EQUIPMENT SUPPORT LEG AND LEVELER WITH RETRACTABLE CASTOR

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An equipment support leg providing a multiplicity of functions. Static applications are addressed through a threaded shaft and foot. The improved foot is bolted into support legs in such a way as to allow swiveling desirable for conforming to grounds. Mobile applications are addressed through a modified castor. The castor may be lowered to the ground or retracted into a safe position by use of a handle attached to a bearing. Jacking or leveling needs are met by use of the leveler handle which is attached to a bearing, located near the top of threaded shaft. Therefore, one support leg converts from stationary capabilities to mobile capacities, and converts back again into the original stationary position.
FIG. 1B
EQUIPMENT SUPPORT LEG AND LEVELER WITH RETRACTABLE CASTOR

REFERENCE TO A MICROFICHE APPENDIX

[0001] Not applicable

BACKGROUND—FIELD OF INVENTION

[0002] This invention relates to an equipment support leg, more specifically an equipment leg which converts from a stationary position to a mobile capacity.

BACKGROUND—PRIOR ART

[0003] Equipment support legs employed over the years for use with scaffold systems, carts, or staging and the like have only provided singular functions. A multiplicity of needs dealing with variations of grounds or flooring, plus the necessity for temporary mobility to move the supported structure should all be met all in one simple to use leg device. Although this has long been desired, the need has yet to be met. Legs for use with a scaffold frame will be the primary example given.

[0004] An equipment leg will usually consist of a small metal square plate, or foot. The center contains one shaft, shortened or lengthened and may be threaded, which inserts up into a scaffold frame leg. The frame then rests upon the upon the metal plate. This foot protects the frame from sinking into the ground and provides stability.

[0005] Another leg consisting of the same components adds on a leveling jack. This is a long threaded shaft with a handle on top that can rotate up or down the shaft. The scaffold frame comes to rest upon this leveling handle, rather than the foot. The handle jacks up the frame or lowers it to level the scaffold platform. The weight of the frame makes it difficult to turn the leveling handle. Often, the worker cannot adjust the leveling jack without applying use of a mail to force the handle into position. Handles crack, chip, snap off and impair safety standards.

[0006] While a scaffold system is being used, the foot has a great amount of weight upon it. This means that an assembled scaffold cannot be lifted in order to remove even a small shafted foot and replace it with another type.

[0007] Frequently, uneven grounds, sloped flooring, or erosion necessitates a swivel foot. Instead of a fixed foot as discussed before, this foot has ability to swivel somewhat to conform to inconsistent conditions varying from day to day. A fixed foot must be resting upon level grounds, which can be dug out and graded up. However, many floorings that scaffold is upon are made with concrete. The concrete may be sloping and rough, as it is not the final finished product. Concrete cannot be dug up, and so a swivel foot is the best option.

[0008] Another problem is the need to move the scaffold system. There simply has not been available for use a support leg which simplistically converts from stationary usage into full mobility. If a flat, fixed foot, or swivel foot has been used, then the whole system must be taken down piece by piece and resurrected in the new location. Often, this is just a few feet away.

[0009] To answer this problem, a leg consisting solely of a castor wheel and a short shaft can be inserted into the frame for mobility. However, this also gives the effect of a castor always in contact with the grounds while work is being done on the scaffold. The unit can roll away, shake, and rock due to gravitational forces, sloping, erosion, high winds and accidental bumping. Although a castor with a long shaft is available to be used, it is considered unsafe by construction workers, and is never to be used on job site.

[0010] Many castors do entail braking mechanisms. There is always a potential for disengagement of the brake. Brakes working by friction do tend to wear out. Toothed brakes sometimes fail to lack registration. Debris can interfere with the brake engagement. Brakes can be forgotten to be utilized due to human error. Heavy loads can cause braked wheels to slide. A castored scaffold leg has an inherent potentiality to roll and subsequently injure a fellow human.

[0011] In order to overcome these dangerous situations, a rolling scaffold is often additionally shored up with cinder blocks, sandbags or other heavy materials. An expensive safety option is the practice of digging a track, or channel, and possibly paving it. The castored frame is somewhat contained within the channel. One very elaborate structure that does contain stationary and mobile use is found in U.S. Pat. No. 3,576,233 given to Thatcher in April 27, 1971. A scaffold structure is attached to a side of a vehicle with legs sitting upon the ground for stability. This is a usable invention, although not practical for the construction industry.

[0012] All the above related factors raise labor and construction costs, lack time efficiency, nor have the working persons best benefits in mind. A better improved equipment support leg is needed to meet the ever changing demands of construction.

SUMMARY

[0013] This present invention accordingly provides an equipment support leg which presents a retractable castor to be raised or lowered for movability through operating a handle-bearing; a heavy duty swivel foot for static applications; and a leveler also fit with a handle-bearing for ease of manipulation, all designed into one durable unit.

[0014] Several objects and advantages of the present invention are:

[0015] (a) to provide a reliable support leg for use with scaffolding frames, carts, staging and the like, which entails stationary and mobile features;

[0016] (b) to provide a support leg with a foot substantially larger than a standard foot which will enable greater spread of load and has at least twice the bearing capacity of the customary foot.

[0017] (c) to provide a large foot capable of swiveling to measure up to the variety of demands happened upon in the diversity of work sites;

[0018] (d) to provide a modified castor resulting in a castor affording greater swiveling capabilities than standard castors, incorporated into the same device as the foot, yielding full mobility of the structure it is joined to;

[0019] (e) to provide an improved wheel which can be interchanged for anticipated weight load, variety
of job site, and preferred wheel materials, while it is still attached to the structure it is supporting;

[0020] (f) to provide a wheel which retracts off the grounds, out of harms way, when a fixed, stable position is desired;

[0021] (g) to eliminate the need of hand brake mechanisms upon the castor that may not engage properly or be operated incorrectly;

[0022] (h) to provide an unique adjusting leveler handle that is easier to maneuver than customary handles being used with which to level the supported scaffold frame;

[0023] (i) to provide a unique support leg that meets all usual standard uses in the construction field all in one device, with safety prevalent in mind;

[0024] (j) to reduce the cost of labor and increase time efficiency by dismissing the need for dismantling a scaffold in order to move the system to another location and rebuild it; rather, this leg allows a stationary foot to convert a scaffold into a rolling unit, then converts again into a fixed position, thus saving much time and effort.

[0025] Further objects and advantages can be construed and discerned through observation of drawings and specifications.

BRIEF DESCRIPTION OF THE DRAWINGS

[0026] For a most comprehensive understanding of the equipment support leg, reference should be made to the following figures, accompanying drawings, and the supporting detailed description.

[0027] FIG. 1A and 1B show a front and side view of the equipment support leg in a stationary stance;

[0028] FIG. 2 displays a side view of the support leg in a mobile position;

[0029] FIG. 3A to 3C show front, side, and top views respectively of the foot of the leg;

[0030] FIG. 4 is a top view of the support leg plate;

[0031] FIG. 5 gives a top view of the bearing 48;

[0032] FIG. 6 shows a top view of the castor plate;

[0033] FIG. 7 is a top view of bearing 34;

[0034] FIG. 8 shows a sectional view of the handle bearing;

[0035] FIG. 9 is a side view of the castor.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

[0036] Referring now to FIGS. 1A and 1B, there is shown the illustrative embodiment of this invention. While FIG. 1B shows a right side view of the leg in a fixed, stable position, FIG. 2 displays a left side view of the same leg in position for mobile use.

[0037] This leg device includes a large base plate, or swivel foot 10, that can be made of steel or aluminum, or cast, to be suitable for a particular use. Swivel foot 10 can be made larger or smaller depending upon expected job loads, preferred rolling devices and industry used for.

[0038] Shown in FIG. 3A, the front view of swivel foot 10 is composed with a set of triangular flanges 112, 114, 116, and 118. These four triangular flanges 112, 114, 116, and 118 are vertical, fastened to swivel foot 10 in symmetrical fashion with a beaded weld 120, 122, 124, 126, 128, 130, 132, and 134, for the entire length of each flange. FIG. 3B shows a side view of triangle flanges 112, 114, 116, and 118. A foot bolt aperture 86 is shown to accommodate a bolt 12, a bolt 14, a nut 16, and a nut 18, to be used for fastening a left support leg 23 and a right support leg 25 to swivel foot 10. This can also be seen in the front view of FIG. 1A. FIG. 3B also details the front and back edges of swivel foot 10. Edges are machine bent or rolled, to turn slightly upward at an angle or sloping to keep swivel foot 10 from catching on debris, work materials, etc., and thereby wedging in and becoming caught.

[0039] FIG. 3C entails a rectangular notch 98 within the center front portion of swivel foot 10, to allow a caster wheel 22 to pass through swivel foot 10 and so contact ground or flooring.

[0040] As seen in FIG. 1, left support leg 23 and right support leg 25 has a cross brace 20 that goes in between left support leg 23 and right support leg 25. Cross brace 20 is connected with a left beaded weld 136 and a right beaded weld 138 to act as the brace to keep the legs 23 and 25 from spreading apart. Cross brace 20 also acts as a locking mechanism for castor wheel 22 in that cross brace 20 prevents castor wheel 22 from swiveling and pivoting when retracted.

[0041] FIG. 1 illustrates a support leg plate 45 in position on top of left support leg 23 and right support leg 25, welded around all top edges of support legs 23 and 25 with a beaded weld 43. A top view of support leg plate 45 is seen in FIG. 4.

[0042] FIG. 4 shows support leg plate 45 having a bolt aperture set 100, 102, 104, and 106, and a shaft hole 108 to accommodate a threaded shaft 58. Shaft hole 108 is bored out to allow threaded shaft 58 to pass through and connect to a coupling, threaded pipe 42, seen in FIG. 1B, by simply screwing them together.

[0043] Shown in FIG. 5, a bearing 48 which has a set of bolt apertures 70, 72, 74, and 76, is then bolted to support leg plate 45 with a bolt set 40, 46, 96, and 110, and a nut set 38, 44, 94, and 111. Bolt 110 and nut 111 are apparent in FIG. 2. A retractable castor handle 56 is welded to bearing 48 with a beaded weld 54 giving the effect of a handle-bearing.

[0044] Shaft 58 threads into threaded pipe 42 after it passes thru bearing 48 by way of shaft hole 108 and support leg plate 45. Threaded pipe 42 is welded to a bearing 34 with a beaded weld 35 as seen in FIG. 1A, 1B, and 2.

[0045] The top view of bearing 34 is shown in FIG. 7. Bearing 34 sitting on its plate which comes manufactured together, has a set of bolt apertures 78, 80, 82, and 84. A castor plate 32 shown in FIG. 6 also has a set of bolt apertures 140, 142, 144 and 146. Castor plate 32 is attached to bearing 34 with a set of bolts 31, 36, 92 and 148, and a set of nuts 150, 33, 30 and 90.
A castor fork 28 is welded to castor plate 32 with a castor fork weld 152, as shown in FIG. 9. This castor fork 28 contains a different angle than normal standard use castors. A standard castor will not work properly in this support leg. Castor fork 28 is cut and customized to obtain approximately a 38° castor angle in relation to the castor plate 32, which will allow castor 22 to move up and down without hitting cross brace 20. This 38° castor angle shown in FIG. 9, seems to help overcome a problem inherent to swivel castors. A castor carrying a load will tend to align itself in the direction it is presently moving, so that when quickly turning in another direction, the castor resists the directional change. A 38° castor angle has resulted in eliminating much of this resistance problem. This modification allows castor 22 to be even more freely mobile, when positioned down as shown in FIG. 2. Castor wheel 22 is fastened on castor fork 28 with an axle bolt 26 and an axle nut 24.

A leveling scaffold handle 60 is attached to a bearing 68 with a beaded weld 62. This also results in a bearing-handle which has ease of movement. Threaded shaft 58 will go through Kingpinless bearing, which is manufactured as bored, down through leveling scaffold handle 60, downward thru retractable handle 56, bearing 48, support plate 45 and continues on to threaded pipe 52, which screw into each other.

FIG. 8 is given to show how shaft 58 passes through handle 56, and bearing 48. Bearing 48 may be Kingpinless which already has a hole, or can be bored out either individually, or by manufacturer.

In order to yield optimum performance of this support leg unit, operation should be done in the following manner:

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

This support leg is designed for use with a structure such as a scaffolding system which has a tubular frame, hole, or sleeve that will allow threaded shaft 58 to be inserted. A set of support legs will be needed to accommodate each corner or area of the structure being supported. As shaft 58 is inserted into the frame, the frame will come to rest upon bearing 68, not upon the handle, as is generally done in the field. In this model, the bearing’s plate has been cut and rounded. Bearing 68 is to be welded or forged into the leveling scaffold handle 60, creating a bearinged-handle. This sort of handle is much easier to manipulate than the basic standard handle that scaffolders usually use. The handle 60 can level a scaffold frame leg by rotating the handle clockwise or counter-clockwise around shaft 58. Counter-clockwise rotations will result in the raising of the handle up the shaft, and therefore also raising the scaffold that is resting upon the bearing 68. By rotating the same handle clockwise, it spins down the threaded shaft, also lowering the structure. Each leg frame of scaffolding must be raised or lowered and checked for levelness through the entire platform and to secure the work area.

Another handle is utilized in this leg device. This will operate castor 22. The retractable handle 56 is to be welded or forged into bearing 48 as one unit, much like the leveling handle and bearing 68. Retractable handle 56 sits atop of bearing 48 which is bolted by its plate to support leg plate 45. As the handle is spun clockwise, the threaded shaft 58 is taken up, thereby raising the castor to which it is ultimately connected to.

Casfor 22 has modified forks 28, which in turn are welded to castor plate 32. The plate 32 is bolted together with bearing 34. The bearing is welded to threaded pipe 42 which has the threaded shaft 58 screwed into it. The castor handle will raise up or lower down the castor by way of the threaded shaft raising and lowering.

Conversion from a stationary unit to a rolling apparatus begins as the castor comes in contact with the ground. As the retractable handle is turned counter-clockwise, the castor is lowered to the floor, creating now a rolling support leg. The lowering of the castor also causes the swivel foot to ascend off the floor, clearing the path for movability. Clockwise rotations of the castor handle castor handle cause the castor to retract safely to its original position, after the rolling capabilities have been used. A scaffold system needs mobility only temporarily; rather, the workmen prefers to undertake his/her labors on a firm, secure, stabilized platform.

As the wheel is raised high enough, castor fork 28 is engaged by cross brace 20. This locks the castor to prevent its swiveling and shaking while retracted.

Foot 10 gains swiveling action from the bolts which attach the flanges to the support legs. Swiveling is appreciated in uneven grounds. Operation of this device should always be in accordance with standard safety practices, and OSHA regulations.

CONCLUSIONS, RAMIFICATIONS, AND SCOPE

Therefore, one can see that the equipment support leg with leveler and retractable castor is a definitive fulfillment of needs particularly desired by the scaffolding industry. Furnishing a support leg which produces a new result in that an improved stationary leg can convert into a mobile capacity as needed, then return to a firm, steadfast placement answers a cry long voiced by construction workmen and the industry’s executives as well. The addition of an improved leveling jack handle is indisputably an advantageous factor.

While this present invention described above and shown throughout the drawings has been individually pieced together, a manufacturer or other producer of this product, whether in total or with specific elements, could readily determine elements to be forged, made integral or use other processes with which to make the leg quicker, more easily and more economically.

Manufacturers would be able to distinguish the best materials suited for consumers particular needs since a variety of industries can benefit from the use of this support leg. To satisfy customer’s needs, this leg could be produced for light, medium, heavy duty or furthered into a gigantic industrial leg support system, with materials selected accordingly. Methods for modular or integrally made elements, their connections, sizes, and shapes of elements can be changed to conform to needs and desires of consumers without changing the true spirit and scope of this invention.

If so desired, the foot may be made without swiveling action. Likewise, the leveling jack handle can be made
without benefit of the bearing, in any type of configuration for rotation or use as a platform to bear weight.

[0060] Finishings can be applied for effective durability and protective qualities as so desired by specific industries.

[0061] The bearing for castoring has been placed atop the castor plate for ease in changing castor wheel. However, this can be alternately placed under the castor plate, with modified forks attached to the bearing.

[0062] This does necessitate a complete castor unit change when preferred, rather than simply removing the wheel and inserting the new one.

[0063] In accordance to patent statutes, further construing and formulations could be made of this support leg and yet not depart from the true spirit and scope of this invention.

REFERENCE NUMBERS LIST

[0064] 10 swivel
[0065] 12 bolt
[0066] 14 bolt
[0067] 16 nut
[0068] 18 nut
[0069] 20 cross brace
[0070] 22 castor wheel
[0071] 24 support leg left
[0072] 24 axle nut
[0073] 25 support leg right
[0074] 26 axle bolt
[0075] 28 castor fork
[0076] 30 castor plate nut
[0077] 31 castor plate bolt
[0078] 32 castor plate
[0079] 33 castor plate nut
[0080] 34 bearing
[0081] 35 beaded weld
[0082] 36 castor plate bolt
[0083] 38 nut
[0084] 40 bolt
[0085] 42 threaded pipe
[0086] 43 beaded weld
[0087] 44 nut
[0088] 45 support leg plate
[0089] 46 bolt
[0090] 48 bearing
[0091] 54 beaded weld
[0092] 56 retractable castor handle
[0093] 58 threaded shaft
[0094] 60 leveling scaffold handle
[0095] 62 beaded weld
[0096] 68 bearing
[0097] 70 bolt aperture
[0098] 72 bolt aperture
[0099] 74 bolt aperture
[0100] 76 bolt aperture
[0101] 78 bolt aperture
[0102] 80 bolt aperture
[0103] 82 bolt aperture
[0104] 84 bolt aperture
[0105] 86 foot bolt aperture
[0106] 88 castor hole
[0107] 90 castor plate nut
[0108] 92 castor plate bolt
[0109] 94 nut
[0110] 96 bolt
[0111] 98 rectangular notch
[0112] 100 bolt aperture
[0113] 102 bolt aperture
[0114] 104 bolt aperture
[0115] 106 bolt aperture
[0116] 108 shaft hole
[0117] 110 bolt
[0118] 111 nut
[0119] 112 triangle flange
[0120] 114 triangle flange
[0121] 116 triangle flange
[0122] 118 triangle flange
[0123] 120 beaded weld
[0124] 122 beaded weld
[0125] 124 beaded weld
[0126] 126 beaded weld
[0127] 128 beaded weld
[0128] 130 beaded weld
[0129] 132 beaded weld
[0130] 134 beaded weld
[0131] 136 beaded weld left
[0132] 138 beaded weld right
[0133] 140 bolt aperture
[0134] 142 bolt aperture
[0135] 144 bolt aperture
[0136] 146 bolt aperture
[0137] 148 castor plate bolt
We claim

1. A combination objection support leg and jacking device with a retractable rolling castor comprising:

a. a jack element which supports an object or portion of an object and of which a portion is threaded

b. an elongated threaded shaft on which the threads of the threaded portion of said jack element are meshed and supported, causing said jack element and the object of portion of object it supports to be moved along the length of said elongated threaded shaft when the threaded portion of said jack element is rotated around said elongated threaded shaft

c. a second jack element comprised of a threaded portion and a non-threaded portion, which are fixed together as a single unit, while being able to rotate independently with respect to one another around a common axis, the threads of the threaded portion of said second jack element are meshed with and supported by the threads of said threaded elongated shaft, causing the second jack element to move along the length of said threaded elongated shaft when the threaded portion of the second jack element is rotated around said threaded elongated shaft

d. a support frame which is attached to the non-threaded portion of said second jack element, both being free to rotate together with respect to said elongated threaded shaft without causing said second jack element to move along the shaft, with the result of the non-threaded portion of said second jack element being able to rotate independently with respect to the threaded portion of said second jack element; conversely the combined said support frame and said second jacking element can also be made to move together along said threaded elongated shaft without the step support from being rotated with respect to said elongated threaded shaft, this being accomplished by rotating the threaded portion of said second jacking element only.

e. a castor element attached to one end of said elongated threaded shaft, which support the shaft and which by enabling a rolling movement along a supporting surface allows the elongated shaft and all said elements it supports, including the object or the portion of object supported by said jacking element, to be moved along the support surface,

whereby said castor can rotate freely around the elongated threaded shaft, the shaft and all said elements and the object or portion of object it supports can be rolled by the castor in any direction along a supporting surface without the scaffolded object or supported portion of object being rotated with respect to the shaft,

whereby said support frame can be moved along the length of the elongated threaded shaft without rotating said elongated threaded shaft the support frame can be moved to a position where it is in contact with the supporting surface, whereby supporting the shaft and all said elements it supports, whereby said castor can be moved off and away from the supporting surface, while the support frame remains in contact with the supporting surface, by counter rotating said jack element and said second element, the support frame is made to support said elongated threaded shaft and all said elements said threaded shaft supports including the supported object, thus converting all the combined said elements into a fixed non-rolling support structure.

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