaded through the system). Immediately above the set of counterweights is a horizontal plate assembly **18** with seven holes therein, each hole being aligned with one of the downwardly descending cables **9** to permit this cable to pass through it for attachment to its respective counterweight **16**. When a user pulls on the proximal end of a cable **9**, the counterweight **16**, attached to its distal end, is lifted thereby contacting and lifting the horizontal plate assembly **18**.

[**0042**] The horizontal plate assembly **18** is constrained to move vertically. For this purpose, the plate assembly **18** is connected to four rollers **20** that slide within four vertical tracks **21**, **22**, **23** and **24**. As a consequence, movement of one or more of the cables **9** will vertically lift the plate assembly **18**. During such cable movement, the remaining cables will be retained in their normal, retracted position by their respective counterweights **16**.

[**0043**] As mentioned previously, the exercise equipment **10** is provided with a common source of resistance. It is this source of resistance for which the present invention differs from the mechanism disclosed in the U.S. Pat. No. 6,705,976.

[**0044**] As best seen in **FIG. 5**, the source of resistance for the exercise equipment **10** comprises a "force transfer" means, such as the horizontal plate assembly **18** that is constrained by the sliding rollers **12** to move within the four vertical tracks **21-24**, which transfers the force from the source of resistance to the cable **9** and, ultimately, the user handle **102**.

[**0045**] It will be understood that any suitable arrangement may be used to constrain the movement of the force transfer means. For example, the force transfer means may be constrained to move vertically, up and down, on Teflon bearings that slide on vertical guide rods. Alternatively, the force transfer means may move horizontally if only springs and/or dampers are used as a source of resistance.

[**0046**] When weights are used, the exercise equipment is provided with means for removably holding a selected number of these weights during upward movement of the force transfer means **18**. This holding means may include a device, such as the horizontal, cylindrical rod **30**, upon which a number of weights **32** may be mounted. The weights **32** are preferably of the type normally found at a fitness center or physical therapy facility so that, as a consequence, the machine need not be provided with such weights when manufactured and delivered.

[**0047**] Alternatively, or in addition, the means for exerting a resistance on the force transfer means **18** when it moves may include a device for removably attaching one or more springs, such as tension springs **34** shown in **FIGS. 1 and 4** and/or compression springs **40** shown in **FIG. 4**. The tension springs may be attached between the rod **30** and a member **36** which extends outward from the bottom portion of the frame of the exercise equipment. Alternatively, or in addition to, such tension spring(s), one or more compression springs **40** may be provided to exert the resistance force against the force transfer means. The downward force exerted by a compression spring **40** may be adjusted by adjusting the vertical position of block **41** which holds the top of the spring.

[**0048**] As in the case of the weights, the tension spring or springs **34** are made removable so that the amount of resistance may be easily adjusted by selecting springs of different tension and/or by attaching a desired number of springs.

[**0049**] The tension springs **34** may comprise one or more coil springs, elastic bands, straps, rods or tube, or the spring may be in the form of a bendable rod. Similarly, the compression **40** spring may be a coil spring which is retained by a rod through its center or within a surrounding tube or a bendable rod, as is well known in the field of exercise equipment.

[**0050**] Various types of springs are illustrated in **FIGS. 10***a*-**10***d*. **FIG. 10***a* illustrates a coil spring, **FIG. 10***b* illustrates an elastic elongate band, **FIG. 10***c* illustrates an elastic tube and **FIG. 10***d* illustrates a bendable rod.

[**0051**] Alternatively, or in addition to the weights and/or springs which are removably attached to the exercise equipment, one or more dampers **38** may be connected between the force transfer means **18** or rod **30** and the frame of the exercise equipment, or member **76**, as illustrated in **FIGS. 1 and 4**.

[**0052**] Each damper **38** may comprise a hydraulic damper, pneumatic damper or an electromagnetic resistance element. Such a damper operates in the manner of a "shock absorber" in a motor vehicle suspension system. The amount of resistance force that it exerts is dependent upon the relative speed of displacement between its two ends.

[**0053**] The present invention thus provides a simple and relatively inexpensive means for exerting a resistance force against the retraction of one or more cables **9** when pulled from their proximal ends **101**. The present invention makes it possible to apply three types of resistance force, either separately or together:

[**0054**] (1) a constant resistance force W produced by a weight or weights **32**;

[**0055**] (2) a distance-dependent force which results from spring(s) **34**; and

[**0056**] (3) a speed-dependent force which results from one or more dampers **38**.

[**0057**] A second embodiment of the present invention is illustrated in **FIGS. 7-9**. In this case, the exercise equipment is provided with a single cable **68** having a proximal end **67** that passes through a pair of pulleys **62**. The pulley pair **62**

is mounted on a movable trolley system **63** that can be repositioned along a track **64** attached to the housing **61**.

[**0058**] As in the case of the first embodiment, the proximal end of the cable **68** is attached to a gripping device or handle **76** so that it may be pulled by a user.

[**0059**] After passing through the pulley pair **62**, the cable **68** is directed through a set of pulleys **70** after which it ultimately extends downward to a source of resistance **69**.

[**0060**] Since the distance between the pulley pair **72** and the first pair of pulleys **70** will vary as the trolley **63** is repositioned along the track **64**, a cable takeup mechanism, comprising a pulley **72.1** which is moveable along a moveable bar **73.1**, is provided. As the trolley is moved, a lever **74** is rotated about a pivot connection to pull the end of a flexible sheath cable **75**. When the lever **74** is moved, the cable takeup mechanism **72** travels in a substantially vertical direction up or down in direct proportion to the distance the moveable trolley **63** is moved along the arced curve. Once the new position is found for the moveable trolley **63** the lever **74** is moved back causing a pin **73** to slide into a corresponding hole along the vertical rod **73.1** holding the pulley **72.1** in place.

[**0061**] The source of resistance in this second embodiment is considerably simpler than that of the first embodiment described above. In this embodiment the distal end of the cable **75** is attached to a plate **69** which is constrained to move vertically by vertical tracks **81**, **82**, **83**, **84** arranged in each corner. This plate **69** serves as the force transfer device in this embodiment.

[**0062**] Extending outward from this plate **69** is a rod **75** of suitable size and diameter to hold one or more disk shaped weights **80**. As in the case of the first embodiment, one or more tension springs **82** or dampers **84** may be connected between the rod **75** and a frame member **77** which protrudes outward from the bottom of the exercise equipment.

[**0063**] When in use, a pull on the gripping handle **76** results in raising the force transfer device **69** and, in turn, the resistance exerting device **75** which protrudes through a slot **78** in the housing. The resistance provided at the distal end of the cable **68** is easily adjusted by adding or subtracting weights **80**, springs **82** or dampers **84** from the rod **75**.

[**0064**] Alternatively, instead of providing a separate rod **75** which protrudes through the slot **78** in the housing, the means for removably holding one or more weights, for removably attaching one or more springs and/or for removably attaching one or more damping devices may be incorporated entirely within the housing. For example, weights such as sandbags, cement blocks, cement-filled cans or the like may be placed directly upon the plate **69**, and the springs **82** and dampers **84** may be attached, by means of hooks, eyes or the like, between the plate **69** and the base of the housing directly beneath it.

[**0065**] With the exception of the fact that the second embodiment operates with only a single cable, the force transfer device and the resistance exerting device in the first and second embodiments are essentially the same.

[**0066**] **FIGS. 11-14** illustrate several additional preferred embodiments of exercise equipment to which the present invention relates. Various elements shown in these figures, to the extent that they are similar or identical to corresponding elements in the embodiment of **FIGS. 1-6**, are designated with the same reference numerals.

[**0067**] **FIG. 11** shows exercise apparatus in which the user grabs a handle **100** attached to a proximal end of a cable **9**, and pulls downward. The cable passes over pulleys **14.1** and **14.2** to a distal end which is attached to an assembly **18** having a bearing **18.1** which surrounds and slides over one or more vertical poles **24**. The precise arrangement, which uses two parallel poles **24***a* and **24***b*, is illustrated in greater detail in side and rear views, respectively, in **FIGS. 15***a* and **15***b*.

[**0068**] As the user pulls downward on the cable **9**, the assembly **18** raises a horizontal rod or bar **30**. To this bar may be attached one or more of the following resistance devices:

[**0069**] One or more weights **32***a*, **32***b* and **32***c*;

[**0070**] One or more tension springs **34***a* and **34***b*;

[**0071**] One or more dampers **38***a* and **38***b*; and

[**0072**] One or more compression springs **40**.

[**0073**] The assembly **18** thus serves as a "force transfer device" coupled to the distal end of cable **9** whereas the bar **36** serves as a means for exerting a counter-force against the force transfer device when the force transfer device is raised upward.

[**0074**] **FIG. 12** shows an alternative embodiment wherein the cable **9** extends downward to a pulley **14.3** at the base of the equipment. In use, the handle **100** attached to the proximal end of the cable must be pulled upward, rather than downward as in the case of the exercise equipment of **FIG. 11**. Otherwise, this exercise equipment is identical to that of **FIG. 11**.

[**0075**] **FIG. 13** illustrates exercise apparatus which is also very similar to that of **FIGS. 11 and 12**, but which avoids the use of the cable **9**. In this embodiment, the rod or bar **30** is rigidly attached to a bar **110** which extends upward to a handle **112** at substantially waist height. The length of the bar **110** may be adjustable to adjust the height of the handle **112**.

[**0076**] In a still further embodiment shown in **FIG. 14**, the handle **112** is attached directly to the end of the rod or bar **30** so that the user may operate the exercise equipment while in the prone position.

[**0077**] **FIGS. 16***a* and **16***b* show an alternative embodiment of the force transfer device **18**. In this embodiment, the bar **30** is fixed to a trolley mechanism **118** which is arranged in two parallel tracks **124***a* and **124***b*. These tracks, and the track followers, are of the type which movably retain garage doors.

[**0078**] It will be understood that various other mechanisms can be used so that movement of the force transfer means is substantially linear. Similarly, instead of providing a horizontal bar **30** for holding disk type weights, the means for removably holding the weights may be a horizontal platform, with or without a vertical bar extending upward from it.

[**0079**] There has thus been shown and described a novel exercise apparatus which may fulfill some or all the objects and advantages sought therefor. Many changes, modifica-

tions, variations and other uses and applications of the subject invention will, however, become apparent to those skilled in the art after considering this specification and the accompanying drawings which disclose the preferred embodiments thereof. All such changes, modifications, variations and other uses and applications which do not depart from the spirit and scope of the invention are deemed to be covered by the invention, which is to be limited only by the claims.

What is claimed is:

1. In exercise apparatus comprising a source of resistance to motion and a handle, connected to said source of resistance, for movement by a user, the improvement wherein the source of resistance comprises, in combination:

(a) force transfer means connected to said handle; and

(b) means for exerting a counterforce on said force transfer means when said force transfer means is raised upward, said counterforce exerting means including at least one of means for removably holding one or more weights, means for removably attaching one or more springs, and means for attaching one or more dampers.

2. The exercise apparatus recited in claim 1, wherein said means for exerting a counterforce includes at least one weight, removably held by said weight holding means.

3. The exercise apparatus recited in claim 1, wherein said means for exerting a counterforce includes at least one tension spring, removably attached to said attaching means.

4. The exercise apparatus recited in claim 3, wherein said tension spring includes an elastic elongate member.

5. The exercise apparatus recited in claim 4, wherein said elongate member has a shape selected from the group consisting of a rod, a tube, a band, a strap and a flat strip.

6. The exercise apparatus recited in claim 3, wherein said tension spring is a coil spring.

7. The exercise apparatus recited in claim 1, wherein said means for exerting a counterforce includes at least one compression spring, removably attached to said attaching means.

8. The exercise apparatus recited in claim 7, wherein said compression spring is a bendable rod.

9. The exercise apparatus recited in claim 7, wherein said compression spring is a coil spring.

10. The exercise apparatus recited in claim 1, wherein said means for exerting a counterforce includes at least one damper, coupled to said force transfer means.

11. The exercise apparatus recited in claim 10, wherein said damper is selected from the group consisting of a hydraulic damper, a pneumatic damper and electromagnetic resistance means.

12. The exercise apparatus recited in claim 1, wherein said means for removably holding one or more weights is a substantially horizontal bar.

13. In exercise equipment including a housing having a structural surface defining a prescribed contour, multiple cable exit points positioned along the structural surface, each exit point having passed therethrough a cable having a proximal end and a distal end, the proximal end of each cable being located outside the structural surface and being attached to a device that enables a user to exert a tensile force to the cable by pulling the cable in any desired direction, the distal end of each cable being coupled to a common source of resistance such that when the proximal end of each cable is pulled by a user, the resistance exerts a counterforce to such cable, and means for retaining each cable in a retracted position, when it is not being pulled by a user, even when one or more other cables are pulled by a user; the improvement wherein the source of resistance comprises, in combination:

(a) force transfer means coupled to the distal end of each cable so as to be raised upward when the proximal end of one or more of said cables is pulled by a user; and

(b) means for exerting a counterforce on said force transfer means when said force transfer means is raised upward, said counterforce exerting means including at least one of means for removably holding one or more weights, means for removably attaching one or more springs, and means for attaching one or more dampers.

14. The exercise equipment recited in claim 13, wherein said means for exerting a counterforce includes at least one weight, removably held by said holding means.

15. The exercise equipment recited in claim 13, wherein said means for exerting a counterforce includes at least one tension spring, removably attached to said attaching means.

16. The exercise equipment recited in claim 15, wherein said tension spring includes an elastic elongate member.

17. The exercise equipment recited in claim 16, wherein said elongate member has a shape selected from the group consisting of a rod, a tube, a band, a strap and a flat strip.

18. The exercise equipment recited in claim 15, wherein said tension spring is a coil spring.

19. The exercise equipment recited in claim 13, wherein said means for exerting a counterforce includes at least one compression spring, removably attached to said attaching means.

20. The exercise equipment recited in claim 19, wherein said compression spring is a bendable rod.

21. The exercise equipment recited in claim 19, wherein said compression spring is a coil spring.

22. The exercise equipment recited in claim 13, wherein said means for exerting a counterforce includes at least one damper, coupled to said force transfer means.

23. The exercise equipment recited in claim 22, wherein said damper is selected from the group consisting of a hydraulic damper, a pneumatic damper and electromagnetic resistance means.

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