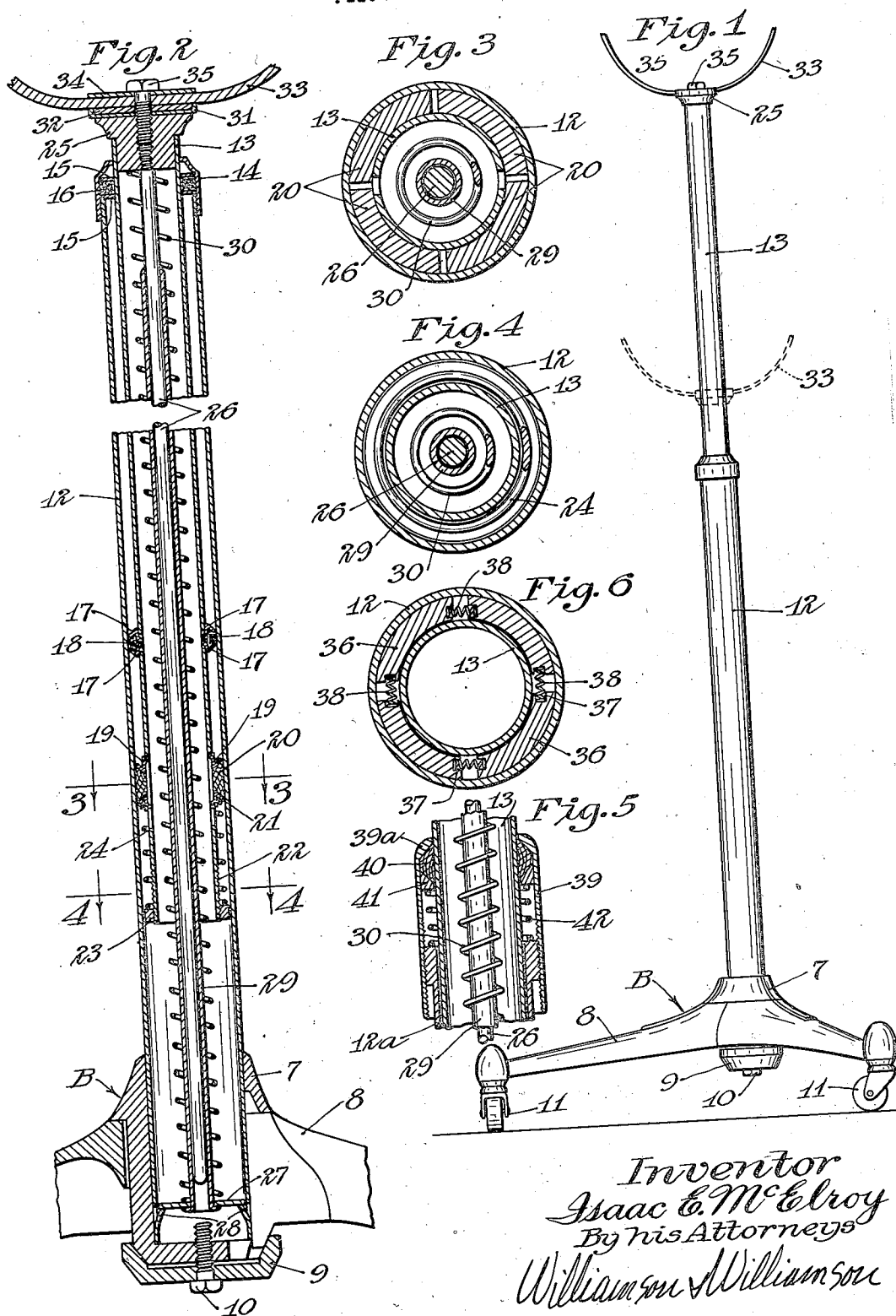


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ADJUSTABLE STANDARD
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ADJUSTABLE STANDARD

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2 Claims. (Cl. 248—2)

My invention relates to standards for wide general use, such as in supporting various appliances such as hair driers, therapeutic lamps, and devices of many other classes, and more particularly to standards which are adjustable in height.

Various adjustable standards now in use require set screws and other manually operated clamping devices to hold them in the desired position. The set screws and clamping devices make necessary an additional operation in changing the adjustment and detract from the symmetrical appearance of such standards. Some adjustable standards now in use are of such construction that it is necessary for the user to support or lift all or a very substantial part of the weight of the appliance supported thereby when readjusting the height of the standard.

It is an object of my invention to provide an adjustable standard of the class described wherein the movable portion of the standard is held in position by means other than set screws or clamps, such means being automatic and requiring no manual operation.

A further object of my invention is to provide an adjustable standard of the class described wherein the movable portion thereof together with the appliance carried thereby, may be moved upward or downward to any desired one of an infinite number of predetermined positions by the application of a slight amount of pressure in the direction of the desired movement, and wherein means, not requiring manual operation, is provided to automatically maintain the standard in the desired position.

A still further and more specific object is to provide an adjustable standard of the class described, wherein the weight of the movable portion thereof and the appliance carried thereby are counterbalanced by a spring constructed and proportioned to support said weight when the movable portion is at substantially its midposition and to permit only a small differential between said weight and the supporting capacity of the spring in other positions, and wherein frictional means, not requiring manual operation, is provided to absorb said differential and hence automatically act to hold the movable portion in any desired position.

These and other objects and advantages of the present invention will more fully appear from the following description, made in connection with the accompanying drawing, wherein like reference characters refer to the same or similar parts throughout the various views, and, in which,

Fig. 1 is a side view of my adjustable standard

in which the movable portion thereof is shown in a raised position in full lines and in a lowered position in dotted lines;

Fig. 2 is a vertical longitudinal section of my adjustable standard;

Fig. 3 is a cross sectional view taken along the lines 3—3 of Fig. 2, as indicated by the arrows;

Fig. 4 is a cross sectional view taken along the line 4—4 of Fig. 2, as indicated by the arrows;

Fig. 5 is a cross sectional view taken through a modified form of the circumferentially disposed frictional gripping elements; and

Fig. 6 is a vertical cross sectional view of another modified form of the circumferentially disposed frictional gripping elements.

Referring to the drawing, a base is shown comprising a cage 7, arms 8, a cup-shaped arm retaining member 9, a cap screw 10, and casters 11 constructed in accordance with my "Pedestal structure for standards" disclosed in United States Letters Patent No. 1,789,905. The lower end of a tubular casing 12 is rigidly secured within the cage 7 of the base B, said casing extending some distance upward from the top of the base. A tubular column 13 of somewhat smaller diameter than the interior diameter of the casing 12 is concentrically disposed within the casing and extends above the top end of the casing. A cap 14 provided at its upper end with an aperture adapted to loosely receive the tubular column 13 is threadedly engaged with the exterior of the upper end of the casing 12 to close the same. Within the cap 14 are two washers 15 with compressible packing material 16 therebetween, said washers encircling the tubular column and being abutted respectively by the top end of the tubular casing 12 and the top portion of the cap 14 to compress the material 16. On the medial portion of the tubular column 13 are two retaining rings 17 encircling said column and retaining absorbent material 18 therebetween, the absorbent material being in contact with the interior surface of the casing 12 and the rings being engaged with the column 13 to prevent longitudinal movement with respect thereto.

Substantially midway between the retaining ring 17 and the lower end of the column 13, frictional gripping means is provided. A retaining ring 19 is mounted on the column 13, said ring encircling the same and having diametrically located inwardly projecting ears projecting into apertures in said column to prevent longitudinal movement of the ring therealong. Immediately below the ring 19 is a series of circumferentially disposed radially movable fric-

tional gripping elements 20, formed of hard wood, fibre, rubber, die-cast blocks, or other suitable material. Immediately below the gripping elements is a longitudinally movable wedging ring 21. The shapes of the rings 19 and 21 and the gripping elements 20, as shown in Fig. 2, include sloping surfaces such that, when the wedging ring 21 is moved upwardly, wedging action will cause the gripping elements 20 to be forced radially outward against the interior surface of the casing 12. The lower end of column 13 is provided with external screw threads 22 which receive the adjusting nut 23. A helical compression and actuating spring 24 surrounds column 13 and is interposed between ring 21 and adjusting nut 23 to exert an upward pressure on said ring 21. The reduced lower end of a bracket supporting head 25, as shown, is secured within the upper end of column 13. A slide rod 26 is concentrically disposed within the interior of column 13 and is threadedly engaged at its upper end with bracket support 25 and depends to a point near the bottom end of tubular casing 12.

A disk 27 is disposed in the lower end of tubular casing 12 constrained against downward movement by supporting ears 28 and acting as a base of resistance for an elongated counter balancing spring 30. A vertical tube 29 is anchored at its lower end to disk 27 and extends axially within column 13 slidably surrounding the slide rod 26.

The elongated counter balancing spring 30 is of helical form and surrounds tube 29 and the upper portion of slide rod 26. The length of spring 30 is preferably, when fully distended, at least twice the height of the tubular casing 12 and over 50% longer than the maximum distance between the base of resistance 27 and the upper abutment (supporting head 25) and is at least four times the length, when fully distended, of the range of adjustability of the standard. The resistance of the counter balancing spring 30 to compression is preferably such in relation to the weight of the column 13 and the apparatus supported by the column that the apparatus will be counter balanced when the same is substantially midway between its upper and lower limits of adjustment, and when the same is more than 40% (preferably 50%) fully compressed. The problem of perfecting my structure so that the column 13 could be manually adjusted without undue effort and adequately held in all adjusted positions was a material one. To solve it the variation in spring pressure between the upper and lower limits of the standard must be minimized in order that relatively light frictional gripping means could be used. The proper range of the elongated coiled spring to the weight supported can perhaps be best expressed as follows:—

The resistance to compression of the spring utilized for the weight supported thereby is such that the weight is counter balanced when the spring is more than 40% fully compressed. The range of compression for all adjusted positions of the standard is between 30% and 70%. If the operating compression of the spring is not within the above defined range, then gripping means of such strength must be used that only with great difficulty can the standard be manually adjusted.

Immediately above the bracket supporting head 25 a cup-shaped washer 31 with an up-turned flange is located in concentric relation relative to

the head 25. Within the recess formed by the flange of the washer 31, a flat washer 32 is located. Above the flat washer is located the hub portion of a bracket 33. Above the hub portion is a flat washer 34. The washers 31, 32 and 34 and the bracket 33 are secured to the upper surface of the supporting head 25 by means of a cap screw 35 extending through aligned apertures in the elements and secured and threadedly engaged with the upper portion of the head 25.

Operation

The tubular column 13 supports the bracket supporting head 25, the bracket 33, and the appliance carried by the bracket and is longitudinally movable with respect to the casing 12. The spring 30 is of such strength that it will counter balance the weight of the above mentioned longitudinally movable parts including the appliance supported thereby, when the same are substantially midway between their upper and lower limits of movement. The spring 30 is made relatively long for the purpose of minimizing variation in spring pressure when elongation or shortening of the spring takes place due to movement of the movable parts away from their mid position. While the working range of spring compression previously set forth will produce successful results, I prefer to use a spring of such length and relation to the weight supported thereby that in fully elevated position the spring will be at least 40% compressed and in extreme lowered position the spring will be substantially 55% compressed. This results in the differential, between the weight supported and the pressure exerted by the spring, being very small in magnitude.

The frictional gripping elements 20, the retaining ring 19 and the actuating ring 21 are proportioned and the spring 24 is tensioned to provide sufficient gripping action to overcome the differential referred to above. The tension of the actuating spring 24 may be adjusted by means of the adjusting nut 23. When it is desired to readjust the height of the moving portions of the standard a pressure sufficient to overcome the gripping action of the gripping elements 20 is exerted in the direction of the desired movement, upon the bracket 33 or any other accessible part thereof. When the desired amount of movement has been effected, the pressure is removed and the gripping elements 20 act to maintain the moving portion of the standard in the desired position. It is obvious that the movable portion of the standard may be rotated to swing the appliance through any desired angle.

The packing 16 retained between the rings 15 serves to prevent entrance of dust to the interior of the standard and also serves to guide the column 13 and prevent undesirable noise when the same is moved. The tube 29 and the rod 26 cooperate to serve as a guide for the movable parts mentioned above and for the spring 30. The absorbent material 18 retained between the rings 17 is adapted to be saturated with oil for lubrication of the interior surface of the casing 12.

The modified form of the gripping means shown in Fig. 5 includes a cap 39 of different form than the cap 14 but mounted in the same position relative to the tubular casing 12a. In this form, the portion of the casing 12a immediately adjacent the upper end thereof has a greater external diameter than the main part of the casing, said portion carrying external screw threads for engagement with internal screw threads on the

cap 39. The upper end of the cap 39 includes an inclined portion 39a sloping inward and upward toward the column 13 to fit loosely about said column. Immediately below the inclined portion 39a, a circumferentially disposed group of gripping elements 40, formed of wood or other suitable material, are concentrically disposed in the annular space between the interior of the cap and the exterior of the column 13. The upper portions of the elements 40 are inclined inward and upward to conform to the shape of the inclined portion 39a and the lower portions of the elements are inclined inward and downward. Immediately below the group of gripping elements 40 is an actuated ring 41, the upper portion of which is inclined inward and downward to conform to the contour of the lower portion of the gripping elements and the lower portion of which is flat. Between the lower portion of the actuating ring 41 and the upper end of the casing 12a, a coiled compression spring 42 is disposed in the annular space between the interior surface of cap 39 and the exterior surface of the column 13. The upward pressure exerted by the spring against the actuating ring results in the ring being forced inward against the outer surface of the column 13. Adjustment of the spring pressure is had by screwing the cap 39 upward or downward.

In the modified form of the circumferentially disposed frictional gripping elements shown in Fig. 6, four segmental-shaped elements 36, similar to the gripping elements 20 shown in Figs. 2 and 3 except for having straight instead of inclined upper and lower sides, are disposed in the annular space defined by the retaining ring 19, the actuating ring 21, the column 13 and the casing 12 of Fig. 2. In this modification the flanges of the rings 19 and 21 are bent into horizontal position, the ring 21 is anchored to the column 13 in a similar manner to the ring 19, and the spring 24 is omitted. The opposing ends of each adjacent pair of elements 36 are provided with recesses 37 within which the ends of a helical compression spring 38 or other form of yieldable spreading means are retained. The springs 38 exert pressures which force the gripping elements 36 radially outward into contact with the interior surface of the casing 12.

It is apparent that I have invented a new and useful form of adjustable standard wherein the weight of the movable portion thereof and the appliance carried by the movable portion are counterbalanced to obviate the necessity for the user supporting or lifting the weight of the movable parts when making a readjustment in the

height of the standard. It is also apparent that I have invented a form of adjustable standard in which the movable portion is automatically retained in the desired position without the need of set screws or clamping devices and in which the need for operation of set screws or clamping devices by the user when readjusting the height thereof is obviated.

The device has been amply demonstrated in actual practice and has been found to be successful for the purposes intended.

From the foregoing description and the three forms of the invention illustrated it will be apparent that within the scope of my invention gripping means may be expanded outwardly to engage the outer tubular member, as shown in Fig. 2, or may be contracted inwardly to engage the inner tubular member or column, as shown in Fig. 5.

The term "gripping elements" appearing in the claims is used in its broad sense to include means for engaging, frictionally, or by interlocking means or otherwise, one of the elements for restraining movement thereof.

It will, of course, be understood that various changes may be made in the form, details, arrangement and proportions of the various parts without departing from the scope of my present invention.

What is claimed is:—

1. In an adjustable standard, a tubular support, an adjustable post slidably telescoped in said support, an elongated counterbalance spring mounted internally of said support and interposed between the lower portion of said support and said adjustable post, a series of gripping elements arranged circumferentially of and interposed between said post and said support, means for restricting said gripping elements against longitudinal movement on said post, and resilient means for urging said gripping elements radially for engagement with said support to yieldably restrain said post from movement in either direction.

2. In an adjustable standard, a tubular support, an adjustable post slidably telescoped in said support, an elongated counterbalance spring mounted internally of said support and interposed between the lower portion of said support and said adjustable post, resilient means expandable in a radial direction interposed between said post and said support for frictionally restraining said post against movement in either direction and adapted to internally grip said support.

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