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STOOL

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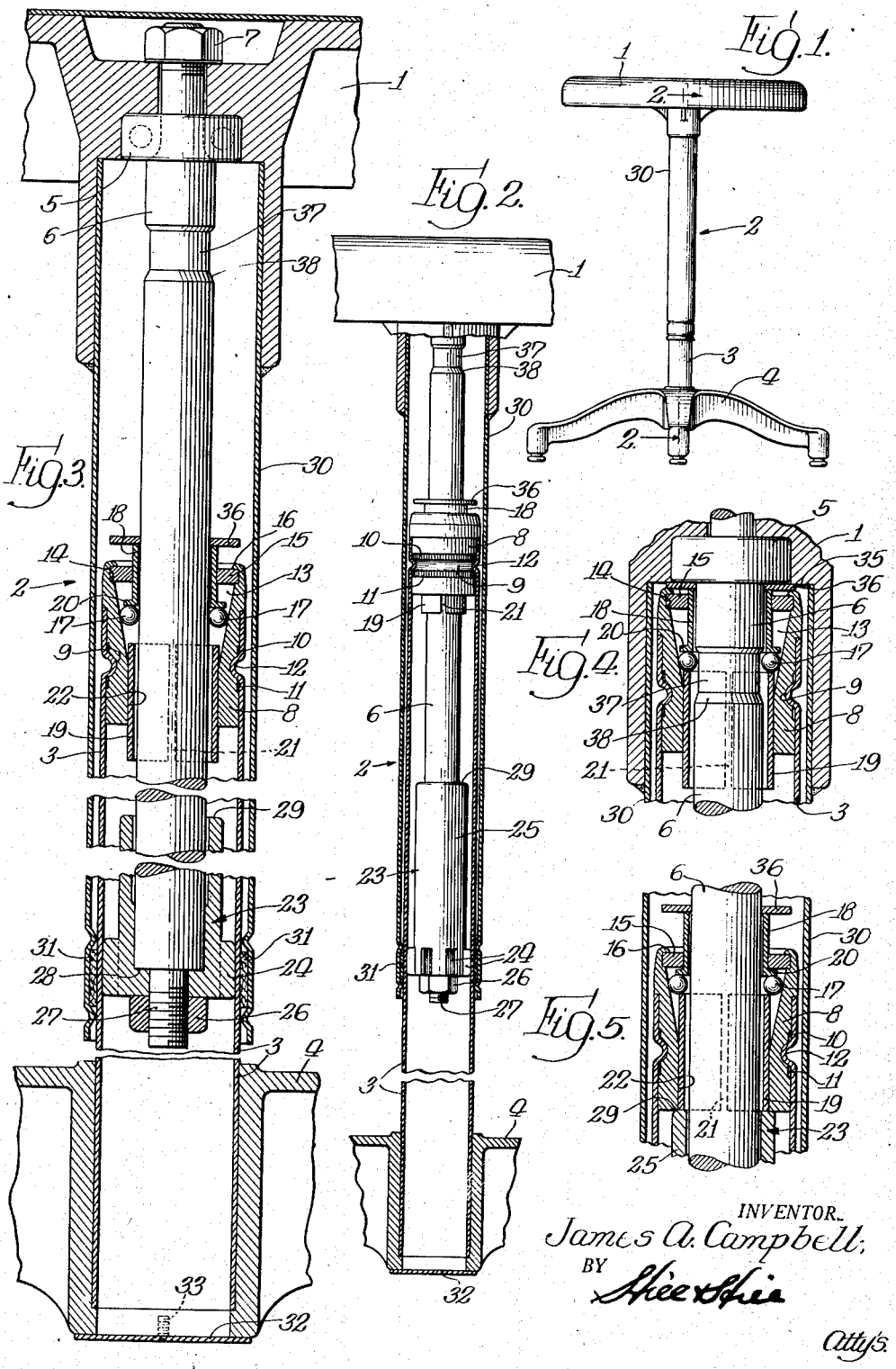

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STOOL

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The present invention is directed to an extensible support providing a pair of telescoping members adapted for relative movement with respect to each other and having retaining means coacting between the members to selectively lock the same in certain relative positions to prevent the diminution of the overall length of the combined members. The extensible support and its new and novel associated retaining mechanism is in this case incorporated in a stool for the purpose of varying the supported height of the seat with respect to the floor.

The stool incorporating the present invention is provided with two relatively movable members combined for telescopic movement, with one of the members secured to the seat of the stool and the other member secured to the legs or base of the stool and with the new and novel form of retaining means coacting between the relatively movable members for the purpose of adjusting the seat height. The foregoing retaining means functions to lock the two movable members in various selected positions and may be released from locking position for the purpose of readjusting the chair from a higher seat level to a lower seat level.

The new and novel features of the invention will be more specifically explained and pointed out in the following detailed description thereof having reference to the accompanying drawing disclosing a preferred form of stool.

In the drawing:

Fig. 1 is a side elevational view of the stool incorporating the present invention.

Fig. 2 is a vertical longitudinal sectional view along the chair column as taken substantially along the line 2—2 in Fig. 1, illustrating most of the interior mechanisms in elevation.

Fig. 3 is a cross-sectional view taken vertically along the column of the stool substantially as in Fig. 2, but further showing the retaining means and its associated mechanism in cross-section.

Fig. 4 is another cross-sectional view of the upper end portion of Fig. 3 illustrating the manner in which the rolling elements of the retaining means are disposed in a position for locking the relatively movable members of the chair column after said members are moved a predetermined amount; and

Fig. 5 is another vertical sectional view through the column illustrating the release of the rolling elements from locking position for the purposes of re-setting the seat height of the stool.

Fig. 1 illustrates a stool having a seat 1 supported by an extensible column 2 having the tubular member 3 secured to the leg base 4. Referring to Fig. 3, the stool seat 1 is rotatably carried upon a suitable bearing 5 which rests upon the reduced end of the column member 6 and these parts are held together by means of a suitable fastening nut 7 or in any other manner desirable. The column members 3 and 6 comprise the two relatively movable members of the extensible column and these members are arranged in telescopic relationship in the manner illustrated.

The retaining means cooperating between the two relatively movable members 3 and 6 comprises a housing 8 in the form of the sleeve that is suitably secured to the end of the tubular member 3 in any suitable manner. In the present construction the sleeve or housing 8 is provided with an annular groove 9 bordered by the serrations 10 and 11, and the walls of the tube 3 are spun into the annular groove 9 as at 12 to rigidly secure said members together. The groove 9 prevents endwise separation of the members 3 and 8, while the serrations 10 and 11 will prevent relative rotary movement of the same members. The housing 8 is provided with a conical chamber 13 terminating in a shoulder 14 for supporting the disc 15 to provide closure means for the upper end of the housing 8. By spinning or crimping over the extreme end 16 of the housing 8 upon the upper face of the disc 15, the latter is fixedly secured to the housing.

A plurality of rolling elements in the form of ball bearings 17 are loosely carried within the conical chamber 13 of the housing 8 and are adapted for coacting between the walls of the chamber 13 and the surface of the center support or movable column member 6. It should be noted that the chamber 13 of the housing 8 may be otherwise formed and does not necessarily need to be conically or circular as shown, and that the rolling elements need not be ball bearings and may be replaced by rollers or the like.

Oppositely disposed with respect to the rolling elements or balls 17 are a pair of sleeves 18 and 19 which constitute shiftable means for extending outwardly at both ends from within the housing 8 and which sleeves cooperate with the rolling elements within the housing. The sleeve 18 is loosely carried between the disc 15 of the housing and the outer surface of the member 6 and normally rests upon the balls 17 by gravity. The sleeve 18, therefore, normally tends to urge or hold the balls 17 in locking position between the walls of the chamber 13 and the member 6, and a suitable annular flange 20 is provided at the

lower end of the sleeve 18 for the purpose of preventing withdrawal of said sleeve from the housing 8. The annular flange 20 further provides means for normally contacting the balls 17 in all positions that the latter may assume during the operation of the adjustable column.

The other sleeve 19 is split as at 21 and is formed to be inherently springy for the purpose of self-expansion within the bore 22 of the housing 8 and is, therefore, held in frictional engagement to be held directly within the bore 22 of the housing 8 at all times. The central column member 6 is suitably guided by the mechanism of the retaining means at one point while the extreme lower end of the column is provided with a suitable fitting 23 formed with a plurality of projections such as 24 which are adapted to engage the interior wall of the fixed column 3 for the purpose of vertically guiding and stabilizing the member 6. The projections 24 have been provided for the purpose of reducing frictional contact. The fitting 23 is also provided with an elongated sleeve such as 25 which is of such a length as to form abutment means connected with the column 6 for the purpose of engaging the shiftable means of the retaining means as will hereinafter be described. The fitting 23 is secured to the end of the column 6 by means of the nut 26 threaded upon the reduced end 27 of the column, relative movement of said members being prevented by means of the shoulder 28. Obviously, suitable shims or washers could be inserted about the shank 27 and between the column 6 and the shoulder 28 for the purpose of raising or lowering the end 29 of the fitting 23 with respect to the end of the column 6 to procure the proper functioning of the retaining means.

The entire retaining mechanism and the associated parts are enclosed by a suitable tubular guard 30 which is connected with the boss of the stool seat 1 in any desirable manner and it will be noted that the guard 30 and column 6 move together simultaneously with the movement of the stool seat 1. A suitable friction ring 31 is carried by the lower end of the guard 30 for the purpose of preventing dust and dirt from entering into the operating mechanisms of the adjustable column. This ring 31 is preferably made of leather and provides a friction member for coacting between the guard 30 and the tubular column 3 to frictionally retard movement of the guard 30 and column 6 relative to the tubular column 3 whenever the rolling elements of the retaining means are in inoperative or unlocked position. To complete the enclosure of the interior of the extensible column, suitable means such as the plate 32 may be used for covering the opening in the leg base 4 of the stool and this cover may be secured by means of suitable screws such as 33 or by any other means. The guard 30 not only acts as a shield, but provides additional structural means for vertically supporting and stabilizing the stool relative to the fixed base members thereof by reacting against bending or tilting of the inner structures of the column. Also, the guard 30 enhances the appearance of the chair.

To render the retaining means operative for supporting the stool seat at various heights, the parts of the stool are positioned as illustrated in Fig. 4 by pressing downwardly upon the stool seat 1 when the latter is in lowermost position. This causes the abutment means secured to the column 6, which in this case may be the roller bearing 5 or the internal shoulder 35 of the boss of the seat, to move the loose sleeve 18 downwardly into the housing 8 through the instrumentality of a washer 36. The washer 36 has been provided as a means for preventing the relatively thin sleeve 18 from entering the bearing 5 or other means that may be provided at this point, such washer also being of a size to contact the upper ends of the spun-in portion 16 of the sleeve 8. In this manner, the sleeve 18 is moved inwardly a definite amount every time that the chair parts are in the position shown in Fig. 4. The movement of the sleeve 18 presses the balls 17 downwardly within the conical chamber 13 of the housing 8, the balls 17 at the same time engaging the frictional sleeve 19 moving the latter outwardly of the housing in the manner illustrated in Fig. 4.

In order that the foregoing operation may be properly performed and to prevent jamming of the parts such as might occur when the balls 17 are forced between the walls of the conical chamber 13 and the surface of the column 6, the latter is provided with an annular recess 37 which establishes suitable clearance for the balls 17 and provides means for rendering such balls inactive while disposed in operative position until the relatively movable members 3 and 6 have been moved a predetermined amount and in the present instance that would be the width of the annular recess 37. When such movement takes place, the balls 17 are slightly raised and moved outwardly by means of the beveled edge 38 of the recess 37 which will then place the balls 17 into their normal active locking position between the walls of the chamber 13 and the surface of the column 6 and free of the sleeve 19. Thereafter the raising of the seat 1 will move the guard 30 and the column 6 upwardly relative to the tubular fixed member 3, drawing the column 6 through the retaining means whereby the balls 17 will lock the column 6 in any position within the limits of movement or expansibility of the chair column for supporting the seat at any selected elevation.

For resetting the seat of the stool in order to obtain a lower seat elevation, the seat 1 is raised to its extreme position which will place the operating mechanisms of the stool in the position indicated in Fig. 5. Here the end 29 of the fitting 23 has engaged the sleeve 19 moving the latter inwardly of the housing 8 raising the balls 17 into the position shown where they are in inactive or inoperative position inasmuch as they are moved out of wedging engagement from between the walls of the chamber 13 and the surface of the column 6. This action also raises the sleeve 18 and washer 36 into the positions illustrated and since the sleeve 19 is frictionally maintained within the housing 8, the center column 6 including the fitting 23, stool seat 1 and guard 30 may then all be moved downwardly with respect to the tubular column 3 until such parts are again placed into the position illustrated in Fig. 4 whereupon the seat height may again be adjusted as desired.

It is obvious that the present extensible column will permit of various applications and need not be limited to a stool such as shown and described. Such a column may be utilized for table legs, furniture legs or multiple chair legs or various other uses where it is desirable to incorporate an extensible support such as described. It is also contemplated to make various modifications in the detailed construction of the present device and the same is, therefore, not to be limited to the exact form, construction, arrangement or

combination of parts as specifically referred to and described or to the particular uses herein mentioned. All modifications and changes shall be governed by the breadth and scope of the appended claims.

What I claim as new and desire to secure by Letters Patent is:

1. In an adjustable stool or the like, the combination of two relatively movable telescoped members coacting to support the stool seat, retaining means connected between said members to lock the same against relative movement in one direction and to allow said members to be relatively moved in the opposite direction to adjust the supported height of the seat, said retaining means comprising a housing connected with one of said members and encircling the other member, said housing having a conical chamber therein, rolling elements in said chamber adapted for locking engagement between the walls of said chamber and the surface of the encircled member, shiftable sleeve means extending outwardly from the ends of said housing and cooperating with said rolling elements within said housing to dispose the elements in operative locking position or to move the same into inoperative position, respectively, whereby said members may be locked in said one direction or released therefrom, and upper and lower abutment members rigidly connected to said encircled member for shifting said shiftable sleeve means when the encircled member approaches the limits of its movements in either direction, said encircled member having an annular recess located adjacent the upper abutment member for relieving the rolling elements of frictional engagement with the wall of the conical chamber and encircled member.

2. In an adjustable stool or the like, the combination of two relatively movable telescoped members coacting to support a stool seat, retaining means connected between said members to lock the same against relative movement in one direction and to allow said members to be relatively moved in the opposite direction to adjust the supported height of the seat, said retaining means comprising a housing connected with one of said members and encircling the other member, said housing having a conical chamber therein, rolling elements in said chamber adapted for locking engagement between the walls of said chamber and the surface of the encircled member, shiftable sleeve means one extending upwardly from said housing, and one downwardly, the downwardly projecting sleeve means being frictionally engaged with the wall of the housing, and said sleeve means cooperating with said rolling elements within said housing to dispose the rolling elements in operative locking position or to move the same into inoperative position, respectively, whereby said members may be locked in said one direction or released therefrom, and upper and lower abutment means rigidly connected to the encircled one of said movable members at the ends thereof for engagement with the projecting portions of the shiftable sleeve means to cause the rolling elements to be disposed in operative or in inoperative positions, respectively, said lower abutment means comprising a sleeve surrounding the encircled member and extending upward from its lower end.

3. In an adjustable stool or the like, the combination of two relatively movable members coacting to support the stool seat, retaining means connected between said members to lock the same against relative movement in one direction and to allow said members to be relatively moved in the opposite direction to adjust the supported height of the seat, said retaining means comprising a housing connected with one of said members and encircling the other member, said housing having a conical chamber therein, rolling elements in said chamber adapted for locking engagement between the walls of said chamber and the surface of the encircled member, shiftable means extending outwardly from the ends of said housing and cooperating with said rolling elements within said housing to dispose the elements in operative locking position or to move the same into inoperative position, respectively, whereby said relatively movable members may be locked in said one direction or released therefrom, upper and lower abutment members connected with the encircled one of said movable members to engage the shiftable means to cause the rolling elements to be disposed in operative or in inoperative positions, respectively, and said encircled member having an annular recess adjacent the upper one of said abutment members for rendering said rolling elements inoperative when shifted into operative locking position by said upper abutment member and shiftable means, until said two relatively movable members are moved relative to each other a predetermined amount.

4. In an extensible support, the combination of a pair of telescoping members adapted for relative movement, retaining mechanism coacting between said members to selectively lock the same in certain relative positions to prevent the diminution of the overall length of said combined members, said retaining mechanism comprising a housing connected with one of said members and encircling the other member, said housing having a conical chamber therein, rolling elements in said chamber adapted for locking engagement between the walls of the chamber and the surface of the encircled member, shiftable sleeve means projecting from the ends of said housing and cooperating with said rolling elements within the housing to position the elements in operative locking position or to move the same into inoperative position, respectively, whereby the overall length of the combined members may be adjustably increased or whereby the overall length of the combined members may be diminished for purposes of readjustment, and upper and lower abutment members rigidly connected to said encircled member for shifting said shiftable sleeve means when the encircled member approaches the limits of its movements in either direction, and said encircled member having an annular recess located adjacent said upper abutment member, whereby the rolling elements are frictionally disengaged from the wall of the conical chamber and encircled telescoping member when the latter is lowered to the lower limit of its movements.

5. In an extensible support, the combination of a pair of telescoping members adapted for relative movement, retaining mechanism coacting between said members to selectively lock the same in certain relative positions to prevent the diminution of the overall length of said combined members, said retaining mechanism comprising a housing connected with one of said members and encircling the other member, said housing having a conical chamber therein, rolling elements in said chamber adapted for locking engagement between the walls of the chamber and the surface of the encircled member, shiftable

means projecting from the ends of said housing and cooperating with said rolling elements within the housing to position the elements in operative locking position or to move the same into inoperative position, respectively, whereby the overall length of the combined members may be adjustably increased or whereby the overall length of the combined members may be diminished for purposes of readjustment, and upper and lower abutment means rigidly connected to one of said telescoping members for engagement with the projecting portions of the shiftable means to cause the rolling elements to be disposed in operative or in inoperative positions, respectively, said lower abutment means comprising a sleeve surrounding the encircled member and extending upward from its lower end.

6. In an extensible support, the combination of a pair of telescoping members adapted for relative movement, retaining mechanism coacting between said members to selectively lock the same in certain relative positions to prevent the diminution of the overall length of said combined members, said retaining mechanism comprising a housing connected with one of said members, and encircling the other member, said housing having a conical chamber therein, rolling elements in said chamber adapted for locking engagement between the walls of the chamber and the surface of the encircled member, and shiftable means projecting from the ends of said housing and cooperating with said rolling elements within the housing to position the elements in operative locking position or to move the same into inoperative position, respectively, whereby the overall length of the combined members may be adjustably increased or whereby the overall length of the combined members may be diminished for purposes of readjustment, upper and lower abutment members connected with the encircled one of said telescoping members to engage the shiftable means to cause the rolling elements to be disposed in operative or in inoperative positions respectively, and said encircled member having an annular recess adjacent the upper one of said abutment members for rendering said rolling elements inoperative when shifted into operative locking position by said upper abutment member and shiftable means, until said two telescoping members are moved relative to each other a predetermined amount.

7. In an extensible support, the combination of a pair of telescoping members adapted for relative movement, retaining mechanism coacting between said members to selectively lock the same in certain relative positions to prevent the diminution of the overall length of said combined members, said retaining mechanism comprising a housing connected with one of said members, and encircling the other member, said housing having a conical chamber therein, rolling elements in said chamber adapted for locking engagement between the walls of the chamber and the surface of the encircled member, and shiftable means projecting from the ends of said housing and cooperating with said rolling elements within the housing to position the elements in operative locking position or to move the same into inoperative position, respectively, whereby the overall length of the combined members may be adjustably increased or whereby the overall length of the combined members may be diminished for purposes of readjustment, upper and lower abutment members connected with the encircled one of said telescoping members to engage the shiftable means to cause the rolling elements to be disposed in operative or in inoperative positions respectively, and the encircled one of said telescopic members having an annular recess therein adjacent the upper abutment member adapted for cooperating with said shiftable means to render said rolling elements inactive when shifted into operative locking position by said upper abutment member and shiftable means, until said two telescoping members are moved relative to each other a predetermined amount, said annular recess having a tapered edge portion for operatively shifting said rolling elements into active locking engagement between the chamber wall and the surface of the encircled member upon completion of said predetermined relative movement of said telescoping members.

8. In an extensible support, the combination of a pair of telescoping members adapted for relative movement, retaining mechanism coacting between said members to selectively lock the same in certain relative positions to prevent the diminution of the overall length of said combined members, said retaining mechanism comprising a housing connected with one of said telescoping members and encircling the other member, said housing having a conical chamber therein, rolling elements in said chamber adapted for locking engagement between the walls of the chamber and the surface of the encircled member, and shiftable means projecting from the ends of said housing and cooperating with said rolling elements within the housing to position the rolling elements in operative locking position or to move the same into inoperative position, respectively, whereby the overall length of the combined members may be adjustably increased or whereby the overall length of the combined members may be diminished for purposes of readjustment, said shiftable means comprising a pair of sleeve members oppositely disposed with respect to the rolling elements within the housing, one of said sleeve members being frictionally engaged with the wall of said housing and the other of the sleeve members being loosely carried by the housing, upper and lower abutment members mounted on the encircled member, and said encircled member having an annular recess therein adjacent the upper abutment member to prevent jamming of the rolling elements when shifted into operative position, said recess having a tapered edge portion adapted to move the rolling elements into engagement with the conical wall of the housing and surface of the encircled member, when the latter is moved endwise a distance equal to the width of the recess, whereby to restore the rolling elements into operative position.

9. In an extensible support, the combination of a pair of telescoping members adapted for relative movement, retaining mechanism coacting between said members to selectively lock the same in certain relative positions to normally prevent the diminution of the overall length of said combined members, said retaining mechanism comprising a housing connected with one of said members and encircling the other member, said housing having a conical chamber therein, rolling elements in said chamber adapted for locking engagement between the walls of the chamber and the surface of the encircled member, and shiftable means projecting from the ends of said housing and comprising a loose sleeve and a sleeve frictionally engaging the wall of the housing, said sleeves cooperating with said rolling elements within the housing to position the elements in

operative locking position or to move the same into inoperative position, respectively, whereby the overall length of the combined members may be adjustably increased or whereby the overall length of the combined members may be diminished for purposes of readjustment, abutment members connected with one of said telescoping members to engage the shiftable means to cause the rolling elements to be disposed in operative or in inoperative positions respectively, one of said telescopic members having an annular recess adapted for cooperating with said shiftable means to render said rolling elements inactive when shifted into operative locking position by said shiftable means, until said two telescoping members are moved relative to each other a predetermined amount, said annular recess having an edge portion for operatively shifting said rolling elements into active locking engagement between the chamber wall and the surface of the encircled member upon completion of said predetermined relative movement of said telescoping members, and a flange connected with said loose sleeve for preventing separation of the latter from the housing, said flange being adapted for bearing upon said rolling elements to normally urge the latter toward locking position by the weight of the sleeve, said flange being adapted to maintain this relationship for all movements of said rolling elements.

10. In an extensible support, the combination of a pair of telescoping members adapted for relative movement, retaining mechanism coacting between said members to selectively lock the same in certain relative positions to prevent the diminution of the overall length of said combined members, said retaining mechanism comprising a housing connected with one of said members and encircling the other member, said housing having a conical chamber therein, rolling elements in said chamber adapted for locking engagement between the walls of the chamber and the surface of the encircled member, and shiftable means projecting from the ends of said housing and cooperating with said rolling elements within the housing to position the elements in operative locking position or to move the same into inoperative position, respectively, whereby the overall length of the combined members may be adjustably increased or whereby the overall length of the combined members may be diminished for purposes of readjustment, said shiftable means comprising a pair of sleeve members oppositely disposed with respect to the rolling elements within the housing, one of said sleeve members being frictionally carried by said housing and the other of the sleeve members being loosely carried by the housing, and one of said telescoping members having an annular recess therein cooperating with one of said sleeves to position the rolling elements in inactive operative position until said two telescoping members are moved relative to each other a predetermined amount to cause active engagement of said rolling elements, and abutments rigidly connected to one of said movable members for shifting said shiftable means when the relatively movable members approach the limits of their movement in either direction.

11. In an extensible support, the combination of a pair of telescoping members adapted for relative movement, retaining mechanism coacting between said members to selectively lock the same in certain relative positions to prevent the diminution of the overall length of said combined members, said retaining mechanism comprising a housing connected with one of said members and encircling the other member, said housing having a conical chamber therein, rolling elements in said chamber adapted for locking engagement between the walls of the chamber and the surface of the encircled member, and shiftable means projecting from the ends of said housing and cooperating with said rolling elements within the housing to position the rolling elements in operative locking position or to move the same into inoperative position, respectively, whereby the overall length of the combined members may be adjustably increased or whereby the overall length of the combined members may be diminished for purposes of readjustment, said shiftable means comprising a pair of sleeve members oppositely disposed with respect to the rolling elements within the housing, one of said sleeve members being frictionally carried by said housing and the other of the sleeve members being loosely carried by the housing, and one of said telescoping members having an annular recess therein cooperating with one of said sleeves to position the rolling elements in inactive operative position until said two telescoping members are moved relative to each other a predetermined amount, said annular recess having an edge portion for operatively shifting said rolling elements into active locking engagement between the chamber wall and the surface of the encircled member upon completion of said predetermined relative movement of said telescoping members, and abutments rigidly connected to one of said movable members for shifting said shiftable means when the relatively movable members approach the limits of their movements in either direction.

12. In an extensible support, the combination of a pair of telescoping members adapted for relative movement, retaining mechanism coacting between said members to selectively lock the same in certain relative positions to prevent the diminution of the overall length of said combined members, said retaining mechanism comprising a housing connected with one of said members and encircling the other member, said housing having a conical chamber therein, rolling elements in said chamber adapted for locking engagement between the walls of the chamber and the surface of the encircled member, shiftable means projecting from the ends of said housing and cooperating with said rolling elements within the housing to position the rolling elements in operative locking position or to move the same into inoperative position, respectively, whereby the overall length of the combined members may be adjustably increased or whereby the overall length of the combined members may be diminished for purposes of readjustment, upper and lower abutment members rigidly secured to the encircled member for shifting said shiftable means when the relatively movable members approach the limits of their movement in either direction, a tubular guard connected to and movable with said encircled member and enclosing the telescoping members and frictional means connected with one of said telescoping members and engageable with the tubular guard to retard free relative movement of said telescoping members whenever the rolling elements are disposed in inoperative position.

13. In an adjustable stool or the like, the combination of two telescoping members, one movable in a longitudinal direction relative to the

other and coacting to support the stool seat, retaining means connected between said members to lock the same against relative movement in one direction and to allow said members to be relatively moved in the opposite direction to adjust the supported height of the seat, said retaining means comprising a housing connected with one of said members and encircling the other member, said housing having a conical chamber therein, rolling elements in said chamber adapted for locking engagement between the walls of said chamber and the surface of the encircled member, shiftable means extending outwardly from the ends of said housing and cooperating with said rolling elements within said housing to dispose the rolling elements in operative locking position or to move the same into inoperative position, respectively, whereby said members may be locked in said one direction or released therefrom, upper and lower abutment members rigidly secured to the encircled member for shifting said shiftable means when the relatively movable members approach the limits of their movement in either direction, and a tubular guard member connected with one of said relatively movable members to enclose and shield said retaining means, said guard having frictional means coacting with the outer of said relatively movable members to retard free relative movement of said telescoping members whenever the rolling elements are disposed in inoperative position.

14. In an adjustable stool or the like, the combination of a vertically movable seat supporting post, a stationary tubular member telescoped over said post, a housing connected to said tubular member and encircling said post, said housing having a conical chamber therein, rolling elements in said chamber adapted for locking engagement between the conical wall of the housing and the surface of the post, shiftable sleeve means in said housing and comprising one sleeve extending upwardly from the upper end of the housing and a second sleeve extending downwardly from the lower end of the housing and frictionally held therein, said shiftable sleeve means cooperating with said rolling elements within the housing to dispose said rolling elements in operative locking position or to move the same into inoperative position, respectively, whereby said rolling members may be locked in one direction or released therefrom, said post having an annular recess adjacent its upper end to prevent jamming of the rolling members when the latter are moved into operative position, and abutments rigidly connected to said post at the ends thereof for shifting said sleeve means when the post approaches its upper and lower limits of movement.

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