

Feb. 5, 1957

E. J. RIES ET AL

2,780,277

VERTICALLY ADJUSTABLE PEDESTAL STOOL

Filed June 27, 1952

4 Sheets-Sheet 1

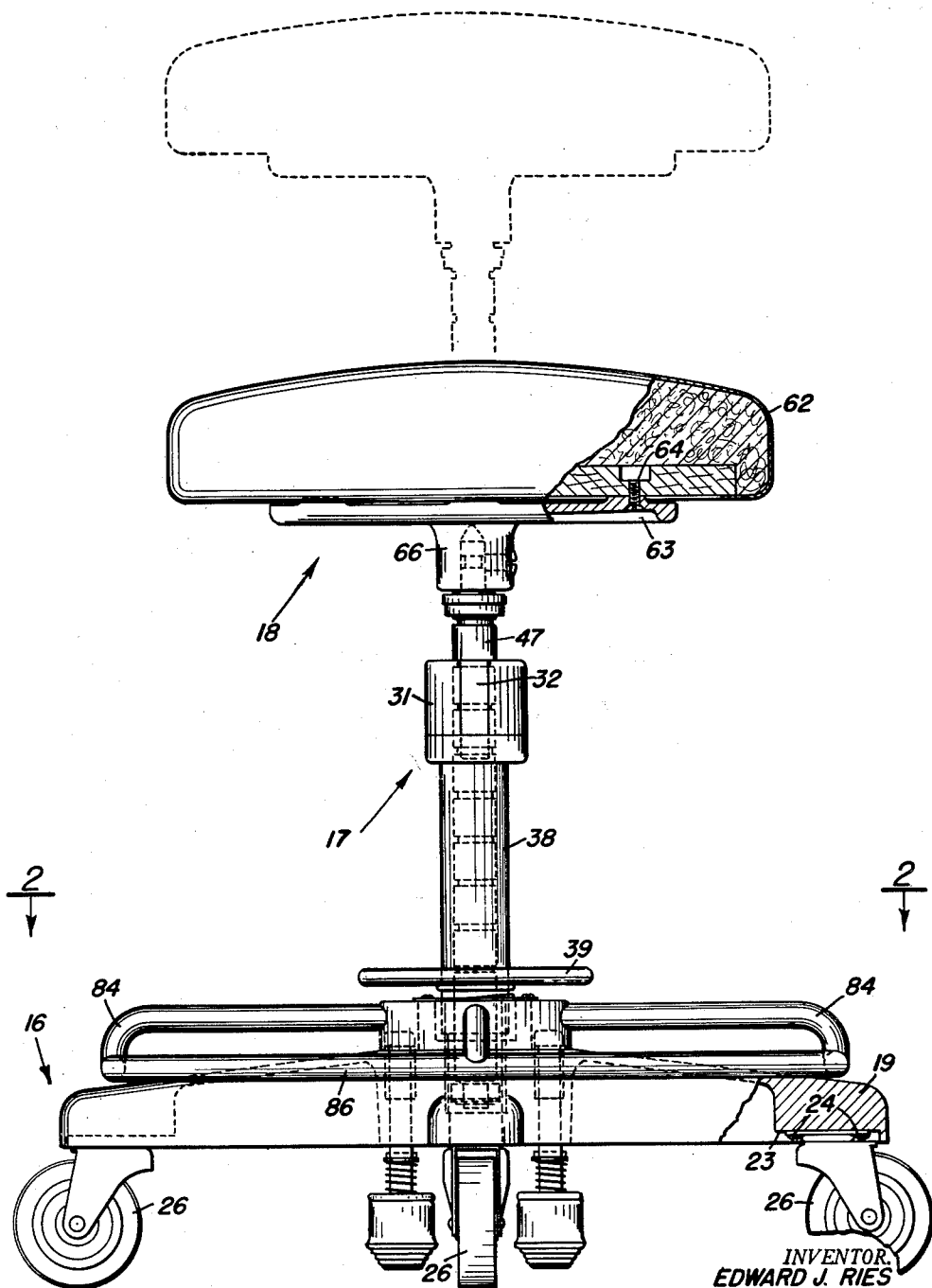


FIG. 1.

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4 Sheets-Sheet 2

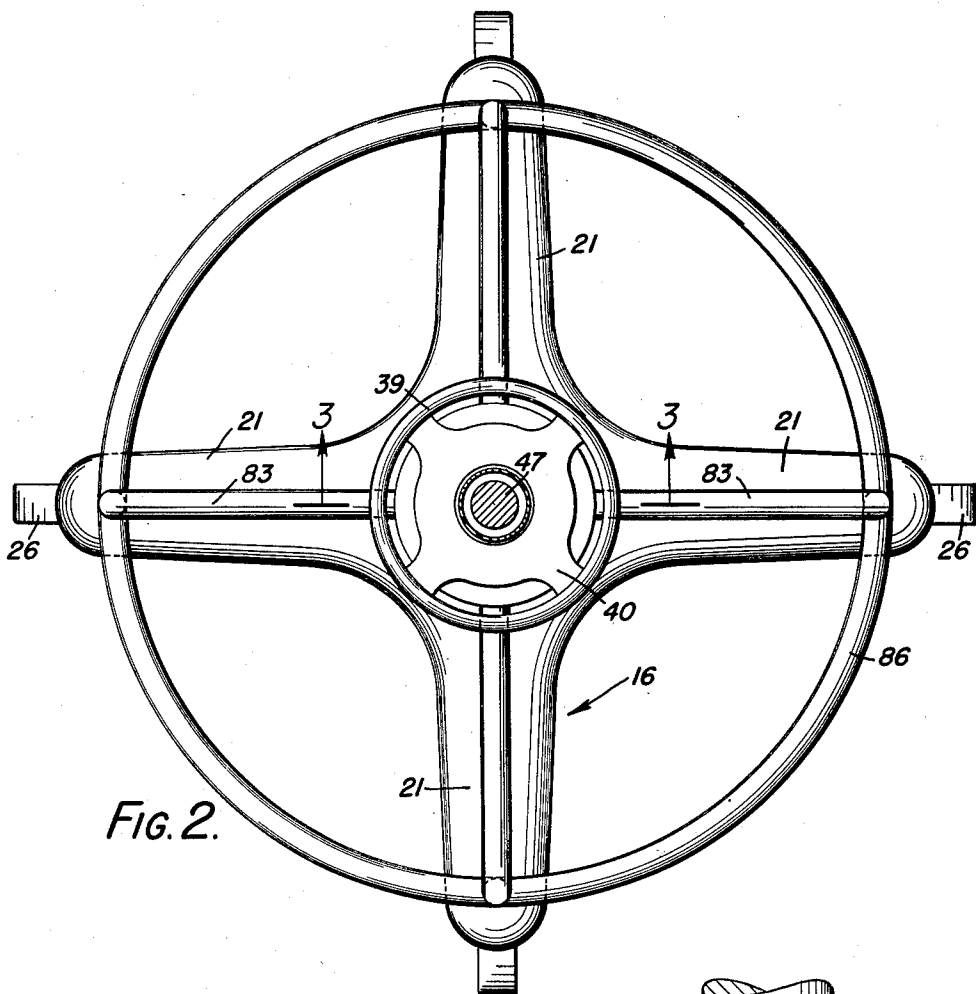


FIG. 2.

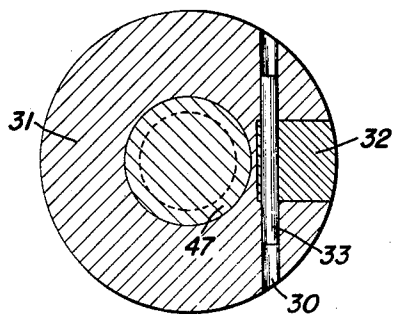


FIG. 6.

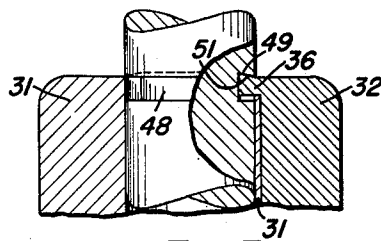


FIG. 5.

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4 Sheets-Sheet 4

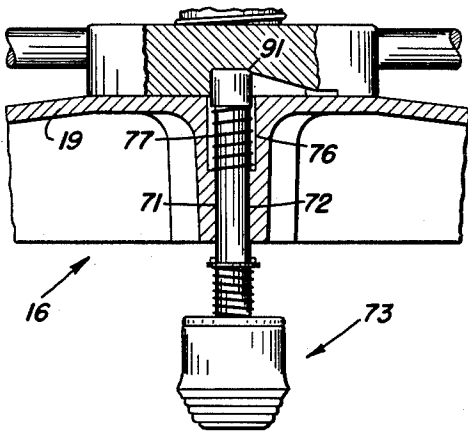


Fig. 7.

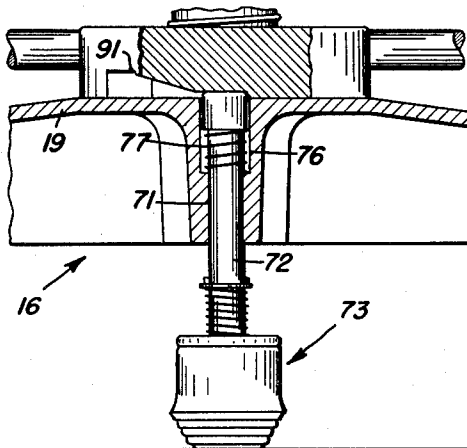


Fig. 8.

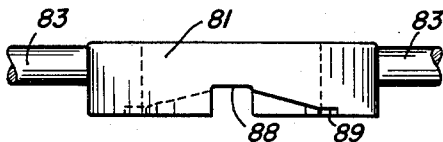


Fig. 9.

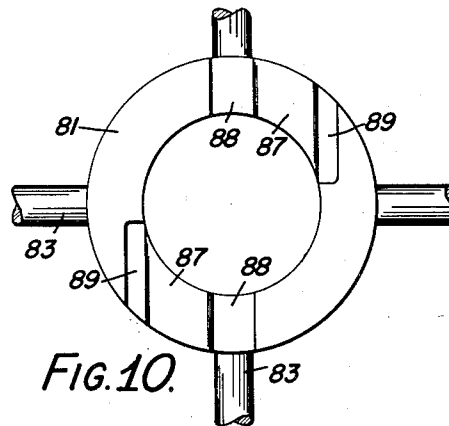


Fig. 10.

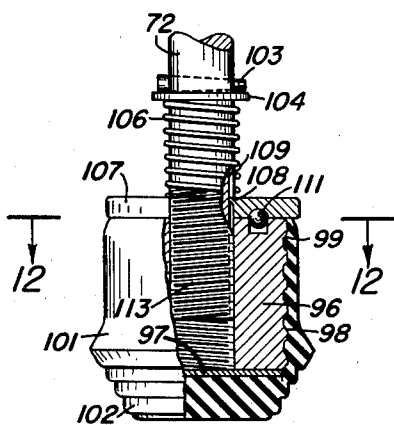


Fig. 11.

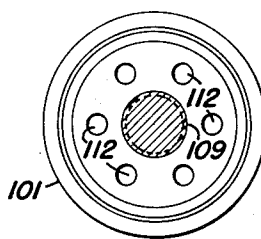


Fig. 12.

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VERTICALLY ADJUSTABLE PEDESTAL STOOL

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Application June 27, 1952, Serial No. 295,916

6 Claims. (Cl. 155—94)

Our invention relates to a mobile stool and more particularly to what may be termed a "stop-and-go" stool.

While the principles of the mobile stool of our invention may be used for general purposes such as by a housewife in the kitchen, laboratory technicians, or by other workers who must shift their position of work or gain access to materials and parts located away from their normal work place, the invention has been designed particularly for use by doctors in diagnostic and treatment work, surgeons and dentists.

Doctors and surgeons performing diagnostic, treatment or surgical work in the practice of their profession frequently are able to work sitting down, but in most cases must move around the operating room or office to obtain various instruments, articles and materials. Moreover, a doctor such as a proctologist, who finds it desirable or necessary to employ an examination or treatment table, has frequent occasion to move about the table and about the room in which the table is located to examine the patient from a different position or obtain instruments or materials located in the room away from the table.

A dentist in the normal practice of his profession during the day requires the use of a great many items such as a variety of sizes of drills, clamps, cotton pads and a great many other instruments, tools, and materials. While a dentist has a movable tray available to him adjacent his work place upon which are placed a great many of the tools and materials he requires in his work, at the same time the great variety of instruments, tools and materials he requires makes it necessary for him to store many of such items in cabinets or other storage places usually arranged in his office as convenient as possible to the dental chair at which he works.

Many doctors, surgeons and dentists prefer to work standing which may possibly in part be due to the many times they must go about the office for instruments, tools and materials which they need. However, in more recent years, professional men have more fully appreciated the strain placed upon them by continuous standing for long periods during the day which has resulted in fallen arches, serious back conditions and general fatigue. A constantly increasing percentage of such professional men desire to sit down while working and yet be free frequently to shift about the room for instruments, tools and materials while remaining in a seated position.

An object of our invention is to provide a mobile stool which is convenient to operate and adjust and gives the doctor, surgeon, dentist or other user the greatest possible freedom of action in moving about a room or office from his normal work place.

Another object of our invention is to provide what may be termed a "stop-and-go" stool particularly adapted for use by a doctor, surgeon or dentist, which is mounted on casters so that the user may easily roll about the operating room or office by foot propulsion and yet may quickly and easily lower friction devices or feet into engagement

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with the floor when he desires a steady immovable stool for use at his work place while examining or operating upon a patient.

Another object of our invention is to provide what may be termed a "stop-and-go" stool in which friction feet or crutches may be lowered into engagement with the floor to prevent the stool from rolling on its casters, the actuating means for lowering the friction feet into engagement with the floor being a relatively large diameter rotatable wheel having spokes accessible to the feet of the user so that by merely exerting foot pressure and without leaving the stool the user may render the stool mobile or immobile as desired, the wheel, at the same time constituting a convenient foot rest.

Our invention also contemplates a stool, the seat level of which may be manually raised and lowered when a releasable lock provided in the seat supporting column is released, the releasing means being convenient to operate by foot pressure.

Other objects and advantages of our invention will be particularly set forth in the claims and will be apparent from the following description, when taken in connection with the accompanying drawings, in which:

Fig. 1 is an elevational view of the stool of our invention with parts being shown in dotted lines and also indicating in dotted lines an upwardly adjusted position of the seat with respect to the base;

Fig. 2 is a sectional view taken substantially on the line 2—2 of Fig. 1 in the direction indicated by the arrows;

Fig. 3 is an enlarged sectional view showing part of the base and the supporting column for the seat and showing in solid and dotted lines the unlocked and locked positions of the release ring with respect to the center post;

Fig. 4 is a sectional view somewhat similar to Fig. 3 showing in addition to the lock between the tubular support column and the center post, the means for rotatably mounting the seat on the center post;

Fig. 5 is a detailed view showing the angles upon which the grooves in the center post are cut and the corresponding angle formed on the detent of the locking lever;

Fig. 6 is a sectional view taken on the line 6—6 of Fig. 4 in the direction indicated by the arrows;

Fig. 7 is a sectional view showing one of the friction feet or crutches together with the actuating cam for lowering the friction feet, the parts being shown in Fig. 7 in the position which they occupy when the friction feet are raised about the floor level and the stool is mobile;

Fig. 8 is a view similar to Fig. 7 with the friction feet in the lowered position which they occupy when the user desires to render the stool immobile;

Fig. 9 is a side elevation showing the hub and indicating the cams on the lower face thereof for lowering the friction feet;

Fig. 10 is a face view of the under side of the hub shown in Fig. 9;

Fig. 11 is a view partly in section showing one of the friction feet or crutches and indicating how the level of the friction feet is adjusted; and

Fig. 12 is a sectional view taken substantially on the line 12—12 of Fig. 11 in the direction indicated by the arrows.

As shown in Fig. 1, the stool of our invention comprises a base generally indicated by the numeral 16, an adjustable supporting column or support structure generally indicated by the numeral 17 and a seat generally indicated by the numeral 18.

The base 16 is preferably a casting 19 which comprises four arms 21 (Fig. 2) extending radially outward from

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an enlarged center portion of the casting indicated by the numeral 22 (Fig. 3). Each of the arms 21 has a machined surface 23 (Fig. 1) which constitutes a caster pad and is adapted to receive screws 24 for supporting a caster 26 in position. The casters are of the usual swivel type so that they will adjust themselves to the direction in which the user wishes to move the stool whereby the stool may be freely propelled over a floor area with a minimum of effort.

As shown in Fig. 3, the center portion 22 of the base casting is provided with a threaded central bore 27, the lower end of which is decreased in diameter to provide a shoulder 28. A tubular support column 29, the lower end of which is threaded, is rigidly secured in a vertical position by threading it into the base until the lower end thereof engages the shoulder 28.

The support column 29 has a collar 31 rigidly secured to its upper end which collar acts as a support for a locking lever or jaw 32. As shown in Fig. 6, the locking lever is recessed in a vertically extending slot formed in the collar 31. The locking lever or jaw includes a fulcrum pin 33 (Fig. 6), a cam element 34 and a detent 36 (Figs. 3 and 4). The fulcrum pin passes through a bore 30 formed in the collar (Fig. 6) and a bore formed in the locking lever. A spring 37 seated in the locking lever or jaw and bearing on collar 31 normally urges the locking lever in a counterclockwise direction about the fulcrum pin 33.

A releasing sleeve 38 extends slidably in concentric relation to the tubular support column 29 and has a release arm or ring 39 secured to the releasing sleeve 38. The release ring 39 includes a spider 40 by which the ring is rigidly secured, as indicated at 41, to the releasing sleeve 38.

Rigidly secured to the upper end of the releasing sleeve is an actuating collar 42 which normally is in engagement with the under side of the collar 31. The actuating collar 42 has an actuating cam 43 facing upon and in engagement with the cam 34 formed on the locking lever or locking jaw. The upper end of the tubular support column 29 has a rectangular cutout 35 (Fig. 3) to enable the locking lever to pivot freely.

Upon a downward movement of the release arm or ring 39, the releasing sleeve 38 slidably telescopes with respect to the tubular support column 29. The actuating cam 43 then moves downward with the releasing sleeve to exert a camming pressure on the cam 34 to pivot the locking lever or locking jaw 32 about the fulcrum pin 33 in a clockwise direction as shown in Fig. 3.

The bore 27 is provided with a second shoulder 44 for the reception of one end of a spring 46 which encircles the lower end of the releasing sleeve 38. The upper end of the spring 46 presses against the lower side of the spider 40 and normally urges the release ring and the releasing sleeve in an upward direction so that the parts occupy the position shown in Fig. 4. When the release ring 39 is pressed downwardly against the action of the spring 46, the parts are shifted to the position shown in Fig. 3.

The center post 47 is telescopically mounted with respect to the tubular support column 29 and has a sliding fit with the collar 31 which acts as a guide and supports the center post against lateral deflection. The center post 47 has a series of indentations 48 therein adapted to receive the detent 36 formed on the end of the locking lever or jaw. The indentations 48 are preferably in the form of annular grooves spaced along the center post whereby when the detent 36 is withdrawn, in the manner set forth above, the center post may be shifted telescopically with respect to the tubular support column to raise or lower the seat, generally indicated by the numeral 18, with respect to the base.

Referring now to Fig. 5, each of the grooves 48 is cut so that its upper margin or wall 49 extends downwardly and outwardly at an acute angle to the vertical.

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The end 51 of the detent 36 is cut at a corresponding angle so that the weight of the seat or the weight of the person seated thereon retains the detent in the groove against accidental displacement. The greater the weight on the seat the more securely the detent 36 is locked in the groove. It will further be noted, particularly from Fig. 6, that the collar 31 and the locking lever 32 present a smooth rounded exterior and the locking lever is free of protuberances likely to be bumped to release the locking parts accidentally.

The lower end of the center post 47 is decreased in diameter, as shown at 52, for the reception of a bumper 53 and a collar 54. The end of the center post is grooved to receive a snap ring 56 for holding the parts in position on the end of the center post. It will be appreciated that when the center post is raised the bumper will engage the end of locking lever 32 (Fig. 3) and will cushion the shock. Moreover, the rubber bumper, together with its collar 54, not only acts as a guide when the center post is being moved relative to the tubular support column but also, together with the collar 31, prevents lateral deflection of the center post with respect to the tubular support column 29.

Referring now to Fig. 4, the upper end of the support post has an annular collar part 57 adapted to receive a rubber bumper 58 which is confined between the collar 57 and a thrust cap or collar 59. The center post has a groove adapted to receive a snap ring 61. The rubber bumper 58 serves to cushion the shock when the seat is lowered and the bumper 58 engages the collar 31 carried on the upper end of the tubular support column.

Referring now to Fig. 1, the construction of the seat 18 per se constitutes no part of our present invention. It is sufficient to state that it includes suitable padding which may be covered by leather, as indicated at 62, the seat being carried by a seat support plate 63 and secured in a manner indicated at 64. If desired, the seat may be provided with a back rest. The seat support plate 63 includes a boss 66 which has a bore 67 therein (Fig. 4) for the reception of the upper end of the center post. The upper end of the center post has a groove 68 formed therein which receives the end of a limit screw 69 which fits somewhat loosely in the groove. The arrangement is such that the seat may be rotated on the upper end of the center post.

It will now be evident that the seat rotates on the upper end of the center post and that the release ring encircles the tubular support column so that it is readily accessible to the foot of the user. That is, no matter what angular position the seat is in with respect to the center post, the user may support the major part of his weight on the floor by one foot and depress the release ring 39 to unlatch the detent 36 and permit upward or downward adjustment of the seat under manual control. When the seat is in the desired adjusted position, the user may release the foot pressure on the release ring 39 so that the springs 46 and 37 will automatically restore the parts to the position shown in Fig. 4. The detent 36 under spring pressure will automatically snap into one of the grooves 48 to lock the center post in the desired position relative to the tubular support column 29.

As shown most clearly in Figs. 3, 4, 7 and 8, the base, generally indicated by the numeral 16, is provided with a pair of vertically extending bores 71 adapted to receive cam followers 72 which constitute legs for the support of friction feet or crutches, generally indicated by the numeral 73. In the drawings, we have shown two friction feet 73. This arrangement affords the stool greater security against mobility than a single friction foot would as the entire stool might tend to rotate on the foot unless the friction foot was of extremely large diameter. However, if desired, more than two friction feet may be employed.

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The upper end of the cam followers or legs 72 are enlarged as shown at 74, the enlarged ends being slidable in counterbores 76. A spring 77 has its lower end seated on the shoulder formed by the counterbore and the upper end of each of the springs presses against the under side of the enlarged end 74 of the leg 72. The upper face of each of the legs 72 constitutes a cam follower surface 78 which is acted upon by a cam as will presently appear.

The annular wall 50 constituting part of the base casting has a machined surface 79 upon which a hub 81 is rotatable. A collar 82 secured by screws to the base 16 has an annular lip which overlies the hub 81 and retains the hub in position on the casting against the action of springs 77.

The hub 81 has a series of spokes 83, in this case four, rigidly secured thereto and extending radially outward therefrom as most clearly shown in Fig. 2. The outer ends of the spokes 83 are turned downward at 84. A ring or wheel 86 is secured to the depending ends of the spokes. The ends of the spokes may be secured to the hub and to the wheel by soldering or in any other suitable manner.

As shown most clearly in Fig. 10 which is a view of the under side of the hub 81, a pair of cam surfaces 87 are provided which terminate in lands or flat spots 88 and 89. The land 88 is slightly depressed to form a slight shoulder 91 (see Figs. 7 and 8) so that ends 74 of the legs 72 tend to remain in the lands unless a deliberate rotational force is exerted on the hub. That is, when the user is seated on the stool and the stool is mobile, it is desirable that the ends 74 of the legs 72 shall remain in the lands should the feet of the user accidentally engage the spokes which might tend to rotate the wheel. With the construction described, except for an accidental and relatively forceful kicking of one of the spokes 83, the ends 74 of the legs 72 tend to remain for the most part in their desired position unless a deliberate rotational force is exerted on one of the spokes.

It will now be understood that a user, while seated on the stool, may render the stool mobile or immobile without leaving his seat and without touching his feet to the floor. In normal use of the stool, it will be most convenient for the user to rest his feet on the wheel 86. While he desires to render the stool immobile, that is, to shift the friction feet or crutches 73 from the position shown in Fig. 7 to that shown in Fig. 8, he will engage his foot with one of the spokes 83 and urge it in a clockwise direction, as viewed in Fig. 2. When the hub 81 is rotated, the ends 74 of the legs 72 ride out of the lands 88 and are urged in a downward direction against the action of the springs 77 to depress the friction feet or crutches 73 into engagement with the floor. At the end of the rotational movement the ends 74 ride onto lands 89. In this position of the parts, the stool is immobile and the dentist, surgeon or other user may work at his work place as for example performing work on a patient seated in a dental chair or reclining on a surgical table, without fear that the stool may slide out from under him. The friction feet or crutches positively anchor the stool to the floor.

When the user desires to move about the room for the purpose of obtaining articles, tools or materials located in a cabinet or other storage place in the room or office without leaving his seat, he rotates the wheel in a counterclockwise direction, as viewed in Fig. 2, which results in the shifting of the parts from the position shown in Fig. 8 to that shown in Fig. 7. The user may then propel himself about the room by his feet while remaining seated on the stool.

The friction feet, generally indicated by the numeral 73, are adjustable on the cam follower legs 72 to enable adjustment of the friction feet so that they are just slightly lower than a horizontal tangent line to the bottoms of the casters. The friction feet 73 comprise a core or

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locking foot 96, the lower end of which has a foot plate 97 rigidly secured thereto. The vertically extending margins of the locking foot 96 are provided with grooves 98 for the reception of corresponding grooves 99 formed in a friction member 101. The friction member 101 may be of rubber or other suitable friction material and comprises a hollow cap having a bottom 102 which may be slipped over the locking foot 96.

The cam follower leg 72 is provided with a diametrically extending bore for the reception of a tapered pin 103. The pin 103 serves as a backing for a washer 104 which is free on the cam follower leg 72. A spring 106, one end of which is seated on the washer 104, encircles the cam follower leg 72 and has its other end pressing against a locking collar 107. The locking collar has a protuberance or key 108 which fits into a keyway 109 extending longitudinally of the cam follower leg 72. The locking collar 107 may be freely shifted upward and downward with respect to the cam follower leg 72 but is restricted against rotation on the leg by the interfitting relation of the key 108 with the keyway 109.

The under side of the locking collar 107 has a recess therein into which a ball 111 is rigidly pressed. The upper face of the locking foot 96 has a series, in this case six, bored recesses 112 (Fig. 12) into any one of which the ball 111 may seat.

It will now be understood that the spring 106 presses on the collar 107 and retains the ball 111 in a selected recess 112. However, when it is desired to adjust the level of the friction feet 73, the locking collar 107 is moved upwardly along the leg to permit threading adjustment of the locking foot 96 with respect to the cam follower leg 72, both of which are threaded for this purpose as indicated at 113. When the desired position of adjustment is obtained, the locking collar 107 is released and the locking foot 96 rotated slightly until the ball 111 snaps into one of the bored recesses 112 under the pressure of the spring 106. The desired position of adjustment of the friction foot 73 is one in which, when the parts are in the position shown in Fig. 8, the bottom 102 of the friction foot engages the floor but does not remove the full weight from the casters. That is, in the proper position of adjustment, the weight of the user on the stool slightly compresses the bottoms 102 of the rubber feet 101 so that the weight of the user is on the friction feet 73 but also partly on the casters so as to provide a stable non-rocking support.

While we have shown and described the preferred form of our invention, it will be apparent that various changes may be made, particularly in the form and relation of parts, without departing from the spirit of our invention as set forth in the appended claims.

We claim:

1. A stool comprising, in combination, a base, a vertically extending tubular support member rigidly secured to the base, a center post member concentric with and movable longitudinally with respect to said tubular support, a seat secured on the upper end of said center post, a collar encircling the center post and carried by one of said members, the other of said members having a series of vertically spaced indentations therein, a locking device comprising a lever having a cam surface fulcrumed on said collar adapted to releasably interfit with said indentations, a release element carried by said stool in the form of a ring of relatively large diameter as compared to the diameter of said members and encircling said members and being adjacent the base and spaced below said collar, and releasing means having a cam surface interfitting with the cam surface on said lever, said releasing means being connected to said release element and extending upwardly along the support column and adapted to transmit a releasing force applied to said release element to said lever through said cam surfaces to withdraw said locking device from its interfitting relation with one of said indentations to enable vertical

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adjustment of said members with respect to each other to change the height of said seat.

2. A stool in accordance with claim 1 in which each of the indentations has a locking surface extending downwardly and outwardly at an acute angle to the vertical and the locking device has a locking surface extending at the same angle as the locking surfaces of said indentations.

3. A locking device for a stool wherein a support column member and a center post member extend vertically in concentric relation to each other comprising, in combination, a collar carried by one of said members, a series of indentations spaced vertically along the other of said members, a lever fulcrumed on the collar having a detent adapted to fit in said indentations to lock the support column and center post with respect to each other in a desired adjusted position, said lever having a cam surface and a release element movably carried by the stool having a cam surface adapted to engage the cam surface on the lever whereby when the release element is actuated a camming force is exerted between said cam surfaces to pivot said lever about said fulcrum and withdraw said detent from its fitting relation with one of said indentations.

4. A locking device in accordance with claim 3 in which the indentations and the detent have interengaging surfaces which extend downwardly and outwardly at an acute angle to the vertical.

5. A stool comprising, in combination, a base, a vertically extending tubular support secured to the base, a center post telescopically movable with respect to said tubular support and having a series of grooves encircling the center post and spaced longitudinally thereof, a seat rotatable on the upper end of said center post, a collar mounted on the upper end of the tubular support having a sliding fit with said center post, a locking lever fulcrumed on said collar and having a detent fitting selectively in any one of said grooves to support the center post in an adjusted position with respect to the tubular support, a sleeve extending downwardly from the collar in concentric relation to the tubular support and slidable thereon, a release element rigid with the sleeve, said re-

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lease element being in the form of a ring of relatively large diameter as compared to the diameter of the sleeve and being accessible to the feet of the user of the stool when seated thereon in any position of angular adjustment with respect to the center post, and cam means between said sleeve and said locking lever adapted to exert a camming force on said lever when a downward force is exerted on said ring to withdraw said detent from one of said grooves and enable telescopic adjustment of said center post with respect to the tubular support.

6. A stool comprising, in combination, a base, a tubular support rigidly secured to the base, a center post movable longitudinally with respect to the tubular support, a seat rotatably secured to the upper end of the center post, a member carried by said tubular support, means for releasably locking said member and center post with respect to each other to support said center post in an adjusted longitudinal position with respect to said tubular support, a release element movably carried by the stool adjacent the base and spaced below said member for operation by the user, means comprising a sleeve connected to said release element and extending upwardly concentric with the tubular support for transmitting a releasing force applied to said release element to said locking means to enable upward or downward adjustment of the center post with respect to the tubular support, said release element being in the form of an annular ring accessible to a user on the seat regardless of the position of rotation of the seat with respect to the base.

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