Jan. 5, 1954 C. E. MYERS 2,665,104

ADJUSTABLE POST

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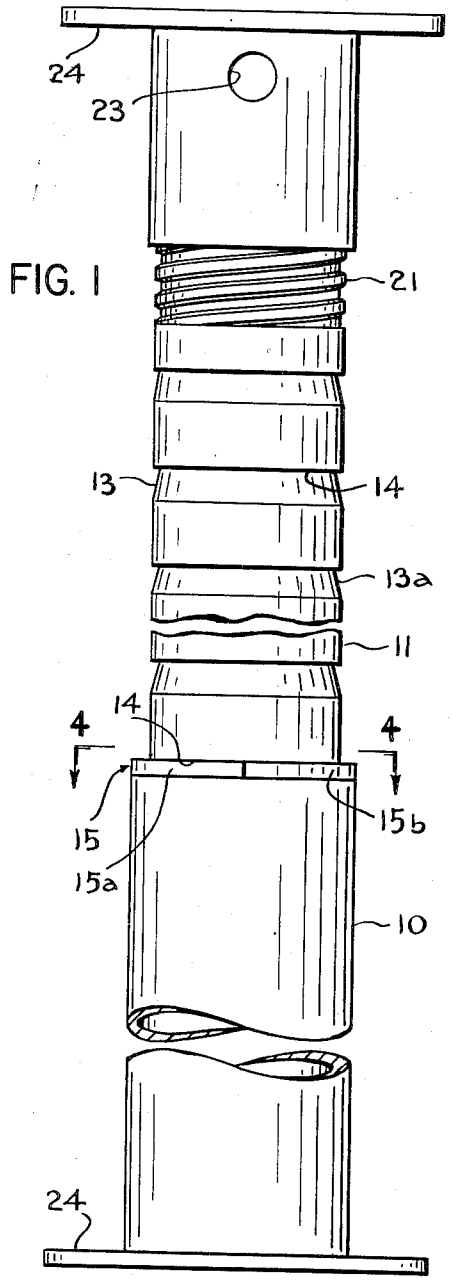


FIG. 1

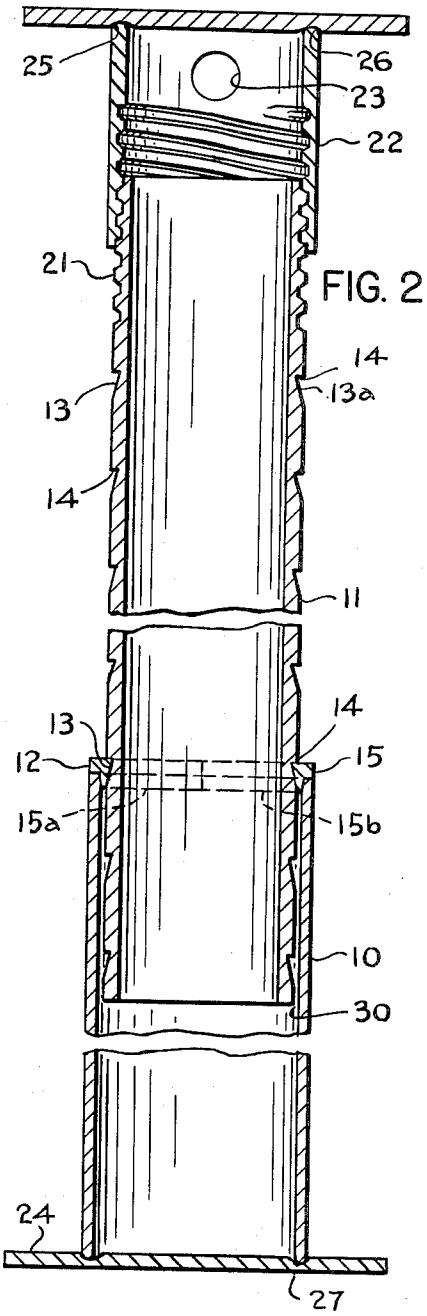


FIG. 2

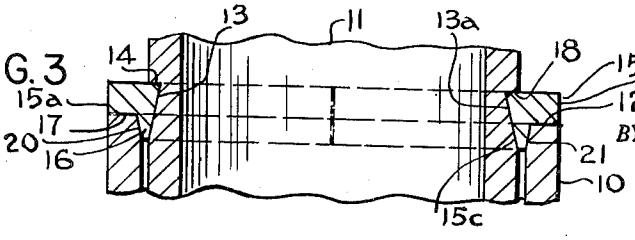


FIG. 3

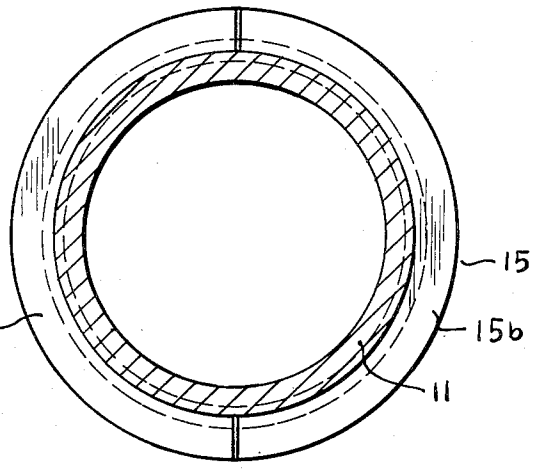
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FIG. 4



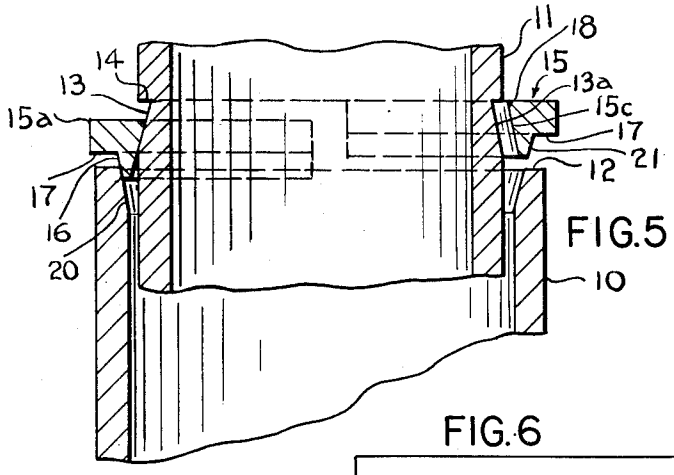


FIG.5

FIG. 6

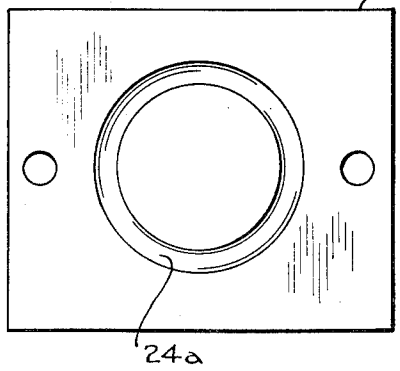
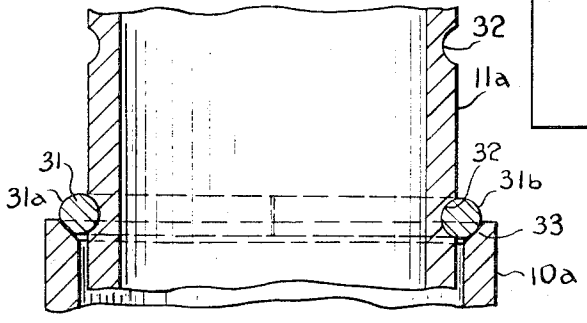


FIG. 7



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FIG. 8

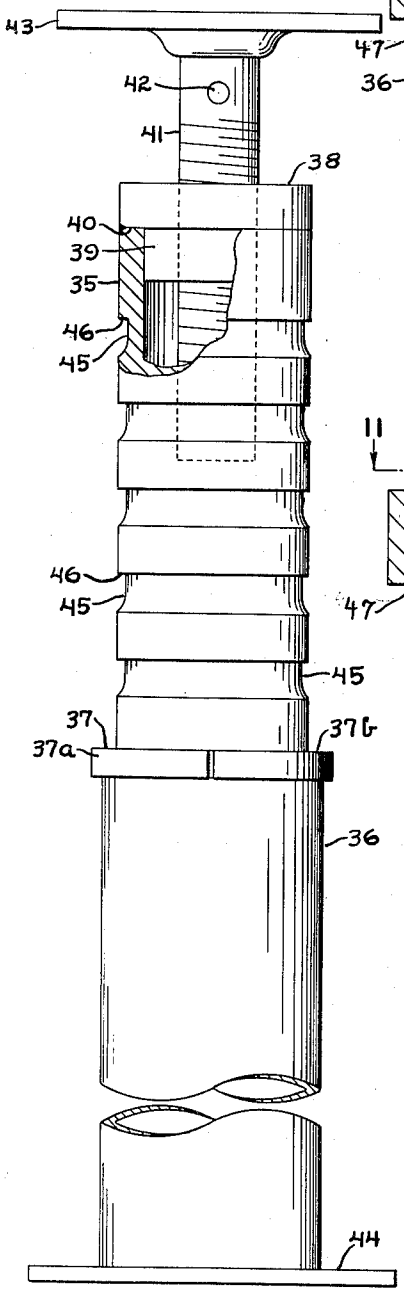


FIG. 9

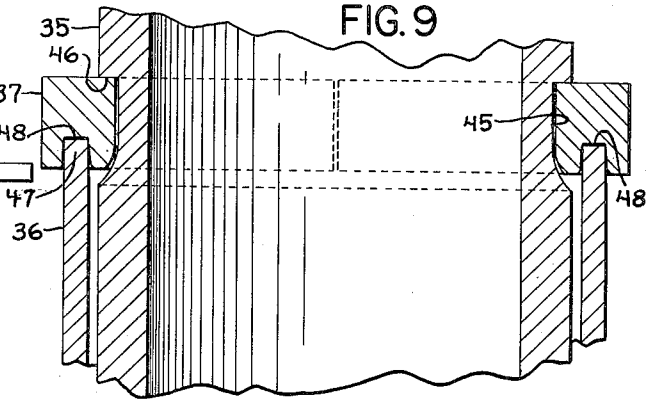


FIG. 10

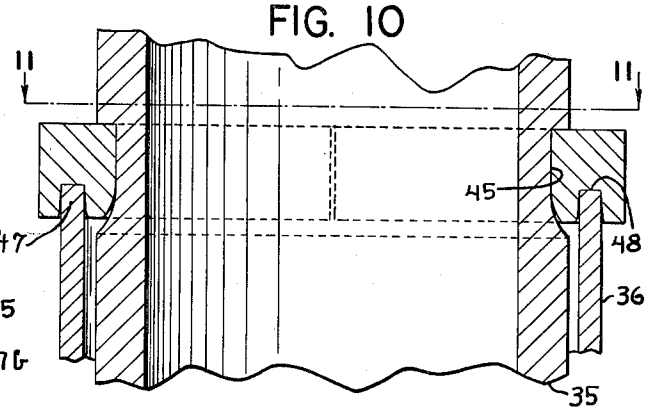
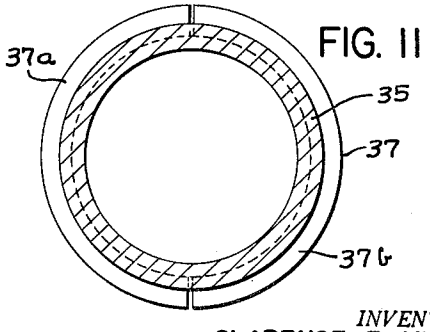


FIG. 11



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UNITED STATES PATENT OFFICE

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ADJUSTABLE POST

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Application April 3, 1950, Serial No. 153,510

3 Claims. (Cl. 248—354)

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This invention relates to adjustable posts of the type including a lifting jack and particularly useful for supporting or leveling sagging floors.

Heretofore, lifting jacks in common use have been provided of the type including two telescoping pipes, which were retained in adjustment to desired length of the jack unit by means of locking pin inserted through the two pipes. The lifting power of this type of jack has been seriously limited to the shearing strength of the locking pin, which supported the entire load of the unit.

One object of the invention is to provide a longitudinally adjustable post of the character described having maximum substantially uniform load strength throughout the length thereof.

Another object of the invention is to provide a lifting jack of the character described wherein the maximum load is not limited by the strength of the device for locking the two pipes in telescoped relation.

Another object of the invention is to provide a telescopic type lifting jack, including an improved locking device which will not damage the telescoped pipes while under load in use.

Another object of the invention is to provide a telescopic type lifting jack wherein said improved locking device is self-operating under a load on the jack tending to shift the same toward full engagement with cooperating parts of the two pipes and thereby substantially increasing the safety factor of the jack.

Another object of the invention is to provide an adjustable post of the character described, including telescoping members and powerful screw-jack lifting means, in which is provided improved means for supporting one telescopic member within another at varyingly extended positions of adjustment, and wherein said improved means is easily and quickly operable by one person to adjust the members to various positions of adjustment without requiring a particularly high degree of skill.

Another object of the invention is to provide an adjustable post of the character described which utilizes a maximum of readily available materials of standard cross-section, such as tubular piping, and which for that reason is simple and economical to manufacture.

These and other objects of the invention will be manifest from the following brief description and the accompanying drawings.

This is a continuation in part of application Serial No. 736,173, filed March 21, 1947, now Patent No. 2,548,844.

Of the accompanying drawings:

Figure 1 is a front elevation, partly broken away, of an adjustable post assembly embodying the features of the invention.

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Figure 2 is a vertical cross-section, partly broken away, of Figure 1 in the corresponding position thereof.

Figure 3 is an enlarged fragmentary view of the supporting connection between the telescoping members as shown also in Figure 2.

Figure 4 is an enlarged cross-section taken on the line 4—4 of Figure 1.

Figure 5 is a cross-section similar to Figure 3, on the same scale, but illustrating the mode of applying or removing the segmental load-supporting ring which is a part of the present invention.

Figure 6 is the detail view of one of the end plates or caps for the post.

Figure 7 is a cross-section similar to Figure 3 illustrating a modified form of load-supporting ring construction.

Figure 8 is a side elevation, partly broken away and in section, of another modified form of telescopic post embodying the features of the invention.

Figure 9 is an enlarged fragmentary cross-section, corresponding to Figure 3, illustrating the supporting connection between the telescoping members, ostensibly while the jack is not under substantial load.

Figure 10 is a view similar to Figure 9, illustrating the locking connection when the jack is under supporting load.

Figure 11 is a transverse cross-section on a reduced scale through the jack, substantially on the line 11—11 of Figure 10.

Referring particularly to Figures 1, 2 and 3, the numeral 10 designates an elongated tubular member or pipe within which is telescopically received a similar tubular element or pipe 11 to extend from an inner end 12 of the member in various positions of longitudinal adjustment. For supporting said member in said positions of adjustment, the element 11 is provided with a plurality of longitudinally spaced grooves 13, 13 defining parallel annular shoulders 14 adapted to be in opposed relation to said inner end of member 10 and each groove being adapted to receive in seating relation therein a two-part segmental ring 15. This ring may have a reduced portion or rib 16, for engagement between member 10 and element 11 (see Figure 3), and defining a longitudinally outwardly presented annular seat 17 for engagement with the end 12 of said member. Thus the ring 15 is adapted to be insertable in a selected groove 13, segment by segment, according to the amount of outward extension of

the member 11 desired. When the shoulder 17 of the ring is properly seated against the inner end 12 of member 10, any load transmitted through element 11 will be supported by the ring through engagement of annular seat 18 thereof with the annular shoulder 14 of said selected groove.

For a purpose to be described, each groove 13 may have a downwardly inclined face 13a from said shoulder 14 thereof, as shown, for substantially complemental seating engagement by a similarly inclined inner face 15c of ring 15, as best shown in Figure 3. For a similar purpose, the inwardly presented marginal edge portion of said inner end of member 10 may be chamfered or beveled at 20 for complemental engagement by a beveled annular face 21 of reduced portion 16 of the ring. The angularity of the complementally engaging beveled faces just described preferably is such as to provide maximum frictional resistance against relative rotational movement between member 10 and element 11.

Selective engagement of the ring 15 in the various grooves 13 of element 11 provides limited longitudinal telescopic adjustment of the post. It is necessary, therefore, to provide a mechanical advantage device for finer longitudinal adjustment of the post and for floor leveling purposes. To this end, a substantial length of the upper end of element 11 is externally threaded at 21 (square threads being shown) for threaded reception of an internally threaded extension sleeve 22 of approximately the same general diameter as tubular member 10. Extension 22 is provided with diametrically opposite apertures 23 in the wall thereof for reception of a suitable turning bar or tool (not shown) for threaded adjustment of the extension with respect to element 11. For the purposes described the pitch of the threads referred to may be substantially less than the spacing between the grooves 13.

Caps or centering plates 24, 24 may be provided at opposite ends of the post, each cap being provided with an annular groove 25 of concave cross-section for self-centering reception of either the rounded end 26 of extension 22 or the rounded end 27 of tubular member 10. As the general diameters of extension 22 and member 10 are approximately the same, the two plates 24 are interchangeable.

In the operation or use of the post, as for leveling and supporting the floor of a building, the operator adjusts the post to approximate required length less than the distance between a supporting surface and an overhead joist or beam of the floor (not shown). That is, the operator holds the element 11 in approximate extended position with one hand, while with the other hand he inserts first one half 15a of ring 15, and then the other half 15b, in the groove 13 selectively adjacent the inner end 12 of member 10. Next, he allows the element 11 to drop by gravity, as from the position of Figure 5 to the position of Figure 3, in which the ring will be self-centeringly positioned with longitudinally oppositely disposed seats 17 and 18 thereof in load supporting engagement with the correspondingly oppositely disposed shoulders 12 and 14 of element 11 and member 10, respectively. The two end plates 24 having been previously positioned at opposite ends of the post, the operator now inserts a bar (not shown) through the apertures 23 of extension 22, and turns said extension on the threaded end 21 of element 11, to further extend the post to urge the top plate 24 against said joist or beam to raise said floor to desired level. This turning action on sleeve 22 under longitudinally compressive load through the post will not turn the element 11, because of the previously described wedging frictional engagement between the inclined annular faces of ring 15 and the complementally inclined faces of member 10 and element 11. A slight clearance, indicated at 30 in Figure 2, provides a certain degree of self-adjusting angularity between element 11 and member 10 during the floor leveling operations.

Referring particularly to Figure 7, there is illustrated a modified form of post with particular reference to the load-supporting ring. The modified ring construction includes a two-part annular member 31 of round cross-section, the ring halves 31a and 31b being, as before, selectively insertable in one of a plurality of annular grooves 32 on an upper tubular element 11a, corresponding to element 11, which is telescopically adjustable within a tubular member 10a, corresponding to member 10. The inner marginal edge portion of member 11a may be beveled, as indicated at 33, to provide a conical seat for seating engagement by ring 31 to prevent accidental removal thereof while the element 11a is supported on member 10a. The installation of the ring 31 during floor leveling operations is otherwise substantially as previously described in connection with the form of the invention illustrated in Figures 1 to 6.

Referring now to the modified form of the invention in Figures 8 to 11, there is illustrated a lifting jack wherein a tubular top member or pipe 35 is telescopically received within a bottom tubular element in pipe 36 of larger diameter, the telescoped pipes being adapted to be locked in longitudinally adjusted positions by means of improved locking (two-part, segmental) ring 37, to be described later. A nut 38 has a reduced portion 39 for tight reception within the outer end portion of pipe 35 and to define an annular shoulder 40 which seats against said top end of the pipe 35. A screw shaft 41 threaded through the nut 38 is provided with an aperture 42 for reception of a turning bar (not shown). The nut may be fixed with respect to the pipe 35, as by welding or brazing methods. Removable plates or caps 43 and 44 are provided on the outer ends of screw shaft 41 and the lower pipe 36, respectively.

As before, for supporting the top pipe 35 in one longitudinally adjusted position on bottom pipe 36, said top pipe is provided with a plurality of longitudinally spaced annular grooves 45, 45 defining parallel annular shoulders 46 presented downwardly in opposed relation to the inner or top end 47 of pipe 36, each groove being selectively adapted to have complementally seated therein the two-part segmental ring 37, and the ring having on the underside thereof an annular groove 48 defining radially inwardly opposed side-walls converging inwardly of the groove, self-centeringly to receive said top end portion 47 of pipe 36. The taper of the opposed walls of the groove 48 is relatively slight, almost straight, to attain the self-centering action with a minimum tendency toward mushrooming the end of pipe 36, when the jack is under load. Also, the general diameter of the groove 48 may be slightly greater (say .005 inch) than the general diameter of top end of lower pipe, substantially as illustrated in Figure 9, whereby the downward load pressure on the top pipe,

combined with said self-centering action of the tapered groove portion of the ring, tending to urge the ring halves 37*a* and 37*b* inwardly, will cause the inner periphery of said halves tenaciously to grip the inner peripheral wall portion of the groove, as shown in Figure 10, and at the same time full seating engagement of the ring parts with shoulder 46 of the pipe is completely assured. Highly satisfactory gripping action is accomplished in this manner when the inner periphery of the ring is cylindrical and the top face thereof is in a plane at right angles to the axis of the ring. The lowermost corner of the groove 45 may be radiused to strengthen pipe 35, and the lower inside corner of the ring is shown cut away on a smaller radius to assure full seating of the ring in said groove.

In use of the form of the invention just described to support a load the ring halves 37*a* and 37*b*, in tending to be urged inwardly, cannot be removed or displaced, accidentally or otherwise. As maximum seating engagement is automatically provided upon application of the load to the jack it is capable of carrying a maximum load calculated on the basis of the area of the annular shoulder portion 46. Moreover, because the top portion of the supporting pipe 36 is confined within the tapered ring groove 48, said top pipe portion cannot become mushroomed or distorted by downward pressure of the ring thereon. The use or operation of the improved jack of Figures 8 to 11 is otherwise as previously described in connection with Figures 1 to 10.

Other modifications of the invention may be resorted to without departing from the spirit thereof or the scope of the appended claims.

What is claimed is:

1. An adjustable post of the character described, comprising a longitudinally extensible unit including a tubular member and a cylindrical element telescopically arranged within the same to have a portion of the length of the element extending longitudinally outwardly of an inner end of the member, said element having on the outer periphery thereof at least one outwardly presented annular groove defining a longitudinally inwardly presented annular shoulder, and a circumferentially segmented ring of at least two parts engageable piece-by-piece within said annular groove and having annular edge portions complementally engageable with said annular shoulder of said groove, said ring having an annular groove defining radially inwardly opposed walls for retaining reception of the tubular inner end of said member therebetween

when longitudinal load stress is applied to said unit in assembled condition with the ring in position in said groove of said element, the mean diameter of said annular ring groove being greater than the mean diameter of said inner end portion of said member, whereby a load applied to said unit tends to contract said ring into tight frictional engagement with said element.

2. An adjustable post of the character described, comprising a longitudinally extensible unit including a tubular member and a cylindrical element telescopically arranged within the same to have a portion of the length of the element extending longitudinally outwardly of an inner end of the member, said element having on the outer periphery thereof at least one outwardly presented annular groove defining a longitudinally inwardly presented annular shoulder, and a circumferentially segmented ring of at least two parts engageable piece-by-piece within said annular groove and having annular edge portions complementally engageable with said annular shoulder of said groove, said ring having an annular groove defining a seat engageable with the inner peripheral end of said member when longitudinal load stress is applied to said unit in assembled condition with the ring in position in said groove of said element, opposite side-walls of said annular ring groove converging longitudinally inwardly to be self-centeringly engageable with said inner end portion of said member.

3. An adjustable post as set forth in claim 2, the mean diameter of said annular ring groove being greater than the mean diameter of said inner end portion of said member, whereby a load applied to said unit tends to contract said ring into tight frictional engagement with said element.

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