Nov. 20, 1962 J. D. HOLDERMAN 3,064,932

ADJUSTABLE STAND FOR CAMERAS, LIGHTS AND THE LIKE

Filed July 1, 1960 7 Sheets-Sheet 1

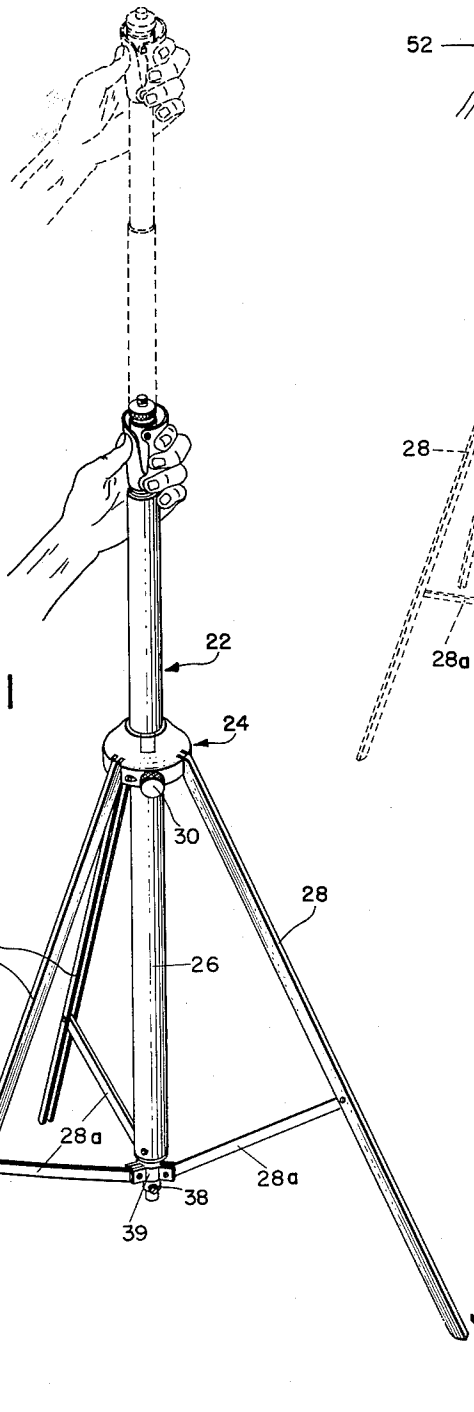


FIG. 1

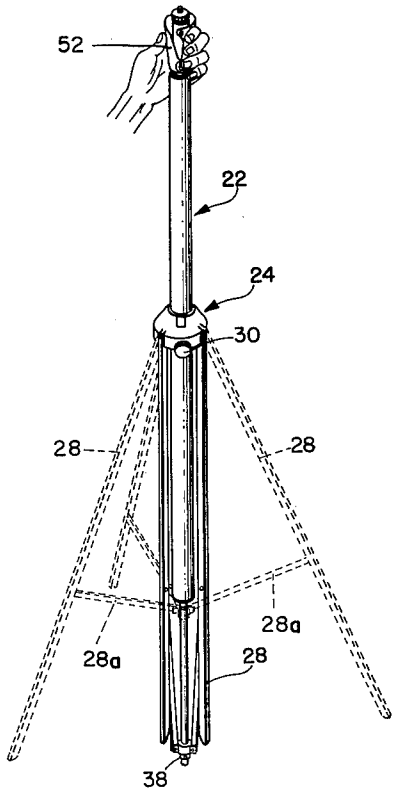


FIG. 2

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ADJUSTABLE STAND FOR CAMERAS, LIGHTS AND THE LIKE

Filed July 1, 1960 7 Sheets-Sheet 2

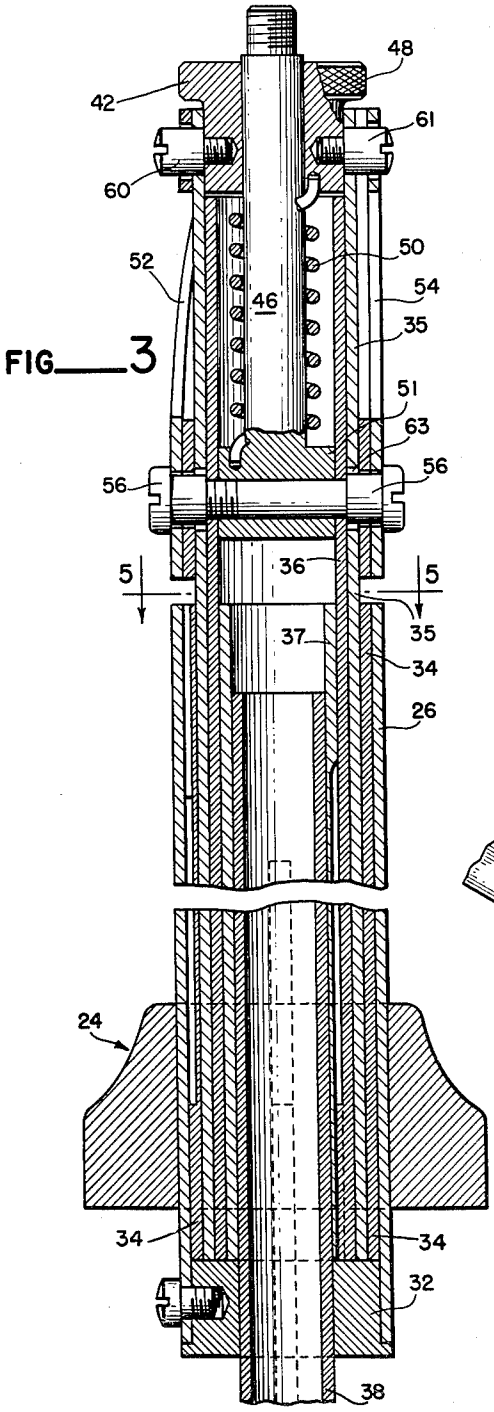


FIG. 3

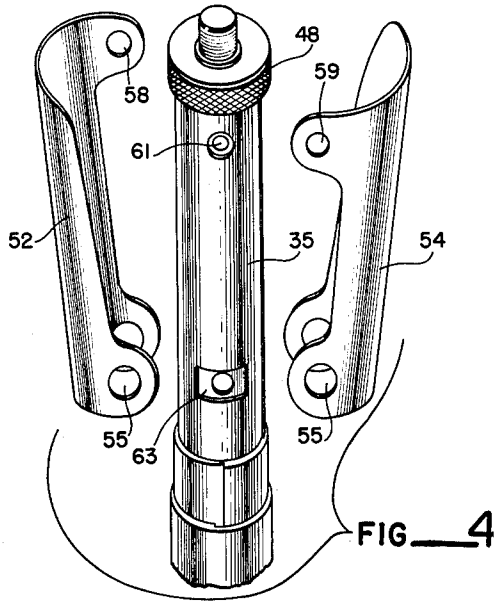


FIG. 4

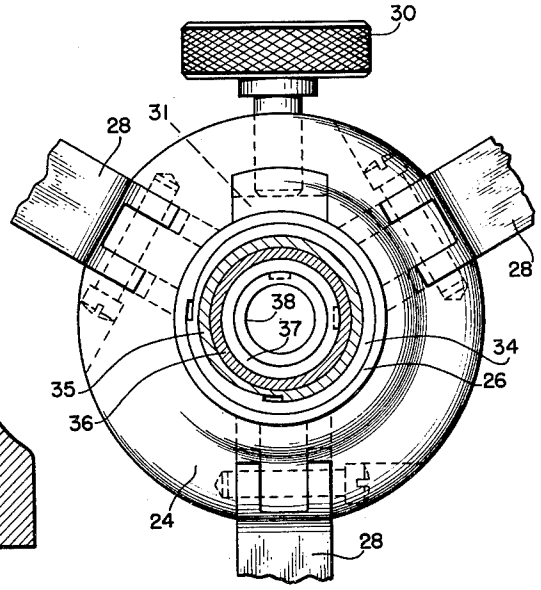


FIG. 5

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Nov. 20, 1962 J. D. HOLDERMAN 3,064,932

ADJUSTABLE STAND FOR CAMERAS, LIGHTS AND THE LIKE

Filed July 1, 1960 7 Sheets-Sheet 3

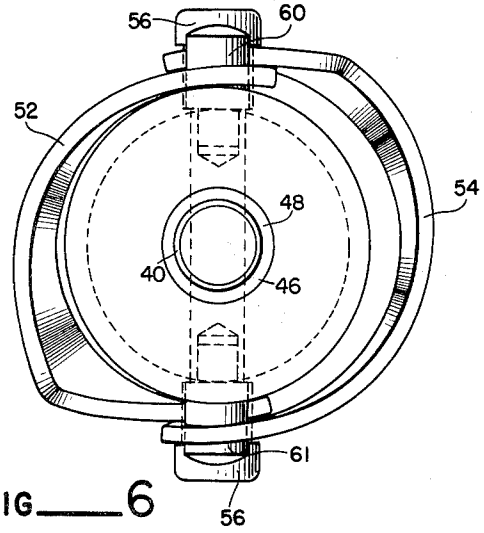


FIG. 6

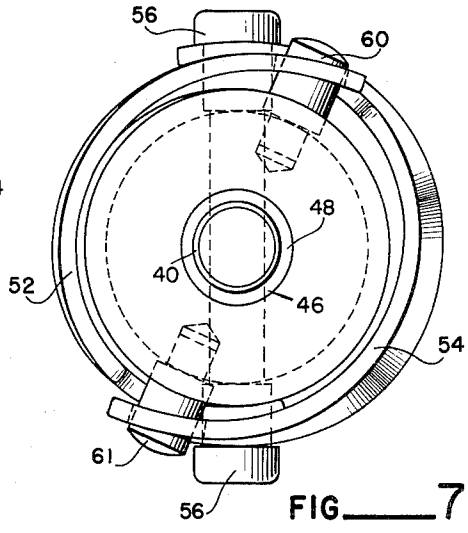


FIG. 7

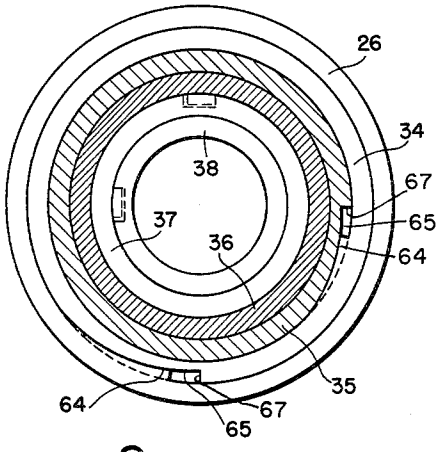


FIG. 8

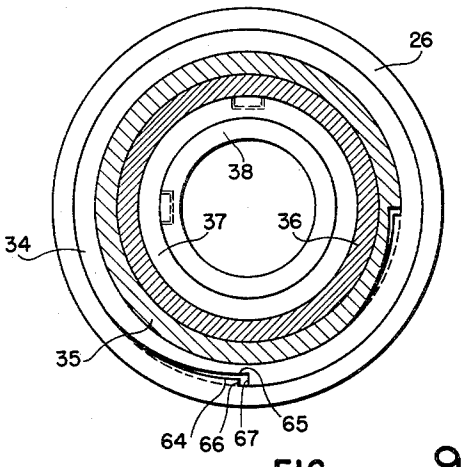


FIG. 9

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Nov. 20, 1962 J. D. HOLDERMAN 3,064,932

ADJUSTABLE STAND FOR CAMERAS, LIGHTS AND THE LIKE

Filed July 1, 1960 7 Sheets-Sheet 4

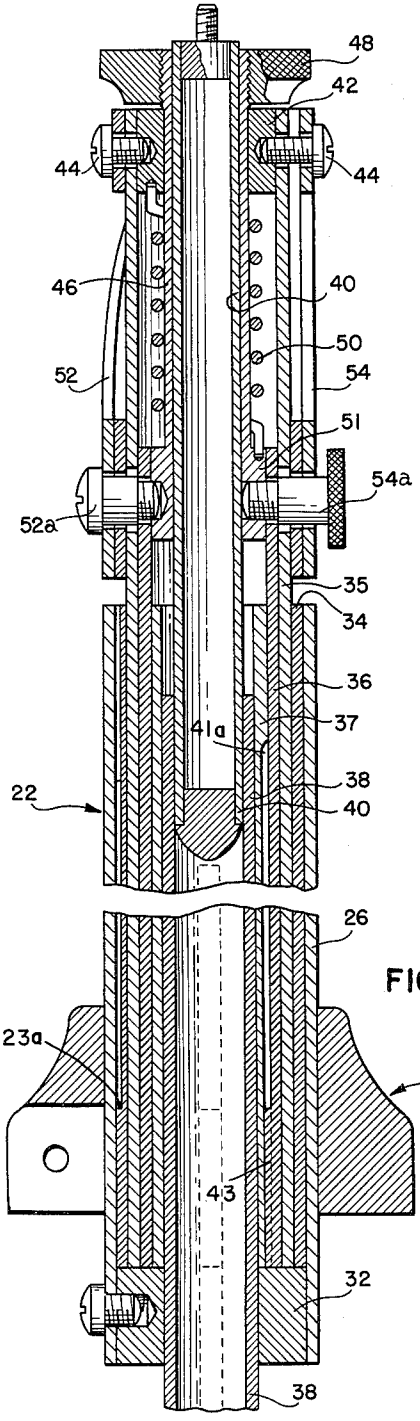


FIG. 10

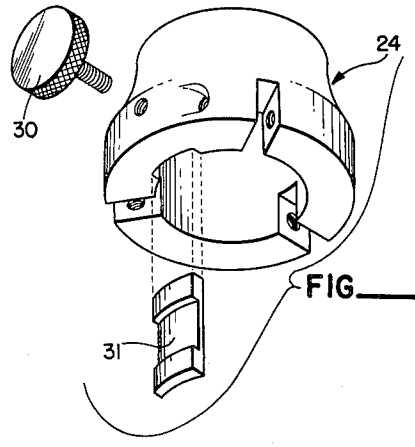


FIG. 11

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Nov. 20, 1962 J. D. HOLDERMAN 3,064,932

ADJUSTABLE STAND FOR CAMERAS, LIGHTS AND THE LIKE

Filed July 1, 1960 7 Sheets-Sheet 5

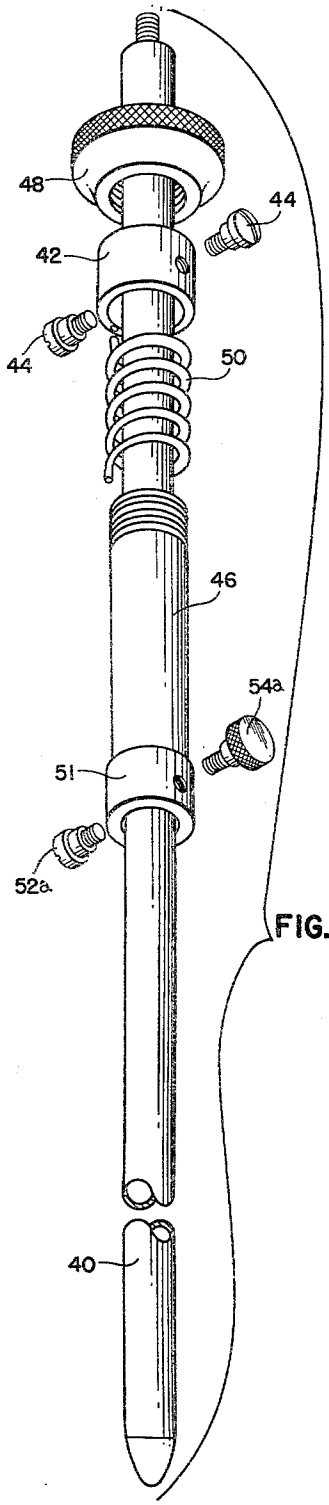


FIG. 14

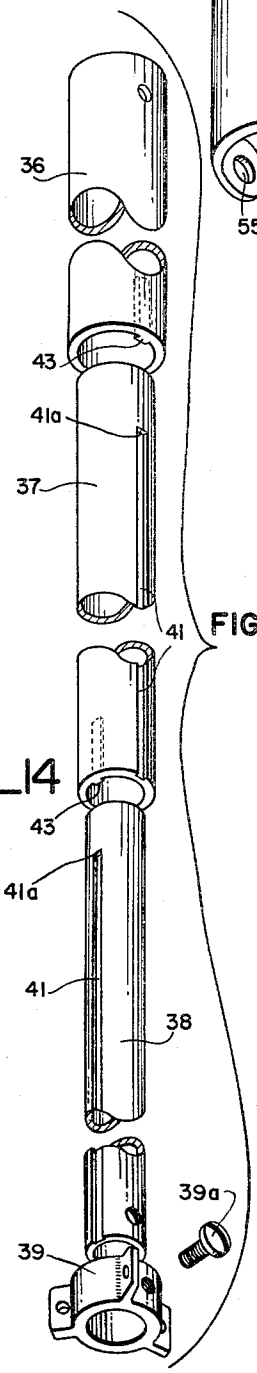


FIG. 13

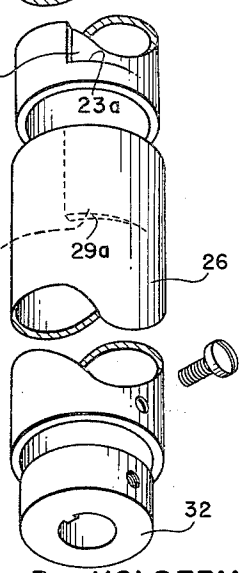
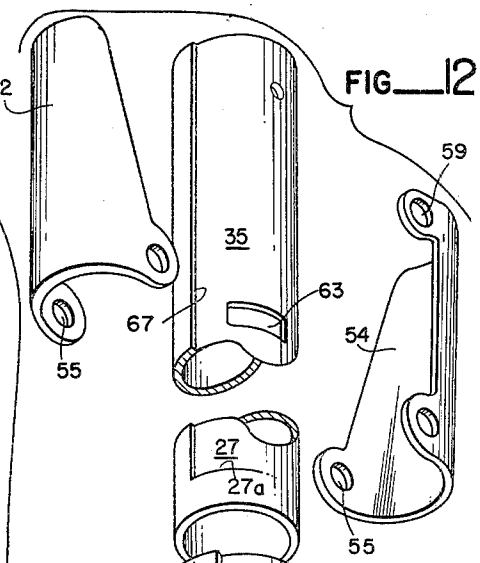


FIG. 12



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Nov. 20, 1962 J. D. HOLDERMAN 3,064,932

ADJUSTABLE STAND FOR CAMERAS, LIGHTS AND THE LIKE

Filed July 1, 1960 7 Sheets-Sheet 6

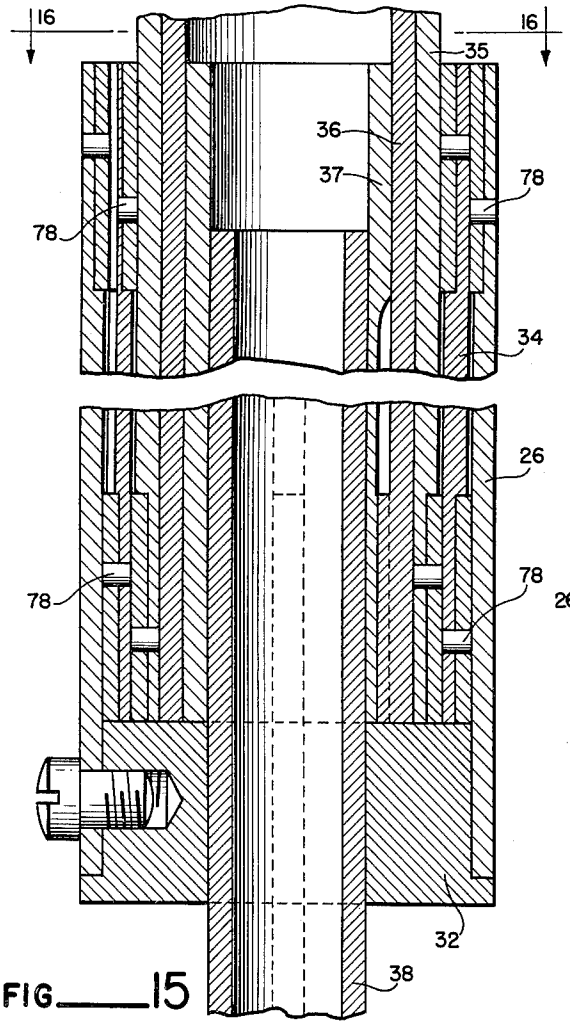


FIG. 15

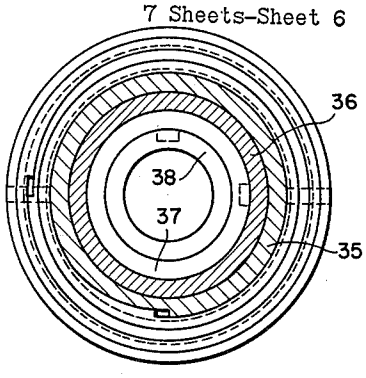


FIG. 16

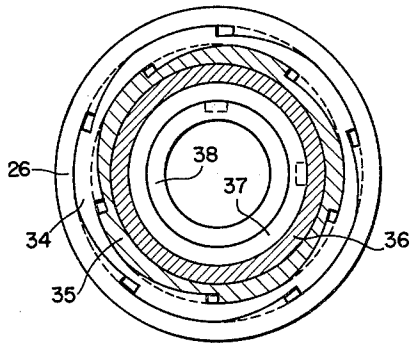


FIG. 17

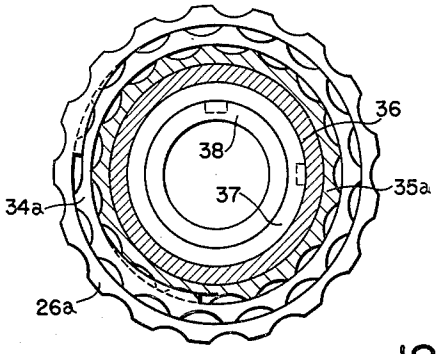


FIG. 18

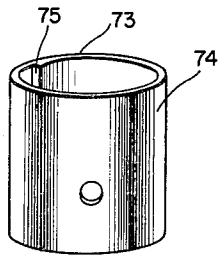


FIG. 19

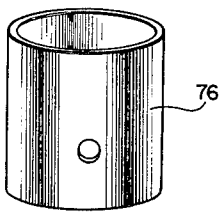


FIG. 20

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Nov. 20, 1962 J. D. HOLDERMAN 3,064,932

ADJUSTABLE STAND FOR CAMERAS, LIGHTS AND THE LIKE

Filed July 1, 1960 7 Sheets-Sheet 7

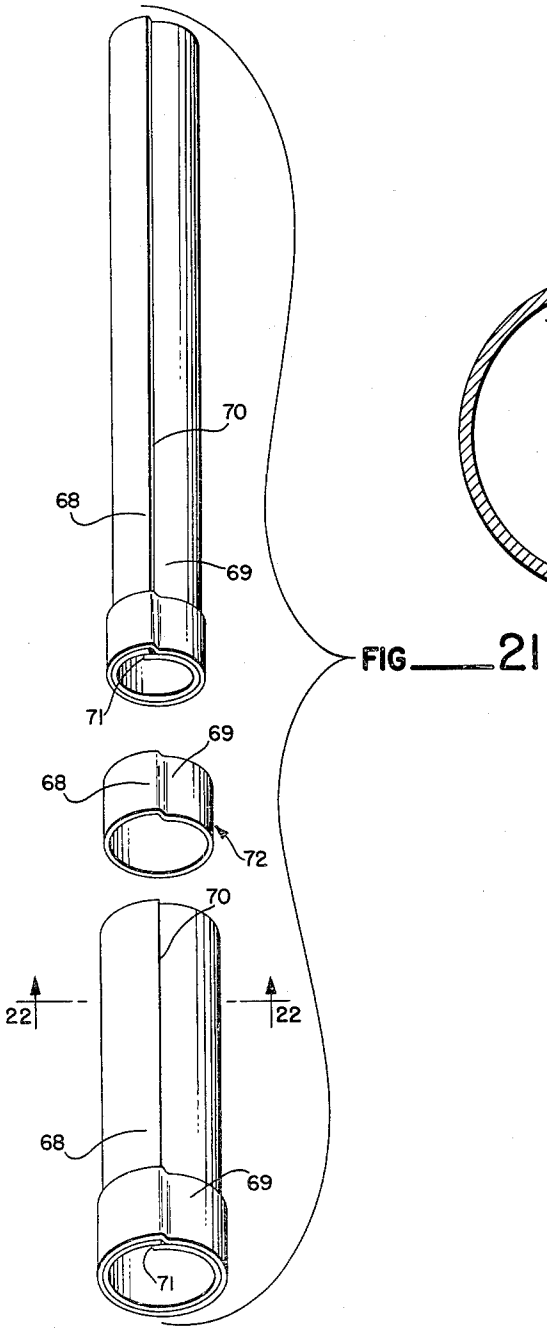


FIG. 21

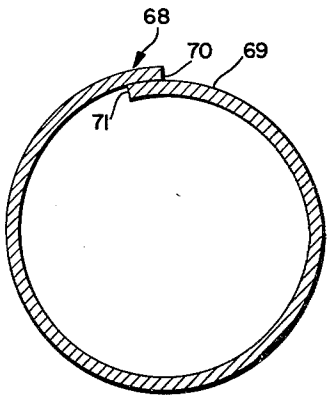


FIG. 22

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INVENTOR.

BY Smith & Tuck

United States Patent Office

3,064,932
Patented Nov. 20, 1962

3,064,932
ADJUSTABLE STAND FOR CAMERAS, LIGHTS AND THE LIKE

Jim D. Holderman, 1234½ McCadden Place, Hollywood 38, Calif.

Filed July 1, 1960, Ser. No. 40,438
5 Claims. (Cl. 248—171)

This present invention comprises the essential parts necessary to provide a stand for cameras, photographic lights and the like and is so arranged that a person may operate the stand either for its erection and vertical adjustment or for dismounting and folding it, with the use of only one hand.

The photographic industry has supplied the commercial photographer and advanced amateurs with a tremendout wealth of available equipment so that in order to maintain his position the average photographer must make use of this equipment in part or he cannot achieve the level of photographic work which is now expected from the present day photographer. The photographer often has difficult conditions imposed upon him. He is often barred from an area except at the time when pictures are to be taken so that he must prepare for the exposures of his photographic material in a minimum of time. These restrictions are not arbitrarily placed upon the photographer but result from the fact that photographs may be desired for instance at a reception or a wedding or some social gathering where in deference to the assembled guests photographers are not wanted except at a period specifically set aside for them. The photographer who follows industrial developments many times can only take his pictures when a specific machine is stopped in its normal functioning and this can usually be accomplished only when a certain definite run has been completed and then his pictures must be very quickly taken in order that he does not impose too long a shut-down of production. These enumerated conditions and many analogous ones mean therefore that a photographer must transport his equipment to the scene of the picture and then be able to get his equipment quickly in position for properly lighting his subject and for supporting his photographic equipment. Too often conditions are such that he cannot lay his expensive camera equipment down while he adjusts the other required elements. It is to meet these common and arduous conditions that I have produced my present photographic stand which may be used to support the illuminating lights or the camera itself, or the equipment may be used in duplicate to serve both purposes. Under these conditions, with one arm and hand employed in carrying equipment, it is very desirable to have a stand or tripod arrangement that can be fully put in place and adjusted for height with only the remaining one hand. It is therefore believed that the present invention is a marked advancement in the photographic field.

The principal object of this present invention therefore is to provide a camera or photographic light stand which can be set up in an adjusted position, or may be taken down and returned to a carrying position by the use of only one hand of the operator.

A further object of this invention is to provide a stand or adjustable height having telescopic tubular sections which are locked in their adjusted position by spring action, and which in turn are released for adjusting, elevating or reducing to the carrying position by means of a lever which unburdens the locked tubes of the spring pressure.

A further object of this invention is to provide an adjustable height column made up of a plurality of pairs of concentrically disposed tubes.

A further object of this invention is to provide a adjustable supporting column embodying a plurality of tubes which are locked in their adjusted position by a partial revolution of one of the concentric tubes with respect to its engaging tube.

A further object of this invention is to provide an adjustable height stand employing a tripod base which may be extended to operating position by pressure on the apex or juncture of the legs and which will fold into the carrying position by gravity when the same is raised from a supporting surface and the operating levers are depressed.

Further objects, advantages and capabilities will be apparent from the description and disclosure in the drawings, or may be comprehended or are inherent in the device.

In the drawings:

FIGURE 1 is a perspective view showing a stand made after the teachings of this present invention and illustrating, in dashed lines, one adjusted position of the head of the same.

FIGURE 2 is a perspective view of the stand of FIGURE 1 showing the manner in which the tripod legs are collapsed when lifted from a supporting surface. The legs are shown in dashed lines in an intermediate position during this operation.

FIGURE 3 is a vertical, fragmentary, sectional view taken along the axis of the tubular section of my stand.

FIGURE 4 illustrates, in perspective and also in exploded relationship, the handles which operate to unlock the securing means of my tripod.

FIGURE 5 is a cross-sectional view in plan taken along the line 5—5 of FIGURE 3.

FIGURE 6 is a top plan view of the tubular portion of my stand and showing the operating levers of FIGURE 4 in both their normal positions.

FIGURE 7 is a view similar to FIGURE 6 but showing ing the operating levers in their compressed positions.

FIGURE 8 is a cross sectional view taken along the line 5—5 of FIGURE 3 and illustrating my tube construction in its locked position.

FIGURE 9 is a view similar to FIGURE 8 and illustrating my tube construction in its unlocked position.

FIGURE 10 is an enlarged, fragmentary, sectional view taken along the vertical axis of my stand similar to FIGURE 3 and showing a modified form of the main tubular structures with the same broken away in the central portion.

FIGURE 11 is a perspective view taken from a low position illustrating the sliding cross head member, also illustrated in FIGURE 5, to which the tripod legs are pivotably secured.

FIGURE 12 is a perspective view, with the parts broken away in part and in exploded relationship, illustrating one satisfactory type of tubing locking means.

FIGURE 13 is a bracketed view in perspective, illustrating all of the coacting parts forming one tubing assembly which uses an arrangement of keys and keyways.

FIGURE 14 illustrates a typical arrangement of inner and upper parts adapted to provide the spring operating means for locking my extension tube means and shown with an extra upwardly extending tube.

FIGURE 15 is a fragmentary vertical sectional view on an enlarged scale of a modified form similar to FIGURE 3 but illustrating the use of sleeves secured to the ends of the tubes to provide clearance throughout the length of the tubes.

FIGURE 16 is a typical cross section taken along the line 16—16 of FIGURE 15.

FIGURE 17 is a cross sectional view as though taken along the line 16—16 of FIGURE 15 but showing a modi-

fied form wherein a plurality of cam grooves and locking means are shown.

FIGURE 18 is a cross sectional view as though taken along the line **16—16** of FIGURE 15 and illustrating a longitudinal fluting to provide clearance and insure a freer working of the tubes.

FIGURE 19 is a perspective view of the type of bushing employed inside of the tubes of FIGURE 15.

FIGURE 20 is a perspective view of the type of bushing employed on the outside of the leg tubes of FIGURE 15.

FIGURE 21 is a bracketed perspective view illustrating an inexpensive construction for my tripod tube members together with the modified sleeve structure for use therewith.

FIGURE 22 is a cross sectional view, on an enlarged scale, taken along the plane of line **22—22** of FIGURE 21.

In the drawings, throughout which similar reference characters indicate like parts, **22** designates generally the telescoping assembly of extension tubes. The sliding crosshead member **24** is disposed to slide on the outer tube **26** of group 22 and has the upper ends of the tripod legs **28** pivotably secured thereto. Struts *29a* are pivotably secured to each of legs **28** intermediate their ends, and to the lower end of tube **38** by means of pivot fitting **39**. A lock screw **30** which bears on pressure block **31** is disposed to lock crosshead **24** in its adjusted position. As illustrated in FIGURE 3 tubes **35** and **36** provide an operating tube assembly.

In the drawings three generally modified forms of the invention are shown in FIGURES 3, 10 and 15. These different species of the invention are best adapted to various ways of making the interconnecting and interlocking telescoping tubes. Cost normally dictates the form of manufacture employed.

Referring to FIGURE 3 and to FIGURES 5, 8 and 9, a coacting curved wedge **64** and a similarly curved cam groove **65** are employed to lock the coacting pair of tubes together by a limited rotation thereof. The amount of rotation is indicated in the two extreme positions as shown in FIGURES 8 and 9 and these terminate at the upper end or lower end as illustrated in FIGURE 12 to prevent separation of the tubes as they are extended.

Referring to FIGURE 10 a key **43** and keyway **41** is employed and these are proportioned so as to either run out at the end or to stop short of the end as illustrated in FIGURE 13 in order to provide end abutments to prevent the tubes separating as they are extended. In both of these forms it must be possible to assemble the locking means and as illustrated in FIGURES 12 and 13 this can be done. Referring to FIGURE 15, sleeves **74** and **76** are doweled to the proper end of the tubes which are much heavier than previously shown, as would be necessary in large tripods.

The telescopic tube combinations have outer or inner tubes secured to the lower element as blocks **32** or the tripod leg strut anchor **39** and screw *39a* which secures it to the innermost tube **38** as shown in FIGURE 13. Three struts **29** are provided each pivotably secured at one end to said crosshead block and at their other ends to said stop block for securing said legs in fixed adjusted positions.

The outer tube **26** forms a sheath for the balance of the tube assembly and is provided at its lower end with a stop block **32** which forms a collapsed position abutment for the inner tubes **34**, **35**, **36**, **37**, and **38**. The upper end of the telescopic tube assembly **22** is provided with an interior terminal block **42** which is secured to the upwardly extending tube **35** by suitable screws **44** in the form shown in FIGURE 10. Encircling the upper portion of the central extra extension tube **40** is an anchor means **46** for the upper end of a torsion spring **50** which may be tubular or a rod as shown in FIGURES 10 and 3 respectively. Spring anchor means **46** is threadedly secured at its upper end to the camera or light platform **48**, and the torsion spring **50** providing spring bias which serves as the means for locking the various telescopic tubes to each other at all times except when counter rotation effort is applied to spring **50**. It will be noted that spring **50** is anchored into block **42** shown in FIGURE 10 at its upper end and in an extended flange portion **51** of the lower end of tube **46**. Screws *52a* and *54a* pass through the upper end of tube **36** and the actuating tube **35** and are threadedly secured in the flange portion **51** of spring anchor **46**.

The main purpose of spring **50** is to provide a biasing means which will normally rotate each tube a small amount, except tube **36**, and lock the various telescopic tubes together and maintain them in the locked position during periods of use. To set up the tripod or to take it down for transportation means must be provided for neutralizing the biasing effect of spring **50** and this has been conveniently arranged by the means illustrated in FIGURES 3, 4, 6, 7, 10 and 12. The manual energizing means for relieving the spring biasing of spring **50** is accomplished by the two hand grip levers **52** and **54** which are diametrically positioned from each other. These are pivoted at their lower end by means of openings **55** which are a snug working fit on the through bolt **56** in the form shown in FIGURE 3 or by screws *52a* and *54a* in the form shown in FIGURE 10. The upper ends have only one opening as **58** and **59** and these preferably engage respectively detent-like screws **60** and **61** secured to terminal block **42**, illustrated in FIGURE 3.

Referring particularly to FIGURE 3 it is to be noted that spring **50** is anchored in member **51** at its lower end and member **51** is held in a nonrotative manner with tube **36** which has a rectangular opening **63** on each side to accept bolt **56**. Grip members **52** and **54** are loosely pivoted and positioned at their upper ends on detents **60** and **61** so that there is room for reasonable angular displacement between openings **58** and **59** and detents **60** and **61**. The detent bolts **60** and **61** are fixedly secured to top fitting **48** or in the form shown in FIGURE 10 to the top fitting **42** by screws **44**.

Reference is now made to FIGURES 6 and 7. In FIGURE 6 the hand grip members **52** and **54** are shown in their free position and under the biasing of spring **50**. When, however, the hand grip members are squeezed together as by the hand of the operator in picking up the device, the effect shown in FIGURE 7 is achieved. Here it will be noted that the axis of detents **60** and **61** has been appreciably displaced from the axis of bolt **56**, as will be noted by comparison with FIGURE 6. It is for this reason that, because of the angularity that is notable in FIGURE 7, there must be reasonable clearance in the engagement of detents **60** and **61** with grip members **52** and **54**. The effect of this change of axis is to rotate tube **35** with respect to tube **36** and to thus, in effect, physically uncoil the torsion spring **50** for a small amount. This has the effect of unlocking the various tubes that have been locked together by the spring biasing and the tubes are therefore free to slide with respect to each other for the range of adjustment provided, thus making it possible to achieve the main purpose of this invention, namely that merely by the control of the position of hand grip members **52** and **54** by one hand the operator has the ability to set up his tripod or to take it down all with one hand. It will be necessary of course to have relief in other positions so that this rotary movement between tubes **35** and **36** can be achieved and to this end it is necessary to provide segmental openings in tube **35** as indicated at **63**. In order to achieve the locking effect between the various tubes the amount of rotation is not great, as will be noted particularly from a study of FIGURES 8 and 9 wherein FIGURE 8 shows the locked position and FIGURE 9 the released position.

A rather wide range of locking means is available as is well illustrated in the prior art and the form nominated

for use is best determined after the method of making the various tubes has been decided upon. Cost and durability are normally the determining fatcors which reflect the materials used and the methods employed. There are several methods available; one is the extrusion of the tubes which means that curved wedge **64** and cam groove **65** can be provided throughout the length of the tubes at no additional cost. It is however necessary to employ the softer metals that can be formed under the extrusion opertaion. For certain uses it is possible to provide these pieces as die castings.

Where cost is a matter of real concern as it is in most manufactured items, the form of tube shown in FIGURES 21 and 22 illustrates one of the most desirable constructions in that sheet materials are used and the tube formed from the flat sheet with a definite overlap as at **68** normally provides a camming surface **69** and abutments at **70** and **71** respectively.

The form shown in FIGURE 12 employs three tubes. Innermost is tube **35** having the transverse slot **63**, the longitudinal shoulder **67**, the cam surface **27** and a transversely positioned abutment **27***a* at the lower end of the tube.

Tube **34**, of increased diameter, has an upper interior transverse abutment **25***a* for coaction with abutment **27***a* to prevent separation of the tubes during their extension. Tube **34** further is provided with a longitudinal shoulder **67**, the cam surface **23** and a lower exterior transverse abutment **23***a*.

Tube **26** of still further increased diameter has an interior transverse abutment **29***a* for coaction with abutment **23***a* to prevent separation of the tubes in their extension. Finally tube **26** has a stop block secured inside its lower end by a suitable screw means.

The transverse abutment is provided in the form shown in FIGURE 13 by the cam keyway **41** and the end **41***a* thereof. In the form of FIGURE 15 collars **74** and **76** provide transverse abutments for similar use. Depressing levers **52** and **54** by grasping them with one hand, as shown in FIGURES 1 and 2 compresses or winds up spring **50** and rotates the two, three tube assemblies, toward each other although the inner tube key-way mechanism as generally illustrated in FIGURES 3, 5, 8 and 9 which show coacting cam surfaces **64** and **65**, remain substantially stationary. The lever action rotates the outer tubes and moves the wedge or cam surfaces out of their locked positions, the shoulder **66** of the wedge abuts the shoulder **67** of the cam **64** and thus transmits the rotation to the next tube **35**. In a like manner all the tubes of all the leg assemblies are unlocked by a single application of pressure to levers **52** and **54**, but the tubes do not necessarily move together synchronized as pairs either rotationally or vertically. Tubes **35** and **36** will move vertically together as a pair because they are both connected to bolt **56**. However, tubes **34** and **37** will in general move together as a pair throughout the maximum extension but if head **48** is extended to only one extension, tube **34** may come up while tube **37** may remain down. The vertical movement of the pairs of tubes may not always be exactly together, but the vertical movement of the outer assemblies as a group will always coincide with the vertical movement of the inner assemblies as a group.

The basic accomplishment is: with an inner and outer assembly of interconnecting and interlocking telescoping tubes a user can lock or unlock all the tubes with one action administered from one end of the entire assembly.

Referring to FIGURES 15 through 20, a modified form of cam means **73** and abutment means **75** is illustrated in which two types of sleeves **74** and **76** are secured to the ends of the telescoping tubes. These sleeves form the cams and abutment portion of the tubes and are secured thereto by dowels **78**. The various sleeves, whether secured inside the tube as is sleeve **72** of FIGURE 21, when in place, or outside the tube, are positioned or are of a thickness to insure clearance between the tube walls. In FIGURE 18 tubes **26***a*, **34***a* and **35***a* are exteriorly fluted to reduce surface contact with each other and to provide a collecting space for dirt which will be contained therein until there is an opportunity to clean the tubes.

FIGURES 12, 13 and 21 illustrate three different forms of abutments and cams which are satisfactory in use and which respond to spring biasing by spring **50** to normally cause them to lock against endwise movement. The form of FIGURE 12 has cam surfaces **23**, **25**, **27** and **29** machined into the metal tubing with the respective abutment surfaces **23***a*, **25***a*, **27***a* and **29***a*. The form of FIGURE 13 employs coacting keyways **41** with the closed end **41***a* providing an abutment and keys **43** and the form of FIGURE 21 has the tube rolled from sheet metal to provide the cam surfaces **69**, the interior abutments **71** and the exterior abutments **70**.

Manner of Use

When the stand is collapsed as in carrying, and the legs **28** are in the folded position it may be put into use by merely squeezing together the two levers **52** and **54** at the top of the stand and the stand can be put into immediate operation. In the beginning it may be assumed that the weight of the stand is supported by resting it upon the floor. Then with the levers depressed, bearing downward will cause the legs to extend so as to form a tripod base to support the structure. With the locking levers **52** and **54** still depressed, the user then merely raises the head of the unit to the desired level and the various tubes, which are concentrically disposed, will be free to extend to the desired height. When the desired adjustment is effected, the locked levers are then released and spring means **50** within the upper portion of the tripod will turn the engaged and actuating tube to successively lock the various parts in their extended and adjusted position. To collapse the stand the locking levers **52** and **54** are pressed inwardly, unlocking the various tubes and the head lowered to its lowermost position and with the locking levers still depressed, the entire unit is raised from the floor and the legs **28** will fold of their own weight so that the device is restored to its transport or carrying position.

It follows that if a tube is allowed to telescope inside of the other and not allowed to rotate, then forced rotation will set up a binding action between the tubes and they will no longer slide with respect to each other. Control over the release and locking of the tubes is achieved by having a spring **50** so placed as to tend to position the tubes rotatively and with exterior means, as handles **52** and **54**, which, when squeezed together will overcome the effect of the spring and permit the free sliding of the tubes.

Having the locking of the tubes controllable by handles **52** and **54** makes it possible to put the stand into use or to fold it up for carrying by using one hand only, thus achieving the principal object of this invention.

It is believed that it will be clearly apparent from the above description and the disclosure in the drawings that the invention comprehends a novel construction of an adjustable stand for cameras, photographic lights and the like.

Having thus disclosed by invention, I claim:

1. A tripod stand for cameras, comprising: an outer tube providing a sheath for a plurality of telescopic and retractable tubes; a stop block secured in the lower end of said sheath; a crosshead member slidably disposed on said sheath and having locking means for securing it in adjusted position on said sheath; three legs pivotably secured to said crosshead member; three struts pivotably secured in spaced relationship at one end to said crosshead block and at their other ends to said stop block; a pair of telescopic tubes slidably and rotatably secured inside said sheath; the innermost tube of said pair serving as an actuating tube; said pair of tubes having coacting longitudinal rotary locking means and transversely dis-

posed abutments at one end of each tube to limit the extension thereof; a torsion spring, for spring biasing said tubes into their locked position, operatively secured at the upper end of said tripod and internally thereof; a spring anchor means disposed internally of the tubes to be actuated and provided with a spring anchor opening for the lower end of said torsion spring; an interior terminal block secured to the upper end of said actuating tube and providing an anchor for the upper end of said torsion spring; a pair of diametrically positioned hand grip levers pivotably secured to said spring anchor means at their lower ends and to the upper end of said actuating tube and said interior terminal block at their upper ends and said handgrip levers, when gripped, overcoming the spring biases and unlocking said longitudinal rotary locking means.

2. An adjustable stand for cameras, photographic lights and the like which is arranged so that it may be set up for use or taken down, through the use of one hand only, comprising: an inner and outer assembly of two or more interconnecting and interlocking telescoping extension tubes, each disposed and implemented for use as part of a coacting group, said tubes having coacting transverse abutments and longitudinal cam means providing limited rotation between a locked and a released position; means for rotating and locking all the tubes of a group into a multiple extension supporting assembly; a crosshead disposed to encircle and slide on said assembly of tubes and having peripherally and radially disposed pivot means; three tripod legs pivotably secured to said pivot means; means to limit the spread of said legs; manually operated means for overcoming said means for locking said tubes and controlling the rotation of said tubes, said manually operated means for controlling the rotation of said tubes having a torsion spring coaxially disposed with said tubes and providing rotative force to bias said tubes into their locked relationship and diametrically disposed coacting hand grip members at the upper end of said tube assembly and adapted to unlock said tubes when pressed together by relieving the tubes of the said spring biasing and permitting longitudinal movement of the tubes.

3. An adjustable stand for cameras, photographic lights and the like which is arranged so that it may be set up for use or taken down, through the use of one hand only, comprising: an inner and outer assembly of two or more interconnecting and interlocking telescoping extension tubes, each disposed and implemented for use as part of a coacting group, said tubes having coacting transverse abutments and longitudinal cam means providing limited rotation between a locked and a released position; means for rotating and locking all the tubes of a group into a multiple extension supporting assembly, a crosshead disposed to encircle and slide on said assembly of tubes and having peripherally and radially disposed pivot means;

three tripod legs pivotably secured to said pivot means; strut means to limit the spread of said legs; manually operated means for overcoming said means for locking said tubes and controlling the rotation of said tubes, said manually operated means to control the rotation of said tubes having spring means operatively disposed with said tubes and providing rotative force to bias said tubes into their locked relationship and hand-grip means at the upper end of said tube assembly for unlocking said tubes when pressed inwardly and thereby relieving the tubes of the biasing provided by said spring means.

4. Means for operating a camera tripod, comprising: an operating tube assembly having an inner tube and an outer tube having means for locking the same together on partial rotation; a pivot bolt positioned by said inner tube; a torsion spring within said inner tube disposed to bias said tube assembly to its locked position and secured at its upper end to means engaging said outer tube and secured at its lower end to means operatively engaging said inner tube; means provided in said outer tube permitting the rotation of said bolt in a horizontal plane without moving said outer tube; lever means pivoted at its lower end to said inner tube engaging means and at its upper end operatively secured to said outer tube, thus facilitating the rotation of said outer tube with respect to said inner tube when the upper end of said lever means is pressed toward the longitudinal axis of said tube assembly to unlock the same.

5. Means for operating a camera tripod, comprising: an operating tube assembly having an inner tube and an outer tube; an interior terminal block secured to said outer tube; a pivot bolt positioned by said inner tube; a torsion spring within said inner tube disposed to bias said tube assembly to its locked position and secured at its upper end to said terminal block and secured at its lower end to means operatively engaging said pivot bolt; openings provided in said outer tube permitting the rotation of said bolt in a horizontal plane without moving said outer tube; lever means pivoted at one end to said bolt and at its other end operatively secured to said outer tube, thus facilitating the rotation of said outer tube with respect to said inner tube when the upper end of said lever means is pressed toward the longitudinal axis of said tube assembly to unlock the same.

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