A kneeling and standing assist device including a knee and lower leg supporting platform which is pivotally movable between spaced handles from a raised inclined position to a lower generally horizontal position against a base with controlled resistance to lowering and assistance to elevating being provided by at least one energy storage extension element mounted between the platform and the base.
KNEELING AND STANDING ASSIST DEVICE

CROSS REFERENCE TO RELATED APPLICATIONS

[0001] This application is based on U.S. Provisional Patent Application Serial No. 60/260,689 filed Jan. 11, 2001, entitled "Kneeling and Standing Assist Device", in the name of the same inventor.

BACKGROUND OF THE INVENTION

[0002] 1. Field of the Invention

[0003] This invention is generally directed to devices for assisting individuals in assuming a kneeling position such as when working in a garden or when working on low level areas such as floors and the like, and which devices are also used to facilitate individuals in standing from a kneeling position. More specifically, the present invention provides an energy loading kneeling and standing assist device wherein a platform is provided which supports an individual's knee or knees and as the platform is lowered from a raised position to a generally horizontal lower position with the movement of the platform being controlled by at least one energy storage extension element, such as a gas spring cylinder, which is utilized to provide resistance to the weight of an individual when initially kneeling so that a controlled descent of the individual relative to a support surface is provided. The extension element thereafter provides energy to assist an individual when rising from a kneeling position to a standing position by providing an uplifting force which is used in conjunction with an individual using one or more handles on the device.

[0004] 2. Brief Description of the Related Art

[0005] There have been a number of innovations made with respect to portable devices which can be utilized to assist individuals when sitting or when standing from a sitting position. One such device is disclosed in U.S. Pat. No. 5,316,370 to Newman. The device includes a platform which is engageable with a seat such as a chair, couch or the like and upon which is pivotally mounted a seat member which is elevated by a compression cylinder. In this manner, when an individual assumes a sitting position, a piston rod associated with the cylinder is compressed thereby developing mechanical force which can be used to aid an individual when they rise to a standing position. Another example of a seat assist device having a mechanical element to create a lifting force is disclosed in U.S. Pat. No. 5,116,100 to Iversen.

[0006] Although there are a number of devices which have been developed for assisting individuals from raising and lowering themselves relative to a seat, there is also a need to provide for a device which can be utilized to assist individuals when lowering themselves to a kneeling position or elevating themselves from a kneeling position such as when individuals are working in gardens and the like. To this end, there have been innovations made over the years with respect to devices which are specifically designed to assist individuals when moving between a kneeling and a standing position or from a standing position to a kneeling position. One early device is disclosed in U.S. Pat. No. 2,318,418 to Peire. This assist device includes a base which is adapted to engage a surface and upon which an individual may place their knees. The base is mounted to a frame which extends upwardly creating a pair of spaced and vertically extending handles. The handles may be engaged such that the weight of the individual is supported by the handle with the weight being transferred to the base as the individual assumes a kneeling position or raises to a standing position. Unfortunately, such devices do not provide any type of mechanical input to assist the individual when elevating to a standing position. Other examples of similar structures are disclosed in U.S. Pat. No. 2,829,704 to Godshalk, U.S. Pat. No. 4,394,049 to Ward, U.S. Pat. No. 4,763,756 to Horan, U.S. Pat. No. 4,798,264 to Miller et al. and U.S. Design Pat. No. 287,074 to Ritchie.


[0008] In view of the State of the Art, there remains a need to provide for a device which can be utilized to aid an individual when rising from a kneeling position which provides some measure of auxiliary mechanical input to supplement the energy which is required by the individual when assuming a standing position.

SUMMARY OF THE INVENTION

[0009] The present invention is directed to a device which can be used to assist individuals when kneeling or standing from a kneeling position and which provides a platform which is pivotable relative to a stabilizing base. The platform includes an upper portion which is specifically designed to provide support for a knee or knees of an individual when stooping to a kneeling position. In the preferred embodiment, the upper portion of the platform is restrained to maintain a somewhat horizontal orientation when the platform is in a raised position by way of links which connect the upper portion of the platform to the base. The links further allow the upper portion of the platform to be extended generally coplanar with the lower portion of the platform when the platform is lowered to a horizontal position generally immediately above the base.

[0010] A mechanical force generating element is provided, such as a gas spring, which is mounted between the platform and the base which provides for both a resistance force to a downward force developed by the weight of an individual being exerted on the platform when the person assumes a kneeling position, so that a person is gently lowered to a kneeling position from a standing position. Further, the force generating element is designed so that energy is developed and stored to urge the platform to the raised position when an individual assumes a standing position from a kneeling position. Thus, the platform is constantly urged from the lower position toward the upper position when an individual uses the platform. In the preferred embodiment, a single gas spring is mounted between the base and the platform, however, two or more gas springs or other extension devices may be used and be within the teachings of the invention.

[0011] The invention also provides at least one handle which is connected to the base and extends vertically upward above the platform and providing a surface which can be grasped by the individual to obtain leverage to facilitate kneeling and elevating to a standing position. In the preferred embodiment of the invention, the two such handles are provided on opposite sides of the base. In some embodi-
ments, the handles may be locked into an elevated position and unlocked and dismantled for compact storage and shipment. In other embodiments of the invention, the handles may also be extendable, such that the height of the handles relative to the base may be adjusted so as to suit a specific individual.

[0012] In a preferred embodiment of the invention, the platform for supporting the knees and lower legs of an individual is constructed of a somewhat pliable plastic material such that the upper portion is allowed to flex or bend relative to a lower reinforced portion of the platform. The lower reinforced portion of the platform is designed to concentrate force from a point of selected adjusted attachment of the lift cylinder or gas spring with the lower portion of the platform such that the amount of force generated to resist downward movement and the amount of force directed for providing upward assistance can be selectively adjusted depending upon an individual's weight.

[0013] Further, in other embodiments of the invention, the upper portion of the platform may be contoured so as to provide a cradled surface for complimentary engagement with the anatomy of an individual's knees. An appropriate padding may also be provided for comfort along the upper surface of the platform.

BRIEF DESCRIPTION OF THE DRAWINGS

[0014] A better understanding of the invention will be had with reference to the attached drawings, wherein:

[0015] FIG. 1 is a rear perspective view of a first embodiment of the invention with a kneeling platform in a first raised position;

[0016] FIG. 2 is a front perspective view of the embodiment of FIG. 1 with the platform in a second lower position;

[0017] FIG. 3 is a front perspective view of a second embodiment of frame of the invention;

[0018] FIG. 4 is a front perspective view of another embodiment of the invention;

[0019] FIG. 5 is a front perspective view of a further embodiment of the invention;

[0020] FIG. 6 is a front perspective view of another embodiment in which the handles are oriented in a reverse direction; and

[0021] FIG. 7 is a rear perspective view of the embodiment of FIG. 6.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0022] With continued reference to the drawings, the kneeling and standing assist device 20 of the invention includes a base 22 which, in the embodiments shown, includes a somewhat U-shaped frame 23 having side members 24 and 25 connected by a front member 26. The frame 22 may be mounted to a surface engaging plate 28 which extends between the front and the side members of the frame and which may be formed of a suitable durable sheet of plastic or metallic material. The plate 28 is further reinforced, in the preferred embodiments shown, by a pair of generally parallel and spaced metallic ribs or bars 29 and 30. Each of the bars 29 and 30 includes a front end which is welded or otherwise secured to the front frame member 26 and which includes openings therein for purposes of pivotally securing a knee and lower leg supporting platform 32 to the base by use of hinge pins 33. The rear portion of the bars 29 and 30 are connected by a reinforcing member 35 mounted along the rear portion 36 of the base plate. Each of the bars 29 and 30 may be welded or mechanically secured to the base plate 28 to ensure that they are retained in position as shown in the drawing figures.

[0023] In an effort to provide leverage and support for an individual when utilizing the kneeling and standing assist device of the present invention, in a preferred embodiment, the invention includes a pair of vertically extending handles 38 and 40 which, in some embodiments, are generally rigidly connected to the side frame members 24 and 25, respectively, of the base. As shown in FIGS. 1 and 2, in this embodiment, each handle includes a vertical extension 39 and 41, respectively, and horizontally oriented hand grips 42 and 43, respectively. The hand grips are oriented at a point spaced vertically above the platform 32 with the height of the hand grips being at an elevation which can be easily grasped by an individual when initially kneeling against the platform such that the handles provide stabilization and also allow leveraged lowering and lifting when an individual moves to and from a kneeling position. It should also be noted that the handles are spaced relative to one another so that an individual can easily stand between the handles when assuming a kneeling position.

[0024] With specific reference to FIG. 3, a variation of the handles of the present invention is shown. In this embodiment, each of the handles 38 and 40 are detachably mounted at 45 and 46 to the base frame and are retained in a raised position by spring locking devices 47 and 48. In this embodiment, the handles may be removed from the base to a storage position wherein the handles are substantially folded against the base allowing for compact shipment of the kneeling and standing assist device. As opposed to detachably mounting the handles, they may be pivotally mounted so as to selectively fold to a collapsed position.

[0025] A further embodiment of the handles of the present invention is shown in FIG. 4. In this embodiment, the height of the hand grips 42 and 43 may be adjusted by vertically extending an extendable portion 50 and 51 of each of the handles 38' and 40' relative to fixed portions 54 and 55 thereof, respectively.

[0026] It should be noted that in some embodiments, a single handle may be provided, such as mounted along the rear portion of the base plate 28 and centrally thereof having hand grips that extend horizontally outward to provide for grasping or stabilizing an individual when kneeling or standing.

[0027] With specific reference to FIGS. 1, 2 and 4, the knee and lower leg supporting platform 32 will be described in greater detail. In the preferred embodiment shown, the platform 32 includes a lower portion 60 which is reinforced along its inner or rear surface by a somewhat trapezoidal metallic plate 62. The plate tapers inwardly toward the lower edge 63 of the platform and includes outer inclined flanges 64 and 65 which have openings in the lower portions thereof for receiving the pivot pins 33 for securing the platform to the bars 29 and 30 which reinforce the base of the device. The configuration of the reinforcing plate 62 allows force to
be directed from outer portions of the platform 32 toward a central portion thereof for purposes of directing force against an energy storage extension element 68, as will be described in greater detail hereinafter.

[0028] The platform also includes an upper portion 66 which is preferably integrally formed and integrally connected through a living hinge 67 with the lower portion 60 of the platform. In this respect, the platform is preferably formed of a durable and yet somewhat pliable plastic material, such that the upper portion flexes to thereby provide not only a cushioning effect when engaged by an individual's knee or leg, but also such that the contour of the upper portion of the platform will vary depending upon the angular position of the platform 32.

[0029] The platform is movable between an uppermost or raised position in which the platform is vertically inclined, as shown in FIG. 1, to a prone or horizontal position covering the base, as shown in FIG. 2 when an individual is kneeling on the platform. In the raised position shown in FIG. 1, it is noted that the upper portion 66 is flexed to provide a curved surface which may be engaged by an individual's knee. In essence, the curvature is such as to extend the upper edge 67 of the platform rearwardly generally toward the rear 36 of the base or toward the handles 38 and 40.

[0030] The curvature and/or orientation of the upper portion of the platform is controlled by a pair of connecting links 70 and 71 which are pivotally mounted at 72 and 73 to the side members of 24 and 23 of the base frame 22. The upper portion of each link is also pivotally connected to the underside of the upper portion 66 of the platform 32. The connecting links 70 and 71 are pivotally mounted spaced rearwardly of the front member 63 of the base 22, such that when the platform is fully raised, the length of the connecting links will cause the curvature to be developed along the upper portion of the platform as shown in FIG. 1. As weight is applied, such as when an individual kneels, thereby urging the platform to the prone or horizontal position shown in FIG. 2, the links are pivotally positioned so as to allow a complete extension of the upper portion 66 of the platform so that the upper portion and the lower portion are generally coplanar.

[0031] The provision of the curved upper portion of the platform in the raised position provides a substantially stabilized surface which supports an individual's knee or knees when they initially begin to kneel against the device and also provides increased user comfort.

[0032] With specific reference to FIG. 5, an appropriate padding 80 may be provided along the upper surface of the platform 32 which may be a foam rubber covered with a weather resistant cover or layer. Further, the upper portion of the platform or padding may include contoured areas 82 which are somewhat concave and which are molded to provide complimentary surfaces for supporting an individual's knees when placed against the platform, thus providing for additional stability and for additional user comfort.

[0033] One of the specific benefits of the present invention over prior art kneeling assist devices is that the present invention not only provides for an adjustable contouring of the knee and leg support platform, but also provides for mechanical assistance in resisting the downward motion of the platform when an individual is moving to a kneeling position using an element which gathers force for providing additional lift when the individual moves from a kneeling to a standing position. In this respect, and extension element 68 is provided, such as a gas spring, having a cylinder housing 84 in which an extension rod 85 is movably mounted. The outer end of the extension rod 85 is pivotally connected to the bar 35 at the rear of the base and the cylinder housing 84 is connected to a mounting pin 86 which is selectively seated within opposing recesses 87 of a mounting rack 88 which is securely mounted to the rear of the reinforcing plate 62. The mounting pin 83 may be selectively positioned within aligned recesses within the rack 88 to thereby adjust the pivoting engagement of the housing relative to the rear of the platform. In this manner, the amount of resistance to force and the amount of force generated during extension can be varied so as to be suitable for a specific individual who will be utilizing the device. By mounting the cylinder 84 at a higher angle, a greater degree of resistance to the weight of an individual initially kneeling is achieved as well as a greater force extended to assist the individual when standing. Thus, depending upon the weight of an individual, the housing will be placed within the appropriately aligned recesses 83 with individuals of lighter weight mounting the housing at a lower angle relative to the base than heavier individuals.

[0034] As opposed to using a conventional gas spring as the extension element 68, other energy storage and force generating devices may be used and be within the teachings of the present invention.

[0035] The operation of the lift cylinder or elements of the invention is such that when weight is applied to lower the platform 32, the housing will move relative to the extension rod 85 thereby compressing a spring or springs or other elements within the housing thus loading the cylinder to provide additional force to aid in lifting the platform when the individual begins to stand. Therefore, with the invention, not only does the extension element 68 provide a resistant force to provide a controlled lowering of the platform 32, but the element also provides an increased lifting force after being fully compressed by the lowering of the platform to its lower position to help an individual elevate or assume a standing position from a kneeling position.

[0036] With particular reference to FIGS. 6 and 7, a further embodiment of the invention is shown. In this embodiment, the seat assist device 20 includes all of the same mechanical components as previous embodiments including a base 22 having a plate 28, reinforcing elements 29 and 30, supporting platform 32, reinforced by plate 62 and extension element 68. However, the front frame members 26 is positioned along the back edge of plate 28 between the side frame members 24 and 25 and the handles 90 and 91 extend upwardly from the front of the side frame members. The handles include grips 92 and 93 which are positioned generally centrally above and on opposite sides of the support platform 32. In this manner, the weight of the individual is directed toward the front of the device more directly than with the previous embodiments.

[0037] It should be noted that although one energy storage and extension element 68 is shown in the drawings, two or more such elements may be used and be within the teachings of the invention with appropriate adjustment being made in
spacing and points of attachment of such elements between the base and the platform 32.

[0038] The materials from which the invention is made may be varied, however, it is preferred that the materials be durable and resistant to climatic conditions so that the device may be used outside as a gardening tool; however, the use is not limited to outdoors, and thus the device may be utilized by carpenters, concrete workers, carpet and floor installers, and individuals who are constantly having to move between a standing and a kneeling position.

[0039] The foregoing description of the preferred embodiment of the invention has been presented to illustrate the principles of the invention and not to limit the invention to the particular embodiment illustrated. It is intended that the scope of the invention be defined by all of the embodiments encompassed within the following claims and their equivalents.

I claim:

1. A kneeling and standing assist device which includes a base having front and rear portions, said base being adapted to rest against a support surface, a knee and lower leg supporting platform, connector means for pivotally connecting said platform to said base, said platform being movable between a raised and inclined position to a lower position wherein said platform is generally horizontal, at least one energy storage extension means connected between said platform and said base, said at least one extension means being in a first extended position when said platform is in said raised position and being compressible to store energy when said platform is moved to said lower position such that said at least one extension member provides a resistance to movement of said platform from said raised position toward said lower position and provides lift assistance to urge said platform from said lower position toward said raised position, and at least one handle extending upwardly from said base and above said platform when said platform is in said raised position.

2. The kneeling and standing assist device of claim 1 including means for connecting said at least one handle to said base so that said at least one handle may be moved from an elevated position to a collapsed storage position generally adjacent to said base.

3. The kneeling and standing assist device of claim 2 in which said at least one handle is removably connected to said base.

4. The kneeling and standing assist device of claim 1 including a pair of spaced handles, and means for selectively extending said handles to adjust the length thereof, and each said handle having an upper handgrip portion.

5. The kneeling and standing assist device of claim 1 wherein at least an upper portion of said platform is formed of a pliable plastic material allowing the upper portion to be curved by said first connector means when said platform is in said raised position.

6. The kneeling and standing assist device of claim 1 including a reinforcing plate secured to a rear surface of said lower portion of said platform, and a connector mounted to said reinforcing element, and one end of said at least one energy storage extension means being adjustable connected to said connector.

7. The kneeling and standing assist device of claim 1 in which an upper portion of said platform includes concave areas adapted for engagement by a knee of an individual.

8. A kneeling and standing assist device which includes a base having front and rear portions, a knee and lower leg supporting platform having a lower portion pivotally connected adjacent to said front portion of said base and an upper portion, first connector means for pivotally connecting said upper portion of said platform to said base in spaced relationship from said lower portion of said platform, said platform being movable between a raised and inclined position wherein said first connector means retains said upper portion of said platform so as to be oriented generally rearwardly of said front portion of said base so as to be non-planar with respect to said lower portion of said platform to a lower position wherein said upper and lower portions of said platform are generally horizontal and coplanar, at least one energy storage extension means connected between said lower portion of said platform and said rear portion of said base, said at least one extension means being in a first extended position when said platform is in said raised position and being compressible to store energy when said platform is moved to said lower position such that said at least one extension member provides a resistance to movement of said platform from said raised position toward said lower position and provides lift assistance to urge said platform from said lower position toward said raised position, and at least one handle extending upwardly from said base and above said platform when said platform is in said raised position.

9. The kneeling and standing assist device of claim 8 including a pair of spaced handles and means for connecting said handles to said base so that said handles may be moved from an elevated position to a collapsed storage position generally adjacent to said base.

10. The kneeling and standing assist device of claim 9 in which said handles are removably connected to said base.

11. The kneeling and standing assist device of claim 8 including a pair of spaced handles, and means for selectively extending said handles to adjust the length thereof, and each said handle as having an upper handgrip portion.

12. The kneeling and standing assist device of claim 8 including a reinforcing plate secured to a rear surface of said lower portion of said platform, and a connector mounted to said reinforcing element, and one end of said at least one energy storage extension means being adjustable connected to said connector.

13. The kneeling and standing assist device of claim 8 in which an upper portion of said platform includes concave areas adapted for engagement by a knee of an individual.