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[54] **JACKING DEVICE**

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[52] **U.S. Cl.** ..... **254/108,** 248/354 P
[51] **Int. Cl.** **B66f 1/04**
[58] **Field of Search** ..... 254/105–111, 254/133 A, 133.1; 248/354 P

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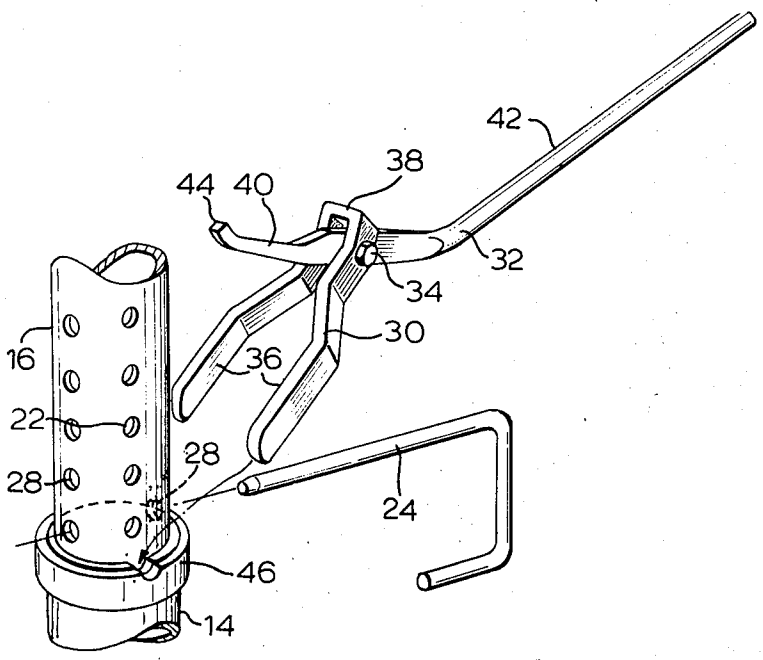
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[57] **ABSTRACT**

A jacking device consisting of first and second tubular members which are telescoped with respect to one another and provided with a simple and inexpensive means for adjusting the length thereof. The device also includes a third tubular member telescoped with respect to the first tubular member and a spring for urging the third tubular member to an extended position with respect to the first tubular member. Simplicity in the adjustment means is achieved by forming a series of longitudinally spaced passages in the second tubular member and forming a support shoulder which includes an annular collar on the other tubular member at one end thereof. The adjustment device consists of a bracket and a lever arm pivotally mounted on the bracket. In use, one end of the lever arm is located within one of the longitudinal passages of the second tubular member and the free end of the bracket is mounted on the support shoulder of the first tubular member. The lever arm is then pivoted about the fulcrum mounting on the bracket to cause the free end of the lever arm to engage the second tubular member and to move the second tubular member outwardly with respect to the first tubular member, the bracket acting as a support for the fulcrum point of the lever arm. A simple mounting for the third telescopic member is achieved by forming rearwardly inwardly directed waist portions in the first tubular member and the third tubular member and locating a pair of discs outwardly from each waist member and retaining each disc against a predetermined movement with respect to one another by extending a bolt therebetween.

11 Claims, 7 Drawing Figures



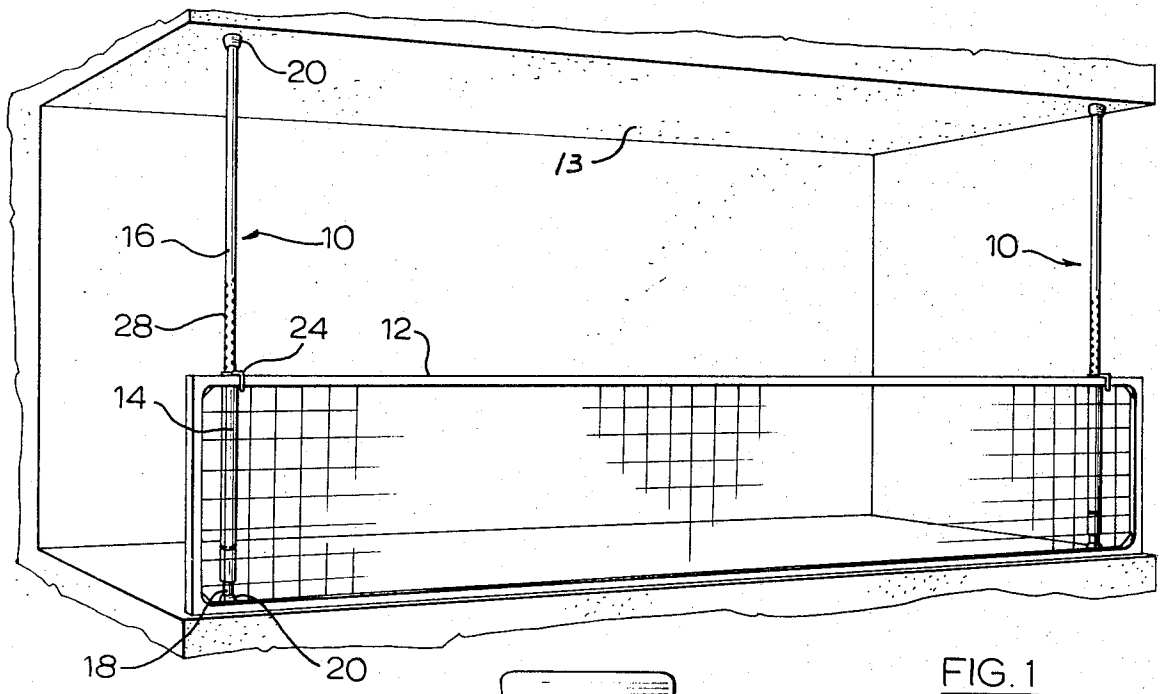


FIG. 1

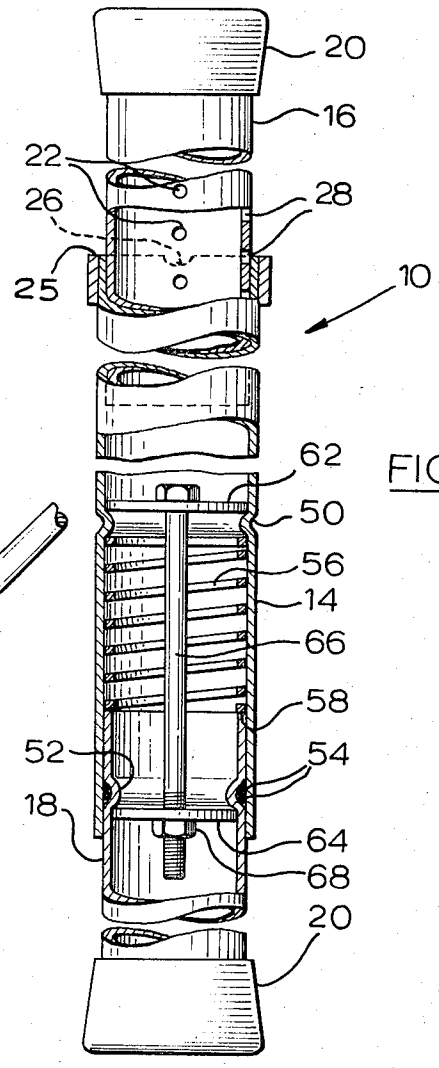


FIG. 2

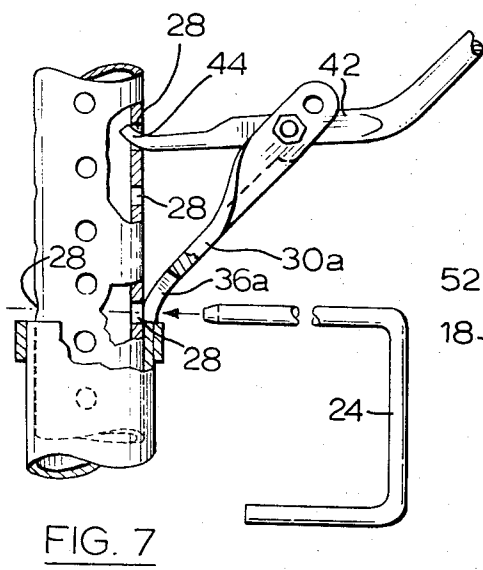
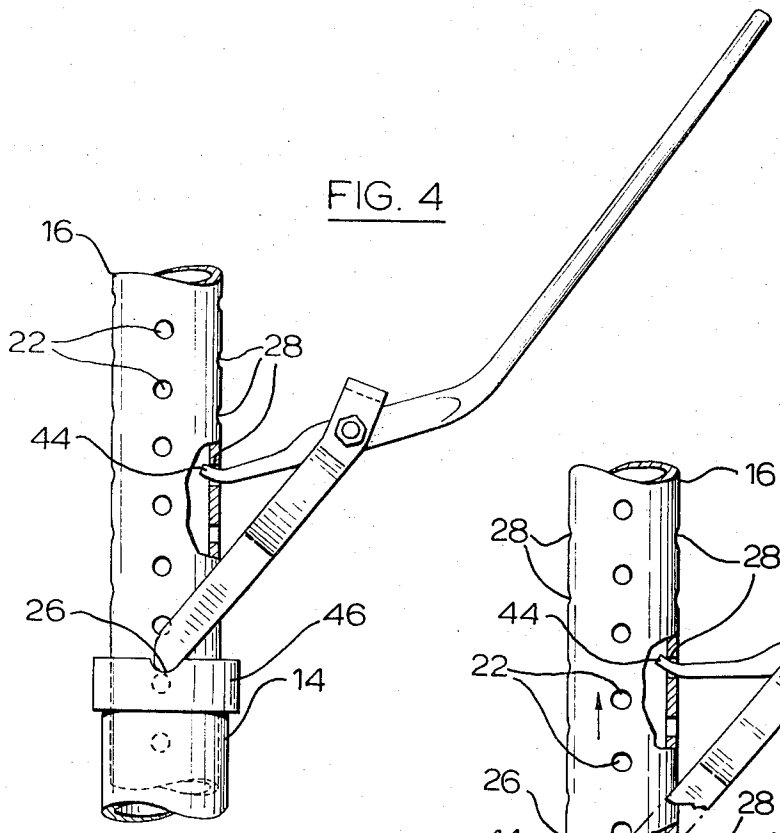


FIG. 7

FIG. 4



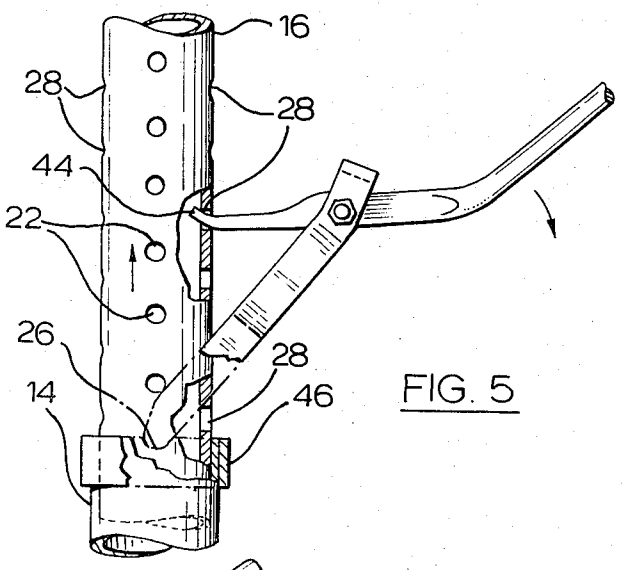
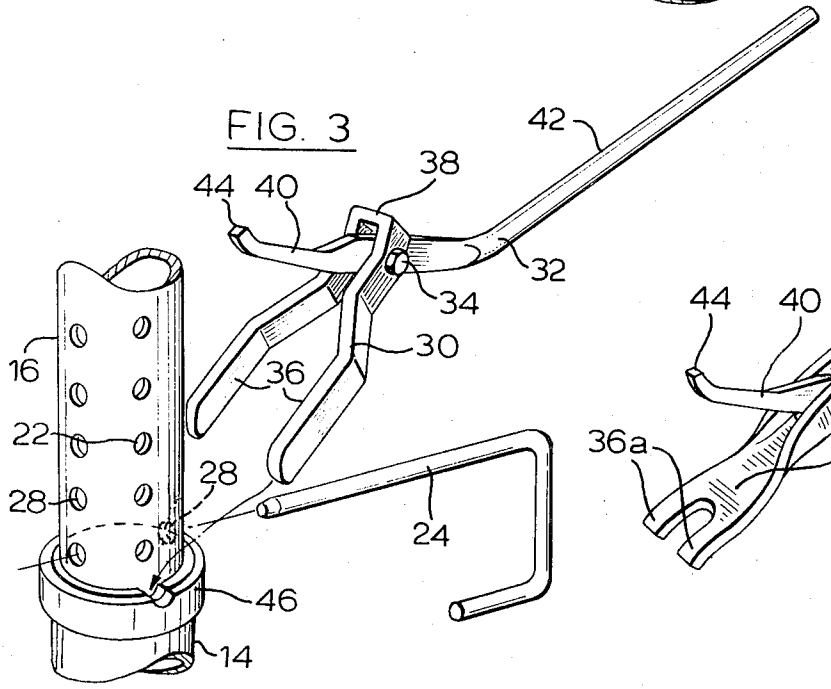


FIG. 5

FIG. 3



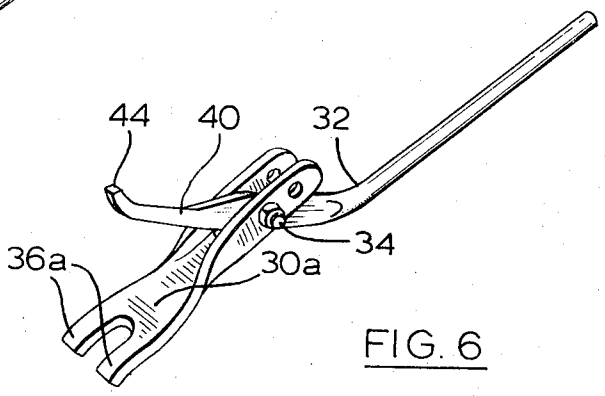


FIG. 6

JACKING DEVICE

This invention relates to a jacking device. In particular, this invention relates to a jacking device suitable for use in the construction industry.

The jacking devices currently used in the construction industry include two tubular elements which are telescoped with respect to one another and adjustable in length by moving one element with respect to the other. The adjustment means used for adjusting the length of the telescoping member usually consists of a jacking nut which is threadably mounted with respect to one of the telescoping elements so that rotation of the nut in one direction causes expansion of the telescoping element while rotation in the other direction causes contraction of the telescoping element. A major disadvantage of this construction is the fact that the exposed threaded portions of the adjustment elements frequently become damaged in use so that difficulty is experienced in attempting to move the adjustment nuts. A further disadvantage of this adjustment nut construction is the fact that it does not include any provision for a rapid action course adjustment.

In another form of jacking device, it is well known to form a plurality of passageways opening through one of the telescoping elements at longitudinally spaced intervals to receive a locking pin to retain the jacking device in a predetermined position. The difficulty with this construction is that it requires considerable physical effort to manipulate the jacking device into an extended position in which it is loaded prior to the location of the locking pin. Furthermore, the amount of the load which may be applied to the jacking device may be too great to permit manual adjustment of the telescoping elements.

In order to ensure that a jacking device, such as the jacking devices used in the construction industry, is not dislodged when the load supported by the jacking device is raised a short distance, it is desirable to provide a mechanism which is resiliently deformable to compensate for periodic variations in a jacking height. Difficulty has been experienced in providing a simple and effective structure for mounting the resiliently adjustable elements with respect to the jacking device.

The present invention provides a simple and inexpensive jacking device for use in the construction industry which includes adjustment means for telescoping one element with respect to the other element under load conditions.

The present invention also provides a simple and efficient structure for mounting a resiliently compressible unit for accommodating variations in length of the loaded jacking device.

According to an embodiment of the present invention, a jacking device consists of a first tubular member having a second tubular member telescopically mounted therein and projecting outwardly from one end thereof. An adjustment means is provided for adjusting the position of the second tubular member with respect to the first tubular member. The adjustment means consists of a bracket member, a lever member and fulcrum means pivotally mounting the lever member with respect to the bracket member. The lever member has a first end projecting outwardly from one side of the fulcrum and a second end projecting outwardly from the other side of the fulcrum. The outer end of the bracket is mountable at one end of said first tubular member in a position with the fulcrum means spaced outwardly from the first and second tubular means. The second tubular member is provided with means for cooperating with the first end of said lever means whereby the second tubular member may be telescoped with respect to the first tubular member in response to movement of the second end of the lever about said fulcrum means. Means is also provided for locking the first tubular member with respect to the second tubular member in a position to which the members are telescoped by means of adjustment means.

The present invention also provides a jacking device as described above having a third telescopically mounted element in the other end of said first tubular member for movement between a first retracted position and a second extended position, and means for resiliently urging the third tubular member towards said extended position.

The invention will be more clearly understood after reference to the following detailed specification read in conjunction with the drawings wherein:

FIG. **1** is a pictorial view illustrating a typical installation of a pair of jacking devices according to an embodiment of the present invention;

FIG. **2** is a partially sectioned side view of a jacking device according to an embodiment of the present invention;

FIG. **3** is a partial pictorial view illustrating the manner in which the adjustment means is mounted with respect to the telescoping elements;

FIG. **4** is a partially sectioned side view illustrating a first step in the operation of the telescoping mechanism;

FIG. **5** is a view similar to FIG. **4** showing a further stage in the jacking operation;

FIG. **6** is a pictorial view of a modified form of adjustment bracket and lever assembly; and

FIG. **7** is a side view similar to FIG. **5** showing the adjustment device of FIG. **6** in use.

With reference to FIG. **1** of the drawings, the reference numeral **10** refers generally to a jacking device according to an embodiment of the present invention. The jacking device is used on a construction site for various purposes, including the supporting of a safety wall assembly **12** or as a brace for an overhead wall or former **13.**

As shown in FIGS. **1** and **2** of the drawings, the jacking devices **10** each consist of a first tubular member **14,** a second tubular member **16** and a third tubular member **18.** The second tubular member **16** and the third tubular member **18** are telescoped within opposite ends of the first tubular member **14.** The exposed ends of the second tubular member **16** and the third tubular member **18** have end caps **20** located thereon to prevent direct contact between the tubular members **14** and **18** and the structures to be supported. The second tubular member **16** is formed with a first set of passages **22** which are located at longitudinally spaced intervals along the length thereof from adjacent the end which is to be telescoped within the first tubular member **14.** The passages **22** extend through diametrically opposed portions of the wall of the second tubular member **16** so that a locking pin **24** may extend therethrough and project from opposite sides of the tubular member. A collar **46** is located at the end of the first tubular member and has an end free projecting radially

in alignment with the end of the first tubular member and cooperating therewith to form a radially extending support surface **25** for the bracket **30** as will be described hereinafter. Small arcuate shaped recesses **26** are formed in the support surface at diametrically opposed location thereon to receive the ends of bracket **30** in use and to prevent circumferential movement of the bracket with respect to the first tubular member. A second row of passages **28** open through one side of the tubular member **16** at the end which is telescoped within the first tubular member **14.**

An adjustment device for adjusting the position of the first tubular member with respect to the second tubular member comprises a bracket **30** and a lever member **32** which is pivotably mounted with respect to the bracket by means of a fulcrum pin **34.** The bracket **30** has a pair of spaced apart arms **36** which are connected at their upper end by a bridge piece **38.** The arms **36** are disposed one on either side of the plane in which the lever **32** pivots about the fulcrum pin **34.** The lever **32** has a first end **40** projecting outwardly from one side of the bracket **30** and a second end **42** projecting outwardly from the other side of the bracket **30.** A short upwardly directed tongue portion **44** is formed at the free end of the first portion **40** of the lever **32.**

When the jacking device of the present invention is to be used, it is manually extended to its maximum height permitted by the enclosure within which it is mounted and the locking pin **24** is located in a position extending through the passages **22** and resting in the support surface **25.** If adjustment is required to increase the length of the jacking device, the adjustment means is mounted as shown in FIG. **3** of the drawings by locating the ends **36** of the bracket **34** in a position in which they are located in the recesses **26.** The lever arm **42** is pivoted to a position with respect to the bracket **34** so that the tongue **44** on the first end of the lever arm **32** may be located within a passage **28** of the second tubular member **16.** The passage **28** in which the tongue **44** is mounted is preferably at the lowest level which the tongue **44** is able to engage. The lever arm **32** is then pivoted through the first elevated position shown in FIG. **4** to the second elevated position shown in FIG. **5.** In the position shown in FIG. **5,** the second tubular member has been extended out of the first tubular member by a length equal to the distance between adjacent passages **22** in the second tubular member **16** so that the locking pin **24** may be relocated, the lever arm **32** pivoted to a position to enable the tongue **44** to engage the next lower passage **28** and thereafter the telescoping operation may be repeated.

FIG. **6** of the drawings illustrates a further embodiment of the invention wherein the bracket **30*a*** is in a different form from that illustrated in FIGS. **3** to **5** inclusive. The bracket **30** nevertheless retains the bifurcated end construction so that short arms **36*a*** are provided which again engage the support surface **25** on opposite sides of the passages **28** in which the locking pin **24** is located in use. FIG. **7** of the drawings illustrates the manner in which the adjusting device of FIG. **6** is used and it will be apparent that the manner of operation is the same as that previously described with reference to FIGS. **3** to **5** of the drawings.

Variations in the required length of the jacking device under loading conditions are accommodated by means of a third tubular member **18** which is telescopically mounted within the lower end of the first tubular member **14.** The first tubular member **14** is formed with a narrow annular inwardly projecting waist portion **50** adjacent the lower end thereof. A similar narrow inwardly projecting annular waist portion **52** is formed adjacent the upper end of the third tubular member **18.** The third tubular member **18** fits in a close fitting sliding relationship within the first tubular member **14** and a pair of resilient sealing rings **54** are located within the recess provided by the waist portion **52.** A compression coil spring **56** extends between the inwardly projecting waist portion **50** of the first tubular member **14** and the end **58** of the second tubular member. The spring **56** urges the third tubular member in a direction outwardly of the lower end of the first tubular member **14.** The extent of movement of the third tubular member **18** outwardly from the end of the first tubular member **14** is regulated by means of discs **62** and **64** and tie rod **66.** The disc **62** is located inboard of the waist portion **50** and the disc **64** is located inboard of the waist portion **52.** The tie rod **66** passes through discs **62** and **64** and nut **68** is locked on the end of the tie rod **66** to limit the extent to which the discs **62** and **64** may move away from one another. The tie rod **66** is slidably mounted with respect to the disc **62** so that when compressed the discs **62** and **64** may move towards one another to compress the spring **56** between the waist portion **50** and the end **58** as previously described.

The tubular members **14, 16** and **18** are preferably made from conventional tubular steel. The adjusting device, including the bracket **30** and lever **32,** is preferably made from a high tensile steel capable of exerting substantial extending forces without deformation.

From the foregoing, it will be apparent that the present invention provides a simple and inexpensive form of jacking device which is particularly suitable for use in the construction industry. The fact that the adjusting mechanism is detachable from telescoping members is of considerable importance as it renders the jacking device substantially tamper proof. Without the jacking device it would be virtually impossible for an individual to tamper with the adjustment. This is a significant factor in jacking devices of the present invention when used to support safety railings as shown in FIG. **1** of the drawings on construction sites. In previous devices where the adjustment mechanism is not removable, adjustments have been made by unauthorized personnel which have resulted in failure of the jacking device.

Various modifications of the present invention will be apparent to those skilled in the art without departing from the scope of the invention. For example, the form of the locking mechanism for locking the telescoping first and second tubular members in the extended position may be in the form of a releasable clamping screw or collar or the like.

From the foregoing, it will be apparent that the present invention provides a simple and inexpensive form of jacking device which can be very easily adjusted to the required length.

The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. A jacking device comprising

a. a first tubular member,

b. a second tubular member telescopically mounted within said first tubular member and projecting

outwardly from one end of said first tubular member,

c. adjustment means for adjusting the position of said second tubular member with respect to said first tubular member,

d. said adjustment means consisting of a bracket member and a lever member, said bracket member having an inner end and an outer end, fulcrum means pivotally mounting said lever member with respect to said bracket member with a first end of said lever member projecting outwardly from one side of said fulcrum means and a second end of said lever member projecting outwardly from the other side of said fulcrum means, said outer end of said bracket being adapted to engage said one end of said first tubular member to support said bracket means in a position with said fulcrum means spaced outwardly from said first and second tubular means,

e. a plurality of longitudinally spaced passages opening inwardly of said second tubular member for engaging said first end of said lever whereby said second tubular member may be telescoped with respect to said first member in response to movement of said second end of said lever about said fulcrum means, and

f. means for locking said first tubular member with respect to said second tubular member to prevent inward telescoping of said second member with respect to said first member.

2. A jacking device as claimed in claim **1** including slot means in said one end of said first tubular member for receiving said outer end of said bracket to secure said bracket against circumferential movement with respect to said one end of said first tubular member.

3. A jacking device as claimed in claim **1** including collar means secured to said first tubular member at said one end thereof and projecting radially outwardly therefrom and cooperating with said end of said first tubular member to provide a radially extending bracket support surface.

4. A jacking device as claimed in claim **3** including slot means in said radially extending support surface for receiving said outer end of said bracket to secure said bracket against circumferential movement with respect to said first tubular member.

5. A jacking device as claimed in claim **2** wherein said outer end of said bracket is formed to provide a pair of legs which are spaced apart a distance sufficient to be located on diametrically opposite sides of said second tubular member, the outer ends of said legs being rounded for pivotal engagement in said slot means.

6. A jacking device as claimed in claim **1** wherein said outer end of said bracket is formed to provide a pair of legs which are spaced apart a distance sufficient to permit said means for locking said tubular member to pass therebetween to engage said tubular members.

7. A jacking device as claimed in claim **3** wherein said bracket member has a bifurcated end for engaging said one end of said first tubular member means at diametrically opposite sides of said first tubular member, said lever means being pivotably connected to said bracket in a plane disposed between the bifurcated ends of said bracket whereby said bifurcated ends form a stable support for said lever in use.

8. A jacking device as claimed in claim **1** including a third tubular member telescopically mounted within the other end of said first tubular member for movement between a first retracted position and a second extended position and means for resiliently urging said third tubular member towards said extended position.

9. A jacking device as claimed in claim **8** wherein said second tubular member is formed to provide a radially inwardly projecting annular waist portion adjacent said other end thereof, said means resiliently urging said third portion towards said extended position comprising compression spring having one end thereof bearing against said inwardly projecting waist portion of said second tubular member and the other end bearing against the end of said third tubular member which is telescoped within said first tubular member.

10. A jacking device as claimed in claim **9** wherein said third tubular member is formed to provide a radially inwardly projecting waist portion adjacent the end thereof which is telescoped within said first tubular member.

11. A jacking device as claimed in claim **10** including means for retaining said third tubular member in a telescoped relationship with respect to said first tubular member comprising a pair of disc members spaced from one another by said waist means of said first tubular member and said waist means of said third tubular member, and tie rod means extending between said first and second disc members.

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