

[54] **EXTENSIBLE LEG STRUCTURE FOR TRIPOD OR THE LIKE**
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Related U.S. Application Data

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[52] U.S. Cl.....**248/171, 287/3**
 [51] Int. Cl.....**F16m 11/38**
 [58] Field of Search.....248/46, 47, 150, 170, 171; 287/3, 96

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[57] **ABSTRACT**

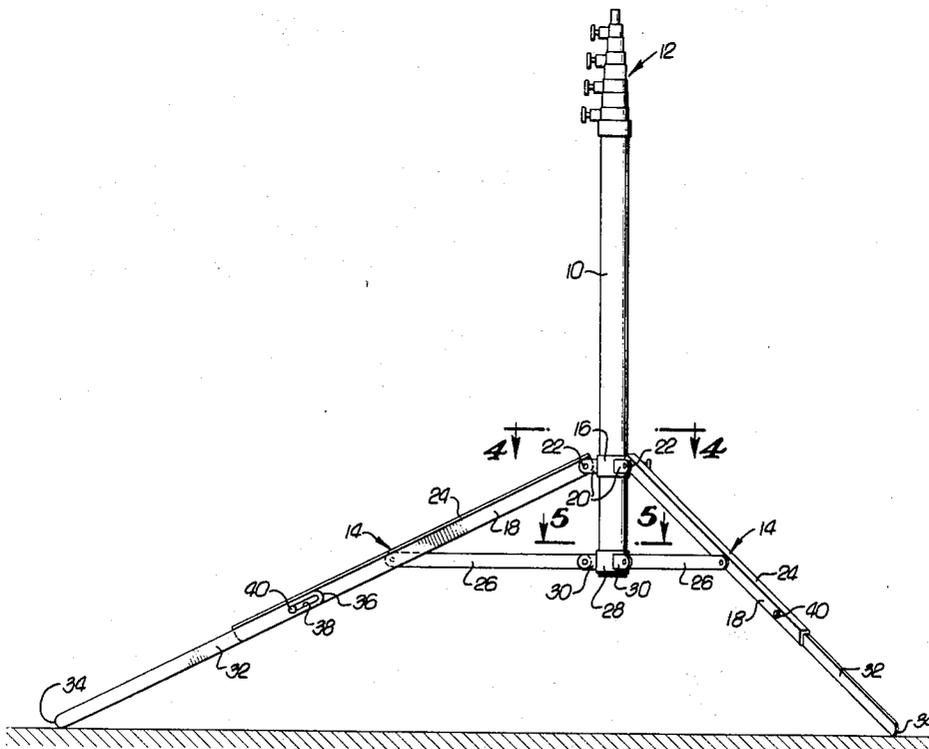
Each leg of the tripod carries a leg extension by the aid of a simple pin and slot connection. In the retracted position the leg extension allows the main leg to contact the floor. The leg extension is moved to operative projected position by a combination of simple angular and sliding movements. The leg extension can be, and normally is, locked against angular movement in both retracted and projected positions.

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4 Claims, 14 Drawing Figures



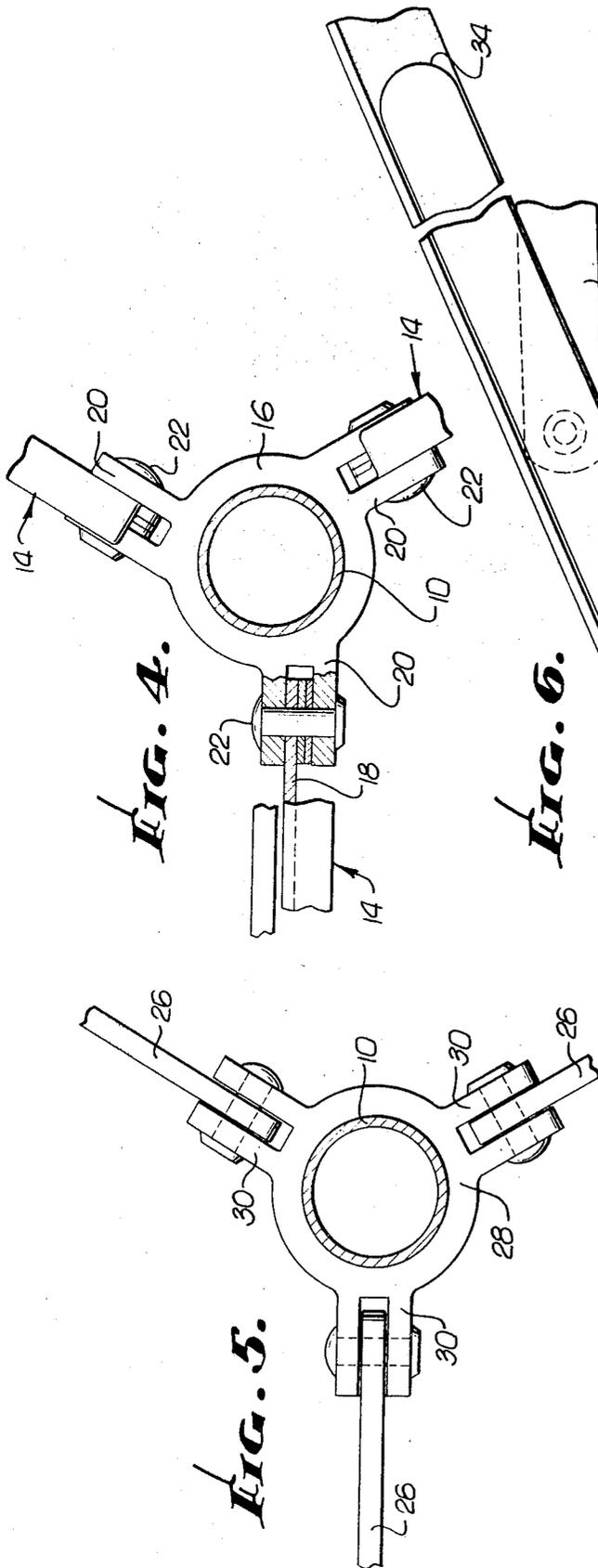


FIG. 4.

FIG. 6.

FIG. 5.

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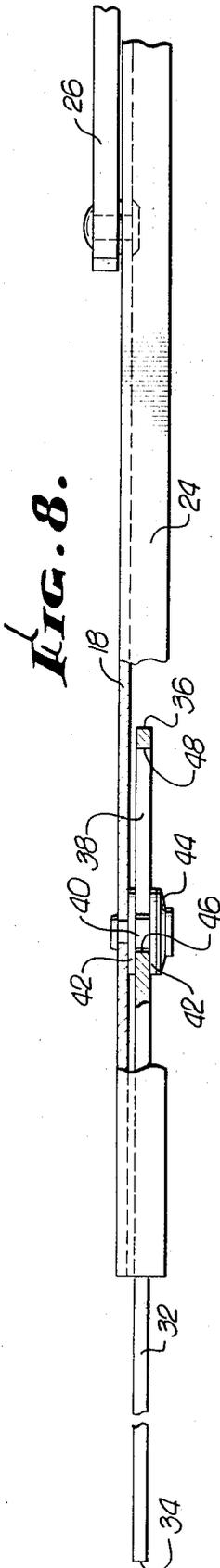


FIG. 8.

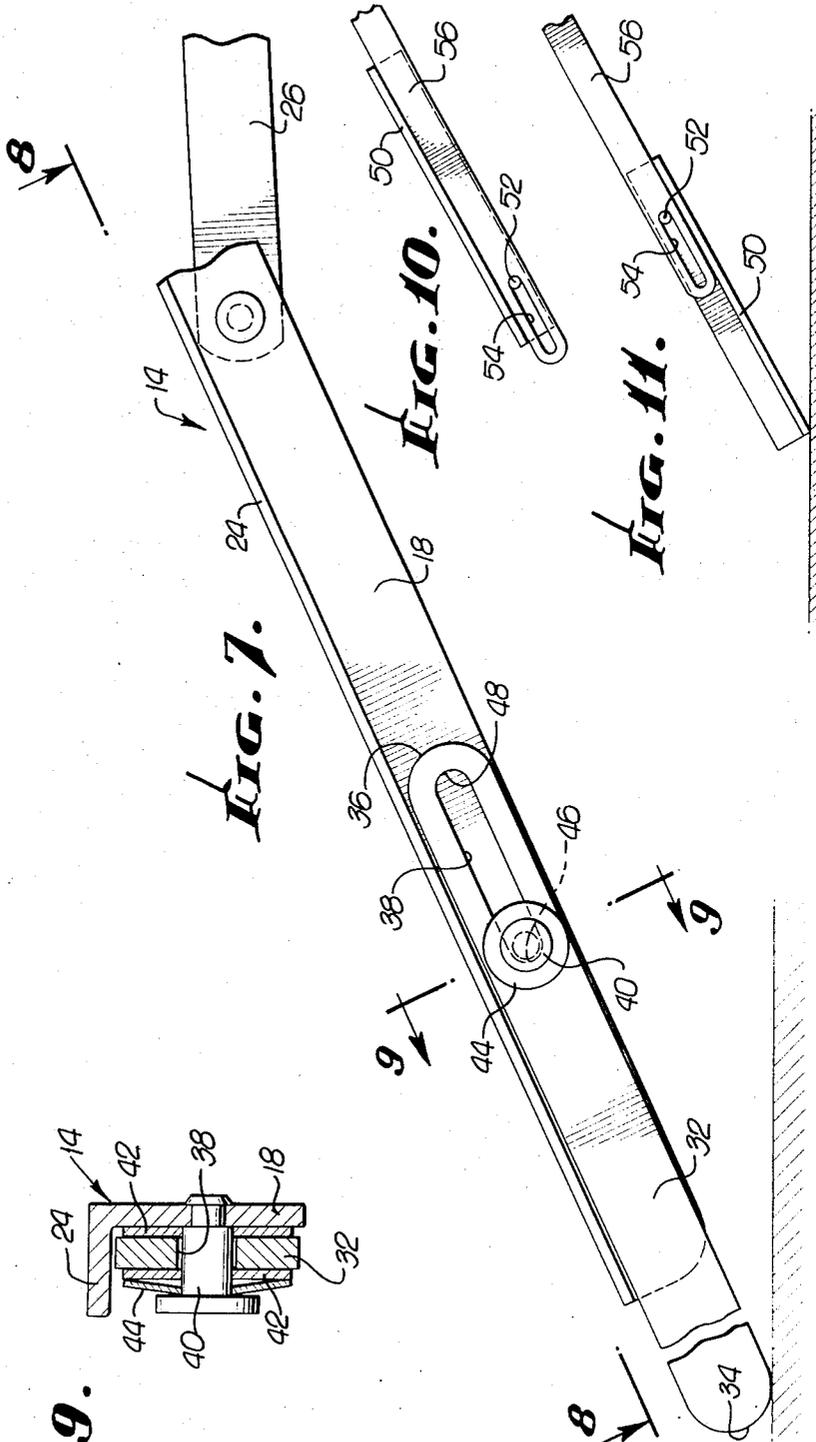


FIG. 7.

FIG. 10.

FIG. 11.

FIG. 9.

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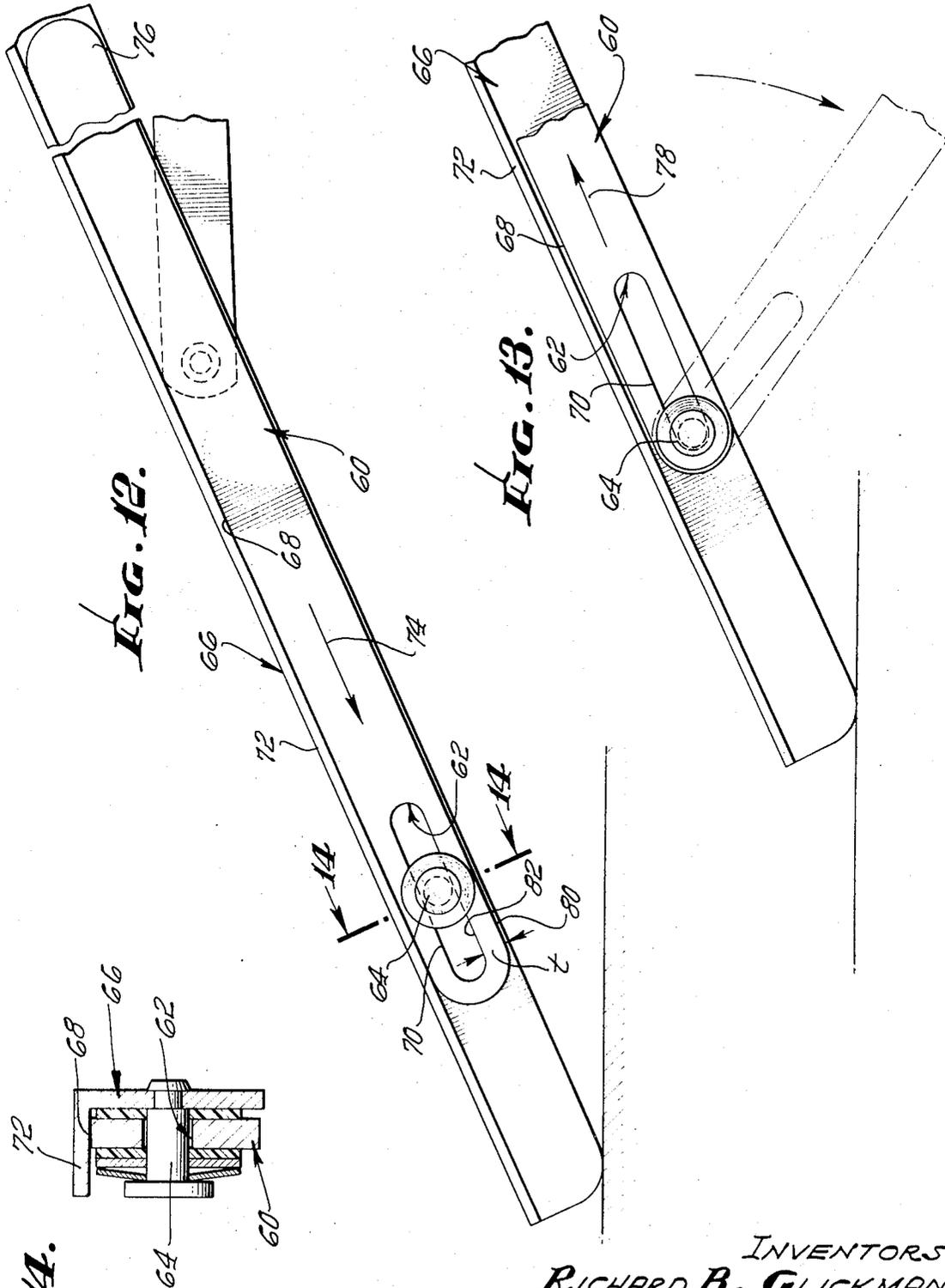


FIG. 14.

FIG. 12.

FIG. 13.

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EXTENSIBLE LEG STRUCTURE FOR TRIPOD OR THE LIKE

RELATED APPLICATIONS

This application is a continuation-in-part of application Ser. No. 37,158, filed May 14, 1970.

BACKGROUND OF THE INVENTION

This invention relates to portable standards, and particularly, to tripods having legs extending from a central column or hub. If the object supported by the standard is relatively low or close to the base plane, the circle defined by the three contact points of the legs can be small without sacrifice of stability. But if the object is to be supported at a high level, the base circle must be enlarged.

A wide variety of extensible leg structures have been proposed. Known devices are either cumbersome to manipulate, complicated, structurally weak in an extended position, vulnerable to damage of operational parts upon rough handling, or unreliable in terms of holding the extended position.

BRIEF SUMMARY OF THE INVENTION

In order to overcome the deficiencies in known devices, we provide a simple leg extension held against the main leg either in an extended or retracted position by the aid of a simple pin and slot connection. The leg extension is moved from one position to the other by a simple combination of longitudinal and angular movements. The structure is exceptionally sturdy, exceedingly simple, and altogether reliable.

BRIEF DESCRIPTION OF THE DRAWINGS

A detailed description of the invention will be made with reference to the accompanying drawings. These drawings, unless described as diagrammatic or unless otherwise indicated, are to scale.

FIG. 1 is an elevational view of a foldable tripod incorporating the present invention.

FIGS. 2 and 3 are side elevational views of the tripod shown in operative position, the extensible leg being retracted in FIG. 2 but projected in FIG. 3.

FIGS. 4 and 5 are enlarged sectional views taken along the planes corresponding to lines 4—4 and 5—5 of FIG. 3.

FIG. 6 is an enlarged fragmentary view of one of the tripod legs and illustrating by phantom lines the manner in which the extensible leg is moved from its retracted position.

FIG. 7 is an enlarged elevational view similar to FIG. 6 but showing the extensible leg in projected position.

FIG. 8 is a plan view of the tripod leg, a portion of the apparatus being broken away and shown in section.

FIG. 9 is an enlarged transverse sectional view showing the pin mounting for the extensible leg and taken along the plane corresponding to line 9—9 of FIG. 7.

FIGS. 10 and 11 are side elevational views similar to FIGS. 2 and 3 but of an alternate tripod leg, FIGS. 10 and 11 showing the leg extension in retracted and projected positions, respectively.

FIG. 12 is a fragmentary side elevational view of another modified tripod leg structure, the extensible leg being shown in its retracted position.

FIG. 13 is a view similar to FIG. 12 and showing, by phantom lines, the manner in which the extensible leg is moved to its extended position. FIG. 14 is an enlarged transverse sectional view showing the pin-mounting structure.

DETAILED DESCRIPTION

The following detailed description is of the best presently contemplated modes of carrying out the invention. This description is not to be taken in a limiting sense, but is made merely for the purpose of illustrating the general principles of the invention since the scope of the invention is best defined by the appended claims. Structural and operational characteristics attributed to forms of the invention first described shall also be attributed to forms later described, unless such characteristics are obviously inapplicable or unless specific exception is made.

The tripod includes a column 10 telescopically accommodating a plurality of vertical extension parts 12. Any desired structure may be supported as, for example, a luminaire.

Each of three tripod legs 14 is pivotally connected to a slidable collar 16 mounted on the column 10. Each leg 14, for purposes to be described hereinafter, has an angular cross-sectional configuration, as shown in FIG. 9. One flange 18 (FIG. 4) is connected to a corresponding clevis part 20 of the sliding collar 16 by a pin 22. The other flange 24 extends along the top edge of the flange 18.

Three braces 26 (FIGS. 2, 3 and 5) are pivotally connected at their inner ends to a collar 28 fixed to the bottom of the column 10. The collar 28 is generally similar to the collar 16 and provides clevises 30 for connection of the braces 26. The braces are pin-connected at their outer ends to the outside surfaces of the flanges 18 at points located intermediate the length of the corresponding legs 14 (see also FIG. 8).

In the upper position of the collar 16, as shown in FIG. 1, the braces 26 extend upwardly from the collar 28 alongside the column 10, and the legs 14 extend downwardly from the collar 16 alongside the column 10. When the legs 14 are pulled outwardly, the collar 16 slides downwardly to the limit of movement determined by the geometry of the braces and the legs. Reaction on the outer ends of the legs (FIG. 2) tends to keep the legs in their projected position. In order to return the legs to the folded position, the collar 16 is moved upwardly.

As shown in FIG. 4, the clevis parts 20 for the upper ends of the legs 14 are offset from a true radial position, whereas the clevises 30 for the ends of the braces 26 extend radially. This offset relationship prevents interference between the legs and the braces and compensates for the fact that the braces 26 are attached to the outside of the flange 18.

Each leg 14 carries a leg extension 32. The leg extension has a rectangular cross-sectional configuration, as shown in FIG. 9, and fits along the flange 18 beneath the top flange 24. Its ends are rounded at 34 and 36.

The leg extension is connected to its leg by a pin and slot connection. A slot 38 is provided adjacent one end 36 of the leg extension 32. The slot is located equidistant from the sides of the leg extension and extends longitudinally thereof. A pin 40 (FIG. 9) secured

to the leg flange 18 extends through the slot 38 and has a head that confines the extension against the flange. Bearing washers 42 are provided on opposite sides of the leg extension 32, and a Belleville spring 44 is interposed between the head of the pin 40 and the corresponding washer in order to impose a slight frictional restraint on the leg extension 32. The ends 46 and 48 of the slot 38 are rounded in order to conform to the configuration of the pin 40.

The leg extension 32, while positioned against the leg flange 18 and beneath the top flange 24, may be moved longitudinally to position the pin 40 either at the inner slot end 46 or at the outer slot end 48.

In the full-line position of FIG. 6, the leg extension 32 is positioned so that the pin 40 engages the inner slot end 46. In this position, the leg extension 32 cannot be moved angularly. However, by shifting the leg extension 32 upwardly, the pin 40 moves to engage the outer slot end 48. In this position, the leg extension 32 can swing in a clockwise direction, as viewed in FIG. 6, to project the leg extension. This movement may be continued for a full 180° at which point further movement is limited by the top flange 24. In such position, the leg extension end 34 is engageable with the floor. Any load imposed upon the extended leg is effectively transferred to the main leg 14 through the top flange 24.

In order to prevent the leg extension 32 from moving angularly should the column 10 be lifted, the leg extension 32 may be shifted longitudinally to the position shown in FIG. 7 wherein the pin 40 is again caused to engage the inner end 46 of the slot 38. In this position, the leg extension is prevented from moving angularly.

A simple, sturdy, extensible tripod leg structure is provided.

In the form of the invention shown in FIGS. 10 and 11, the leg extension 50 is of angular cross-sectional configuration and carries a pin 52 cooperable with a slot 54 formed at the end of a main leg structure 56. The main leg structure 56, in the present instance, is formed as a flat bar. The operation is the same as in the previous form except that the extensible leg, when retracted, is positioned on top of the main leg. In both forms the friction imposed by the Belleville spring holds the leg extension in position so that a positive, although slight force is required to move it.

In the form illustrated in FIGS. 12 through 14, the leg extension 60 has a slot 62 cooperable with a pin 64 mounted by the main leg 66. The slot 62, in the present instance, instead of being parallel to the top edge 68 of the leg extension 60, is slightly inclined thereto. The top edge 70 of the slot 62 and the top edge 68 of the leg extension 60 form a wedge that enters the space between the pin 64 and the top flange 72 of the main leg 66 as the leg extension 60 is moved downwardly, as indicated by the arrow 74. The wedge action secures the leg extension 60 in place. Thus, the upper end 76 of the leg extension is tightly held against the flange 72. Without the wedge arrangement, the top end 76 of the leg extension might tilt slightly downwardly allowing rattling and resulting in an objectionable appearance. The wedge arrangement remedies the problem. Moreover, the wedge is self-compensating for wear.

The slot 62 is designed so that a wedging arrangement is normally achieved when the pin is located substantially centrally along the length of the slot.

To extend the leg, the extension 60 is first moved upwardly as indicated by the arrow 78 in FIG. 13, so as to free the wedge. Thereupon, the leg extension can be rotated downwardly, as indicated in the phantom-line position. The thickness t of the leg extension from its lower surface 80 to the bottom surface 82 of the slot, is less than the clearance between the pin 64 and the flange 66 so that in the extended position, the leg extension is free to move longitudinally.

What is claimed is:

1. In a portable standard:

- a. a central column or hub;
- b. a plurality of leg members each having one end connected to the column or hub and having the other end adapted to contact the floor;
- c. a companion leg extension member for each of the leg members, one of the companion members being in the form of a bar having flanges extending substantially at right angles with respect to each other, and the other of said companion members being in the form of a bar of substantially rectangular cross-sectional configuration mounted to abut one of said flanges at the angular limits of movement of said leg extension member;
- d. a pin and slot connection between each leg extension member and its corresponding leg member;
- e. the pin part of said connection mounting said leg extension member for angular movement between a retracted position in which said leg member and leg extension member are in juxtaposed relationship and a projected position in which said leg extension member extends beyond said leg member;
- f. each slot having a surface forming a wedge releasable fitting between the corresponding pin and flange for holding the respective extension member tightly against the corresponding flange only when in the retracted position;
- g. the slot part of said connection mounting said leg extension member for relative sliding movement both at retracted and projected positions and between limits at one of which said leg extension is free to move angularly between its angular limits and at another of which said leg extension member is not allowed to move;
- h. said leg extension members having floor contacting ends remote from the corresponding pin and slot connections.

2. The portable standard as set forth in claim 1 together with friction means associated with the pin parts of said connections for restraining relative angular and longitudinal movement of said members.

3. In a portable standard:

- a. a central column or hub;
- b. a plurality of legs each having one end connected to the column or hub and having the other end adapted to contact the floor in a small diameter circle; said legs each having an angular cross section and comprising a pair of flanges extending substantially at right angles with respect to each other with one of the flanges extending substantially in a vertical plane and the other of the flanges extending along the top or at least in spaced relationship to the bottom of the said one of said flanges;

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- c. a leg extension for each of the legs and comprising a bar of substantially rectangular cross section, one end of said leg extension being rounded off; said leg extension having adjacent said one end a slot extending at a slight incline to the edge of said bar;
- d. a pin carried on the vertical flange of each of said legs and extending in the slot of the corresponding leg extension;
- e. the distance from one end of said slot to said rounded off end being less than the distance between said pin and said other flange so that each leg extension is movable from a retracted position in which a first elongated edge of said leg extension abuts the under surface of said other flange to a projected position in which the second edge of said leg extension abuts the under surface of said other flange, all upon longitudinal position-

- ing of the leg extension in one direction in which said pin is at said one end of said slot;
- f. said slot being inclined away from said bar first longitudinal edge to provide a wedging action eliminating rattling of said leg extension when in said retracted position, the maximum distance of said slot from said bar second longitudinal edge being less than the distance between said pin and said other flange so that said pin seats against the other end of said slot when said leg extension is in said projected position.
- 4. The portable standard as set forth in claim 3 together with friction means for restraining longitudinal movement of said leg extensions, comprising a spring surrounding each of said pins and urging the leg extension against the vertical flange of the corresponding leg.

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