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# MODULAR TABLE LEG ASSEMBLY

## Abstract

A table leg assembly for use with either a fixed height table or an adjustable height table. The table leg assembly includes a foot casting that includes at least a pair of legs extending from the body portion of the foot casting. In an adjustable height table, an outer leg column is attached above the foot casting and a leg column extension is attached below the foot casting. An inner leg column is movable by a drive cylinder to adjust the height of the table. The table top is attached to and moves with the inner leg column. In a fixed height table, the leg column extension is eliminated, and the same foot casting and outer leg column define the table leg assembly.

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## Background/Summary

## BACKGROUND

[0001] The present disclosure generally relates to a modular table leg assembly that can be used with either a fixed height table or an adjustable height table. More specifically, the present disclosure is directed to a table leg assembly that includes a common foot casting and outer leg column that are used with both a fixed and adjustable height table.

[0002] Many furniture manufacturers offer various different types of tables to fit the needs of specific customers. As an example, furniture manufacturers may offer a line of tables that have the same overall appearance but can be ordered as a simple, fixed height table, an adjustable height table, a fixed height nesting table in which the table top transitions from a horizontal use position to a nearly vertical storage position and a static height nesting table. Each of these four different variations in the table line can require slightly different components to create the required table legs for the specific table. In such situation, the furniture manufacturer much maintain inventory of a number of table specific parts so that the selected table can be assembled when ordered.

[0003] The inventors of the present disclosure have recognized the problems associated with maintaining an inventory of multiple parts to form the different table types and have thus created a modular design for the table leg assembly. The modular table leg design of the present disclosure reduces the number of parts that must be kept in inventory while allowing for the configuration of the table leg assembly for use with multiple table types.

## SUMMARY

[0004] The present disclosure relates to a modular table leg assembly that can be used with multiple different table types. The modular table leg assembly design of the present disclosure reduces the number of parts that must be maintained in inventory while allowing for the creation of fixed height and adjustable height tables that may include nesting or static table tops.

[0005] The table leg assembly of the present disclosure is designed to provide support for a table top. The table leg assembly includes a foot casting that is a common component for either a fixed height table or an adjustable height table. The foot casting is cast from a durable metallic material, such as aluminum. The foot casting includes a central body portion and at least a pair of legs that extend from the body portion. The body portion is formed from an outer wall that defines an open interior and at least a pair of attachment channels that extend through the entire height of the foot casting.

[0006] The table leg assembly further includes an outer leg column that is shaped and formed to be received on an upper end of the foot casting. The outer leg column is aligned with the foot casting such that attachment channels in the outer leg column are aligned with the attachment channels in the body portion of the foot casting. If the table leg assembly is to be used with an adjustable height table, a leg column extension is positioned below the foot casting. The leg column extension has generally the same profile as the outer leg column and includes an open interior and a pair of attachment channels. The attachment channels of the leg column extension are aligned with the attachment channels of the foot casting.

[0007] Once the table leg assembly is configured to include the leg column extension for an adjustable table or without the leg column in a fixed height table design, at least a pair of draw bolts are used to secure the modular components together to create the table leg assembly. In the design of the present disclosure, the same foot casting and outer leg column are used across all of the possible table configurations, thereby reducing the number of parts needed and reducing the cost to the table manufacturer.

[0008] In an adjustable height table design, an adjustment cylinder is seated within a bottom cap mounted to the leg column extension. Since the leg column extension extends below the foot casting, the leg column extension increases the possible length of the adjustment cylinder and thus increases the amount of extension for an internal cylinder rod of the adjustment cylinder. The cylinder rod is connected to an inner leg column that can be extended and retracted within the outer

leg column. The inner leg column is coupled to the table top such that the table top moves with the movement of the inner leg column.
[0009] Various other features, objects and advantages of the invention will be made apparent from the following description taken together with the drawings.

## Description

BRIEF DESCRIPTION OF THE DRAWINGS
[0010] The drawings illustrate the best mode presently contemplated of carrying out the disclosure. In the drawings:
[0011] FIG. **1** is a perspective view of an adjustable height table including the modular table leg assembly of the present disclosure;
[0012] FIG. **2** is a perspective view similar to FIG. **1** showing the adjustable height table in the fully raised position;
[0013] FIG. **3**A is a side view showing the adjustable height table in the fully lowered position;
[0014] FIG. **3**B is a side view showing the adjustable height table in a mid-height position;
[0015] FIG. **3**C is a side view showing the adjustable height table in the fully raised position;
[0016] FIG. **4** is a perspective view showing the transition of the adjustable height table to a storage position;
[0017] FIG. **5** is a partially exploded view showing the components of a nesting table with adjustable legs;
[0018] FIG. **6** is an exploded view of the table leg assembly for an adjustable height table in accordance with the present disclosure;
[0019] FIG. **7** is a top view of the foot casting that forms part of the table leg assembly;
[0020] FIG. **8** is a section view taken along line **8**-**8** of FIG. **6**;
[0021] FIG. **9** is a section view taken along line **9**-**9** of FIG. **6**;
[0022] FIG. **10** is a section view taken alone line **10**-**10** of FIG. **6**;
[0023] FIG. **11** is a vertical section view of the table leg assembly for an adjustable height table;
[0024] FIG. **12** is a perspective view of a fixed height table including the modular table leg assembly of the present disclosure;
[0025] FIG. **13**A is a side view showing the fixed height table;
[0026] FIG. **13**B is a side view showing the pivoting movement of the table top; and
[0027] FIG. **14** is an exploded view of the table leg assembly for the fixed height table.
DETAILED DESCRIPTION
[0028] FIGS. **1** and **2** illustrate a height adjustable table **10** constructed utilizing the modular table leg assembly **12** of the present disclosure. The height adjustable table **10** includes a table top **14** that is adjustable between a fully lowered position shown in FIG. **1** and a fully raised position shown in FIG. **2**. The table top **14** is supported above a floor surface by a pair of modular table leg assemblies **12**. In the embodiment shown in FIGS. **1** and **2**, each of the table leg assemblies **12** includes an inner leg column **16** that is extendable and retractable into and out of a stationary outer leg column **18** such that the height of the table top **14** from a floor surface can be modified. In the embodiment shown in FIGS. **1** and **2**, the table top **14** is also pivotable from a use position shown in FIGS. **1** and **2** to a nearly vertical storage position as best shown in FIG. **4**. The pivoting movement of the table top to the storage position allows multiple tables **10** to nest with each other in the storage position to reduce the amount of space needed to store the multiple tables when not in use. Although the adjustable height table **10** in the embodiment shown in FIGS. **1** and **2** is pivotable to the storage position, it should be understood that the table top **14** could be fixed in the horizontal use position of FIGS. **1** and **2** while operating within the scope of the present disclosure.
[0029] As shown in FIGS. **1** and **2**, the pair of table leg assemblies **12** are joined to each other by a

cross support **20** that extends between the pair of outer leg columns **18**. The cross support **20** provides the desired spacing and support for each of the two table leg assemblies **12**.
[0030] In the embodiment shown in FIGS. **1** and **2**, each of the table leg assemblies **12** further includes a foot casting **22**. The foot casting **22** includes a pair of legs **24** that each extend from a center body portion **26**. Each of the legs **24** includes a caster wheel **28** that allow the entire height adjustable table **10** to be moved along a floor surface.
[0031] In the height adjustable table **10** shown in FIGS. **1** and **2**, the table leg assembly **12** further includes a leg column extension **30** that extends below the body portion **26** of the foot casting **22**. Each leg column extension **30** provides an extension of the leg column below the body portion **26** of the foot casting **22**. The leg column extension **30** is used to increase the possible length of the inner leg column **16** to thereby increase the amount of upward movement of the table top **14**.
[0032] FIGS. **3**A-**3**C illustrate the movement of the height adjustable table **10** from the fully lowered position shown in FIG. **3**A to the fully raised position shown in FIG. **3**C. During this movement, the inner leg column **16** is moved upward out of the outer leg column **18** by an inner cylinder drive mechanism that will described in greater detail below. Since the leg column extension **30** is shown mounted to the foot casting **22**, the amount of vertically upward movement of the table top **14** is increased as compared to a table leg assembly **12** that does not include the leg column extension **30**. In the image of FIG. **3**C, the amount of vertical movement is illustrated by arrow **32**. This amount of vertical movement is greater than an embodiment in which the table leg assembly **12** does not include the leg column extension **30**.
[0033] FIG. **4** illustrates the pivoting movement of the table top **14** from the generally horizontal operating position shown in FIG. **1** to a nearly vertical, storage and nesting position of FIG. **4**. The nesting height adjustable table **10** includes a pair of pivot assemblies **34** that are used to pivotally mount the generally planar table top **14** to the top end of each of the table leg assemblies **12**. Each of the pivot assemblies **34** includes a release handle **36** that extends to the outer edge **38** of the table top such that a user can grasp either one or both of the release handles **36** to release the pivoting mechanism included in the pivot assemblies **34**. When the release handles **36** are engaged, the user is able to pivot the table top to the nesting position, as shown by arrow **40** in FIG. **4**.
[0034] Referring now to FIG. **5**, each of the table leg assemblies **12** further includes a mounting head **42** that is attached to the top end of the inner leg column **16**. The mounting head **42** provides a point of attachment for each of the pivot assemblies **34** and provides access to the operating and drive components contained within the table leg assembly **12**. The mounting head **42** moves along with the upward and downward movement of the inner leg column **16**, as can be seen in the side views of FIGS. **3**A-**3**C. In addition, the mounting head **42** provides a cable passageway **44** that allows one end of a release cable to enter into the open interior defined by the table leg assembly **12**. The operating cable is connected to a activation handle **46** which is positioned below and slightly recessed from the front edge **48** of the table top **14**. Thus, when a user desires to raise or lower the height of the table top **14**, the user can grasp the activation handle **46** and lift up or push down on the table top **14** to adjust the height. Once the desired height has been achieved, the activation handle **46** is released by the user and the table top **14** assumes the desired position.
[0035] FIGS. **6** and **7** illustrate the operating components of the table leg assembly **12** when the table leg assembly **12** is used with a height adjustable table. As described previously, the table leg assembly **12** includes an outer leg column **18**, a foot casting **22** and a leg column extension **30**. As illustrated in FIG. **3**, each of these components has a generally consistent outer profile such that when the outer leg column **18**, the foot casting **22** and the lower leg column extension **30** are assembled, the entire table leg assembly **12** has a consistent and visually pleasing appearance.
[0036] FIG. **7** is a top view of the foot casting **22**. As described previously, the foot casting **22** includes a body portion **26** and a pair of legs **24**. The body portion **26** defines an open center portion **50** that is sized to allow the inner leg column **16** to move into and out of the body portion **26**. On either side of the open center portion is a section of the extruded wall **52** that defines one

two attachment channels **54**. The attachment channels **54** extend the entire length of the body portion **26** and allow one of a pair of draw bolts **56** to pass through the entire height of the foot casting **22**, as will be described below and as shown in the section view of FIG. **11**. The top end of the body portion **26** includes a pair of alignment tabs **58** that help to align the outer leg column **18** with the foot casting **22** during assembly. In the embodiment shown, the entire foot casting **22** is formed from a cast aluminum material, although other materials are contemplated.

[0037] FIG. **8** is a section view of the outer leg column **18**. The outer leg column **18** is defined by an outer wall **60** that includes a pair of extending fingers **62** on each side. The fingers **62** define an attachment channel **64** that will be vertically aligned with the attachment channels **54** in the foot casting **22** when the two components are assembled as shown in FIG. **6**. In the embodiment shown in FIG. **8**, the entire outer leg column **18** is formed from an extruded metallic material, such as aluminum.

[0038] FIG. **9** is a section view through the lower column extension **30**. As can be seen in a comparison between FIGS. **8** and **9**, the cross-sectional appearance of the lower leg column extension **30** and the outer leg column **18** are nearly identical. The leg column extension **30** is formed from an outer wall **66** that includes similar fingers **68** that define an attachment channel **70**. Thus, when the leg column extension **30** is positioned below the body portion **26** of the foot casting **22** as shown in FIG. **6**, the attachment channels **70** are vertically aligned with the attachment channels **54** formed in the body portion **26**.

[0039] FIG. **10** is a section view taken through the inner leg column **16** shown in FIG. **6**. The section view of the inner leg column **16** illustrates that the inner leg column **16** is formed from an extruded outer wall **72** that defines a generally flat outer surface **74** and a curved inner surface **75**. The outer surface **74** is visible to the exterior of the table while the curved inner surface **74** faces the interior of the table. The inner leg column includes a pair of curved, recessed surfaces **76** that provide clearance for the draw bolts **56** and a secure contact surface for the glide elements **106** shown in FIGS. **6** and **11** such that the inner leg column **16** is freely movable into and out of the combination of the outer leg column **18**, the foot casting **22** and the column extension **30**, along the glide elements **106**.

[0040] Referring back to FIG. **6**, when the modular table leg assembly **12** is used with the adjustable height table, the assembly further includes an adjustment cylinder **78**. The adjustment cylinder **78** is an air cylinder that includes a cylinder body **80** that extends from a bottom end **82** to a top end **84**. The adjustment cylinder **78** includes an extendable cylinder rod **86** that can be retracted and extended from the cylinder body **80** through the release of internal air pressure, as is well known. The cylinder rod **86** includes a top end **88** that is securely connected to the mounting head **42** attached to the top end of the inner leg column **16**. In this manner, when the cylinder rod **86** is extended into and out of the cylinder body **80**, the cylinder rod **86** will cause the movement of the inner leg column **16** into and out of the outer leg column **18** and foot casting **22**, along the glide elements **106**.

[0041] In the embodiment shown in FIG. **6**, the table leg assembly **12** further includes a top cap **90** mounted to a top end **92** of the outer leg column and a bottom cap **94** mounted to the bottom end **96** of the leg column extension **30**. The top cap **90** includes a center opening **98** that allows the cylinder rod **86** to extend through the top cap **90** during the movement of the inner leg column **16**. The bottom cap **94** provides a point of attachment and mounting for the bottom end **82** of the cylinder body **80**.

[0042] FIG. **11** is a section view of the assembled table leg assembly **12** when used with the adjustable height table **10**. As can be seen in this view, the bottom end **82** of the cylinder body **80** is received within an alignment slot **100** formed in the bottom cap **94**. The alignment slot **100** accurately locates the cylinder body **80** and prevents lateral movement of the cylinder body **80**. When the table leg assembly **12** is in the assembled condition, the pair of draw bolts **56** extend through the entire structure to securely hold the table leg assembly in the assembled condition.

Each of the draw bolts **56** includes an expanded head **102** that engages with and is received in the bottom cap **94**. The draw bolts **56** extend through the attachment channel **70** (FIG. **9**) in the leg column extension **30** and into the corresponding attachment channels **54** (FIG. **7**) formed in the body portion **26** of the foot casting **22**. Each of the draw bolts **56** further extends into the outer leg column **18** and are received within the attachment channels **64** (FIG. **8**). Finally, the threaded outer end portion **104** of each draw bolt **56** is received within internally threaded openings formed in the top cap **90**. In this manner, the draw bolts **56** create a secure connection between the leg column extension **30**, the foot casting **22** and the outer leg column **18**.

[0043] The top end **88** of the cylinder rod **86** is securely attached to the bottom wall of the mounting head **42**. Thus, as the cylinder rod **86** is extended, the mounting head **42** and the attached pivot **34** moves vertically to adjust the vertical position of the table top **14**. The mounting head **42** is securely connected to the inner leg column **16** such that the inner leg column **16** and the mounting head **42** move along with the extension and retraction of the cylinder rod **86** into and out of the cylinder body **80**.

[0044] As shown in FIG. **11**, a series of guide elements **106** are mounted along the inner wall of the outer leg column **18**. The series of guide elements provide a guide surface during the vertical movement of the inner leg column **16**. The guide elements **106** are formed from a resilient plastic material, such as but not limited to Delrin®. Referring back to FIG. **6**, each of the draw bolts **56** includes the expanded head **102** on one end and the threaded portion **104** on the opposite end. The threaded portion **104** is received within the top cap **90**. The remaining portions of the body **110** of the draw bolts **56** are unthreaded such that the draw bolts can pass through the components of the assembled table leg assembly **12**.

[0045] FIG. **12** illustrates another embodiment of a type of table that can be assembled using the table leg assembly of the present disclosure. In the embodiment of FIG. **12**, the table is shown as a fixed height table **112** that utilizes the table leg assembly **114** of the present disclosure. The table leg assembly **114** uses many of the same components as the table leg assembly **12** shown in the previous figures. However, the table leg assembly **114** is designed to be used with a fixed height table **112** and thus does not include the adjustment cylinder and the extendable inner leg column. Since the adjustment cylinder is removed in the fixed height table **112**, the table leg assembly **114** also does not need to include the lower leg column extension shown in the previous figures. Instead, the foot casting **22** is used with only the outer leg column **18**. Since the height of the table top **14** is fixed, the entire vertical adjustment mechanism, including the drive cylinder and the inner leg column can be eliminated. As shown in the FIGS. **13**A and **13**B, the outer leg column **18** is connected directly to the mounting head **42**. As in the previous embodiments, the mounting head **42** provides support for the pivot assemblies **34**, which allow the table top **14** to pivot from the horizontal use position of FIG. **13**A to the generally vertical storage and nesting position of FIG. **13**B.

[0046] As shown in the exploded view of FIG. **14**, the table leg assembly **114** includes the outer leg column **18** mounted directly to the body portion **26** of the foot casting **22**. The outer leg column **18** is secured to the body portion **26** by a pair of lower draw bolts **116**. The lower draw bolts **116** include the expanded head portion **118** and a threaded upper end **120**. The threaded upper end **120** is received within the body of the outer leg column **18** to securely attach the outer leg column **18** to the foot casting **22**. The top end **92** of the outer leg column **18** is received within the head **42**. A pair of upper draw bolts **122** extend through the head **142** such that the threaded outer end **124** of each of the upper draw bolts **122** is received and retained within the interior of the outer leg column **18**. A cover plate **126** is secured to the top end **128** of the head **42** by a series of threaded connectors **130**. The cover plate **126** thus encloses the open interior **132** of the head **42**.

[0047] As can be understood in the above description, the table leg assembly of the present disclosure can be used in a table that either has a fixed height or has an adjustable height through the operation of an internally located adjustment cylinder. In both embodiments, the table leg

assembly includes a common outer leg column **18** and a foot casting **22**. In the adjustable height table leg assembly, a lower leg column extension **30** can be utilized to increase the amount the table top **14** can be extended from the foot casting **22**. Since the foot casting **22** and the outer leg column **18** are common between both a fixed height table and an adjustable height table, fewer components need to be inventoried when assembling the two different types of tables. The use of the additional extension below the foot casting also allows for different amounts of table height adjustment depending upon user requirements. a

[0048] This written description uses examples to disclose the invention, including the best mode, and also to enable any person skilled in the art to make and use the invention. The patentable scope of the invention is defined by the claims, and may include other examples that occur to those skilled in the art. Such other examples are intended to be within the scope of the claims if they have structural elements that do not differ from the literal language of the claims, or if they include equivalent structural elements with insubstantial differences from the literal languages of the claims.

## Claims

**1**. A table leg assembly for supporting a table top, the table leg assembly comprising: a foot casting including at least a pair of legs extending from a body portion; an outer leg column supported on the foot casting, the outer leg column being supported on the body portion of the foot casting; and a leg column extension selectively positionable below the body portion of the foot casting, wherein the bottom leg column is coupled to the body portion of the foot casting to extend the outer leg column and is selectively removable from the foot casting.

**2**. The table leg assembly of claim 1 further comprising a pair of draw bolts extending through the foot casting and the outer leg column to secure the foot casting and the outer leg column to each other.

**3**. The table leg assembly of claim 2 wherein the pair of draw bolts extend through the bottom leg column extension to secure the bottom leg column, the outer leg column and the foot casting together when the bottom leg column extension is positioned below the foot casting.

**4**. The table leg assembly of claim 3 further comprising a top cap mounted to an upper end of the outer leg column and a bottom cap mounted to the bottom leg column extension, wherein the pair of draw bolts extend between the top cap and the bottom cap.

**5**. The table leg assembly of claim 1 further comprising an adjustable leg column that extends through the outer leg column and the foot casting and is received in the bottom leg column extension when the bottom leg column extension is positioned below the foot casting, wherein the adjustable leg column is movable out of the outer leg column to move the table top.

**6**. The table leg assembly of claim 5 further comprising an adjustment cylinder having a cylinder body and an extendable cylinder rod, wherein a bottom end of the cylinder body is received in the bottom leg column extension and a top end of the cylinder rod is coupled to the adjustable leg column.

**7**. The table leg assembly of claim 6 further comprising a bottom cap coupled to the bottom leg column extension, wherein the bottom end of the cylinder body is supported by the bottom cap.

**8**. The table leg assembly of claim 2 wherein the foot casting and the outer leg column each include a pair of internal passageways that are aligned with each other to receive the pair of draw bolts.

**9**. The table leg assembly of claim 1 wherein the bottom leg column extension is selectively removed in a first embodiment in which the height of the table top is fixed and utilized when the height of the table top is adjustable.

**10**. A table, comprising: a table top; and a pair of table leg assemblies for supporting a table top, each of the table leg assemblies comprising: a foot casting including at least a pair of legs extending from a body portion; an outer leg column supported on the foot casting, the outer leg

column being supported on the body portion of the foot casting; and a bottom leg column extension selectively positionable below the body portion of the foot casting, wherein the bottom leg column is coupled to the body portion of the foot casting to extend the outer leg column and is selectively removable from the foot casting.

**11**. The table of claim 10 further comprising a pair of draw bolts extending through the foot casting and the outer leg column to secure the foot casting and the outer leg column to each other.

**12**. The table of claim 11 wherein the pair of draw bolts extend through the bottom leg column extension to secure the bottom leg column, the outer leg column and the foot casting together when the bottom leg column extension is positioned below the foot casting.

**13**. The table of claim 10 further comprising an adjustable leg column that extends through the outer leg column and the foot casting and is received in the bottom leg column extension when the bottom leg column extension is positioned below the foot casting, wherein the adjustable leg column is movable out of the outer leg column to move the table top.

**14**. The table of claim 13 further comprising an adjustment cylinder having a cylinder body and an extendable cylinder rod, wherein a bottom end of the cylinder body is received in the bottom leg column extension and a top end of the cylinder rod is coupled to the adjustable leg column.

**15**. The table of claim 10 wherein the bottom leg column extension is selectively removed in a first embodiment in which the height of the table top is fixed and utilized when the height of the table top is adjustable.

**16**. A method of forming a table leg for using in supporting a table top, the method comprising the steps of: providing a foot casting that includes a pair of legs extending from a body portion; attaching an outer leg column to the foot casting; determining if the table leg is a fixed height table leg or an adjustable height table leg; attaching a leg column extension to the body portion of the foot casting if the table leg is an adjustable height table leg; connecting the foot casting and the outer leg column using a pair of draw bolt for the fixed height table leg and connecting the foot casting, the outer leg column and the bottom leg column with the pair of draw bolt for the adjustable height table leg.

**17**. The method of claim 16 further comprising the steps of: inserting an adjustable leg column into the outer leg column and the foot casting, wherein the adjustable leg column is received in the bottom leg column extension when the bottom leg column extension is positioned below the foot casting, wherein the adjustable leg column is movable out of the outer leg column to move the table top.

**18**. The method of claim 16 wherein the foot casting, the outer leg column and the leg column extension have the same outer profile.