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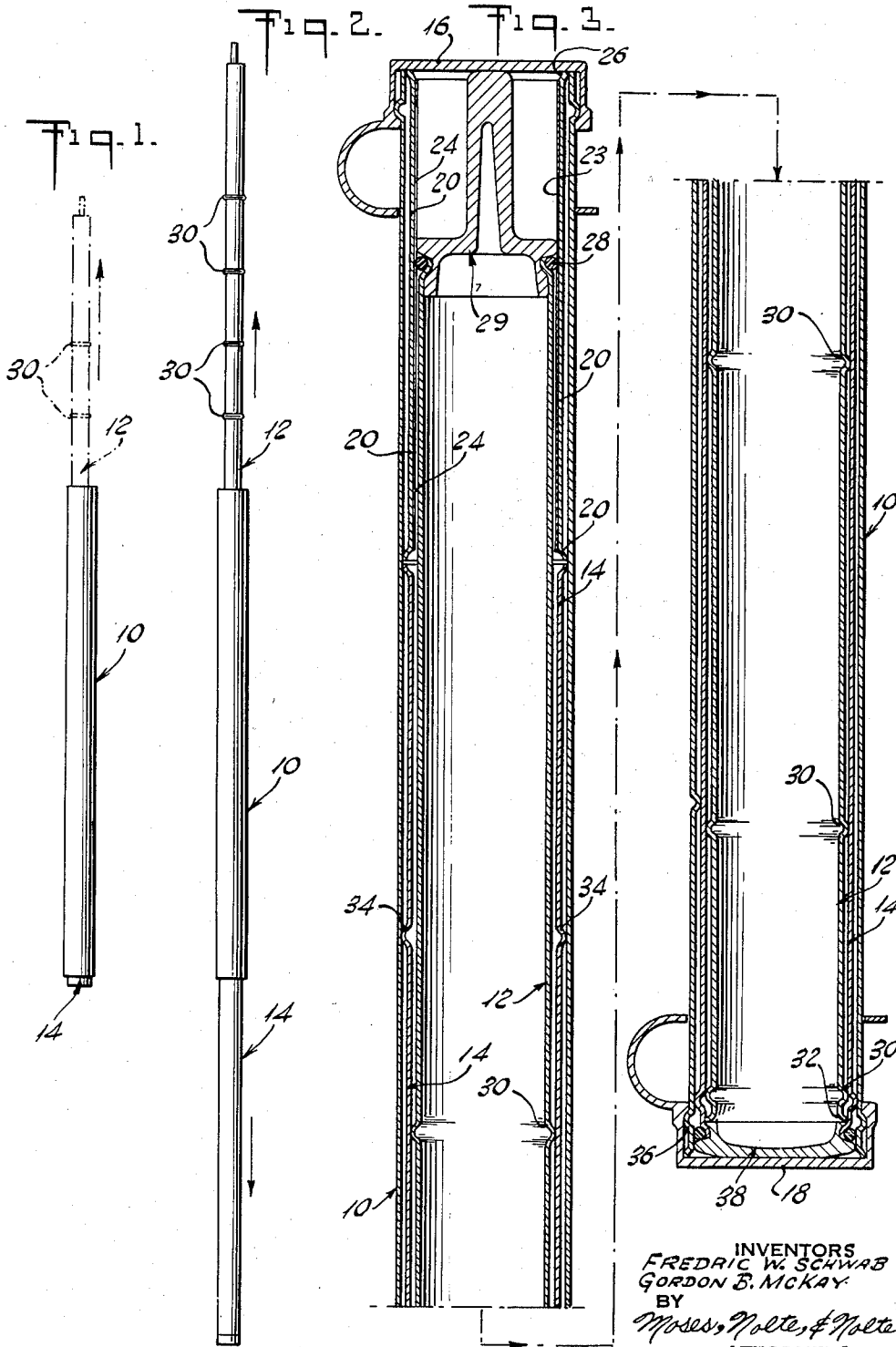
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2,947,557

LOCKING DEVICE

Filed April 24, 1959

2 Sheets-Sheet 1



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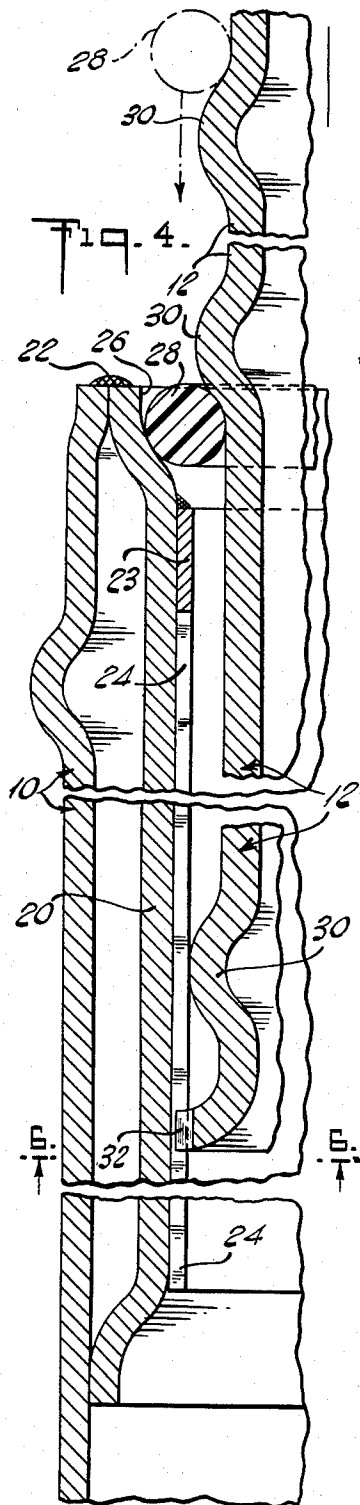
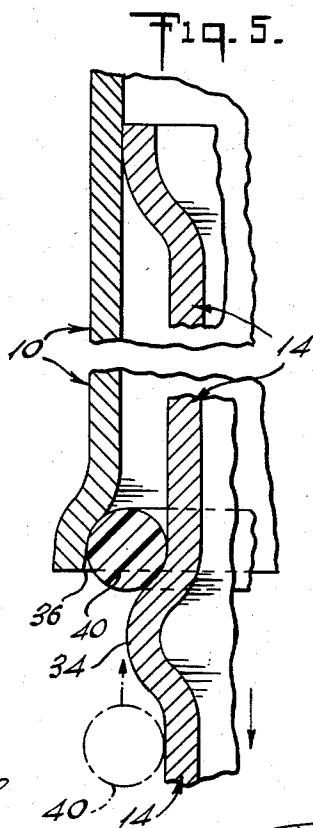
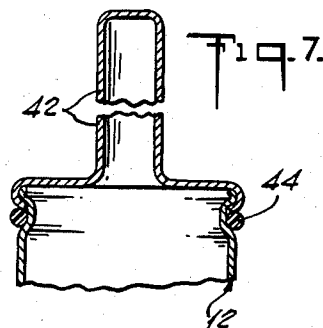
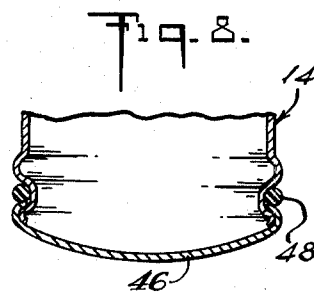
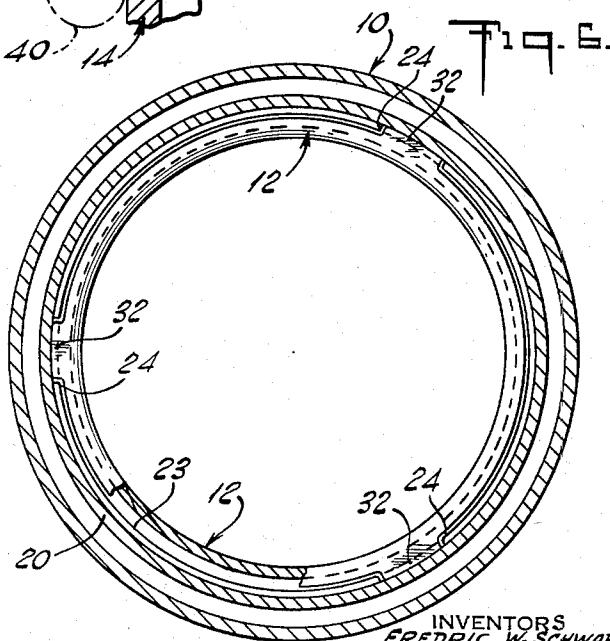
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LOCKING DEVICE

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5 Claims. (Cl. 287—58)

This invention relates in general to a locking construction for telescopically adjustable members and particularly to a new and useful telescopic pole, mast or column construction including novel means for locking slidable member portions in various positions of extension.

The present invention is particularly directed to a novel extensible pole construction including at least two telescopically slidable members one having a series of spaced annular protuberances and the other having an annular recess or ledge, and including a resilient ring member which may be positioned on the inner member between one of the protuberances thereon and the ledge formed on the next adjacent outer telescopic member to lock the members in one of a predetermined number of extensible positions.

The resilient ring locking construction is self acting and self aligning. When a load is applied to the members when they are extended, inward pressure against the locking device causes the members to lock tightly and the load is aligned and uniformly distributed around the periphery of the resilient locking ring from one member to the other.

In accordance with one aspect of the present invention there is provided a collapsible column or tent pole which is water-tight both in its collapsed and extended positions and hence is quite well suited for use in all types of weather.

Accordingly it is an object of this invention to provide a locking construction for telescopic members.

A further object of this invention is to provide a telescopic pole construction including a resilient member which may be positioned between cooperating protuberance and rim formations on adjacent telescopic members to lock the members in a predetermined extended position.

A further object of the invention is to provide a telescopic pole construction which is simple in design, rugged in construction and economical to manufacture.

The various features of novelty which characterize the invention are pointed out with particularity in the claims annexed to and forming a part of this specification. For a better understanding of the invention, its operation advantages and specific objects attained by its use, reference should be had to the accompanying drawings and descriptive matter in which there are illustrated and described preferred embodiments of the invention.

In the drawings:

Fig. 1 is a side elevation of the tent pole constructed in accordance with the invention and illustrating the manner in which the inner telescopic member may be moved upwardly to open it to the desired and extended position;

Fig. 2 is an elevation of the tent pole of Fig. 1 indicating the intermediate telescopic member in a fully extended downward position and the inner telescopic member in a fully extended upper position;

Fig. 3 is a broken transverse section of a fully collapsed tent pole constructed in accordance with the invention;

Fig. 4 is a fragmentary enlarged detail of a portion of the upper end of the tent pole with the inner member shown extended;

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Fig. 5 is a fragmentary enlarged detail of a portion of the lower end of the tent pole with the intermediate member shown extended;

Fig. 6 is a reduced horizontal section taken on the line 6—6 of Fig. 4;

Fig. 7 is a fragmentary transverse section of another embodiment of inner telescopic member top construction; and

Fig. 8 is a fragmentary transverse section of another embodiment of bottom construction for the intermediate telescopic member.

Referring to the drawings in particular the invention as embodied therein includes an outer elongated telescopic pole member generally designated 10, an inner telescopic pole member generally designated 12, and an intermediate telescopic pole member generally designated 14. Each of the pole members 10, 12 and 14 are cylindrical and are of diameters sufficient to permit relative sliding motion therebetween.

Each of the top and bottom ends of the outer telescopic pole members 10 is covered by a resilient cap member 16 and 18, respectively. An inner sleeve 20 is positioned within the outer telescopic member 10 in alignment with the intermediate telescopic pole member 14. The sleeve 20 is welded as at 22 along its top edge to the outer telescopic pole member 10 and an inner sleeve 23 is positioned in and welded to the sleeve 20. The sleeve 23 is provided with a plurality of keyways 24 extending along the length thereof at spaced locations around its inner periphery (Figs. 4 and 6). The upper end of the sleeve 20 is bent outwardly to form an annular flange 26 to receive a resilient member 28. In the present instance the resilient member 28 is a so-called "O-ring" but it may be any similar resilient member made of plastic, metal or similar materials. The member 28 is carried within a flanged recess of a top member generally designated 29 which is affixed to the top of the inner telescopic pole member 12.

In accordance with the invention the inner member 12 is provided with a plurality of spaced annular lips or protuberances 30 which are spaced axially along its length. When the inner member 12 is extended as indicated in Fig. 1 it is pulled upwardly from the outer member 10 and a predetermined one of the protuberances 30 is aligned slightly above the flanged recess 26. When the O-ring is located within the recess of the cover member 29, it is of a greater external diameter than the inner member 12 but is slightly smaller than the internal diameter of the sleeve 20 so that it does not interfere with the sliding of the inner member 12 within the sleeve. The resilient member 28 is then pushed downwardly along the inner telescopic pole member 12 and over the protuberances 30 until it is aligned between the flange 26 and a chosen protuberance 30 as indicated in Fig. 4. In this position the inner telescopic pole member 12 is locked in an extended position against inward movement in relation to the outer telescopic pole member 10. When the O-ring 28 is moved to the position indicated in Fig. 4, it is positioned on the inner member 12 so that its external diameter becomes greater than the internal diameter of the sleeve 20 and hence it rests on the ledge 26 and is prevented from moving upwardly by the protuberance 30.

The inner telescopic pole member 12 is provided with a plurality of outwardly projecting bottom tips 32 which ride within the keyway 24 when the inner telescopic pole member 12 is retracted to a substantially fully extended position. The keyway 24 extends from a location spaced from the top of the inner sleeve 23 to the bottom thereof. When the inner telescopic pole member 12 is in its last portion of its fully extended position, the key 32 rides in

the keyway 24 and rotation of the inner telescopic pole member is prevented. When the inner pole member 12 is at an intermediate or lower position the key 32 rides on the inside wall of the intermediate member 14 if the latter is retracted.

In accordance with the invention, the intermediate telescopic pole member 14 is provided with at least one annular protuberance 34 which is located at a spaced distance from the top edge thereof and which cooperates with a ledge portion 36 (Figs. 3 and 5) formed on the outer telescopic pole member 10. Additional protuberances such as 34 may be advantageously located along the height of the intermediate telescopic member 14. The intermediate telescopic pole member 14 is provided with a bottom cap 38 having a recessed flange portion which carries an O-ring 40 of dimensions similar to O-ring 28. When the intermediate member 14 is fully extended downwardly, as illustrated in Figs. 2 and 5, the O-ring is slipped upwardly on the member until it is positioned over the protuberance 34 and on the ledge 36 to lock the intermediate and outer telescopic pole members 14 and 10 in their extended position.

In Fig. 7 there is illustrated an alternate top construction 42 for the inner telescopic pole member 12. In this construction, an annular recess is formed to receive an O-ring 44.

In Fig. 8 there is illustrated an alternate embodiment of bottom 46 for the intermediate member 14. In this embodiment, a recess is formed to receive an O-ring 48.

The tent pole is normally carried and shipped with both of the caps 16 and 18 in place and with the intermediate and inner telescopic pole members 12 and 14 fully retracted within the outer telescopic pole member 10. The pole may be extended a slight amount by merely retracting the inner telescopic pole member 12 until the first protuberance 30 is positioned slightly above the ledge 26. The O-ring 28 is then slid downwardly over the surface of the inner telescopic pole member 12 until it is aligned above the ledge 26 and under the protuberance 30 corresponding to the length of pole which is extended. With the O-ring 28 in the position between the protuberance 30 and the ledge 26, as indicated in Fig. 4, the pole is compressed somewhat and the outer telescopic pole member 10 and the inner telescopic pole member 12 will be locked in position.

The inner telescopic pole member 12 may be extended until the last protuberance 30 is aligned above the ledge portion 26. In this position the key 32 will ride in the keyway 24 and no relative turning between the outer telescopic pole member 10 and the inner telescopic pole member 12 will be possible. The portion of the annular plate 23 at the upper end of the keyway 24 prevents the inner telescopic pole member 12 from coming out of the outer pole member 10.

The pole may be extended one long increment by retracting the intermediate telescopic pole member downwardly until the protuberance 34 is aligned below the ledge 36 of the outer telescopic pole member 10. The O-ring 40 carried on the intermediate telescopic pole member 14 is then pushed upwardly thereon until it is positioned in the ledge 36 on the other side of the protuberance 34. A sufficient length of pole is provided between the protuberance 34 and the top of the intermediate pole member 14 to provide an adequate bearing support between the intermediate pole member 14 and the outer pole member 10 in the fully extended position of the intermediate member.

It should be appreciated that while the locking construction is illustrated in connection with a tent pole member, it is equally applicable to all types of extensible members. When the members are fully extended and locked in position and also when the device is fully collapsed and the covers are in place, it is fully water-tight. The construction is such that the pole will float when it

is closed and covered. Because the extensible members are provided with a series of protuberances, it can be assembled in darkness and the parts are easy to manipulate even by a person wearing heavy gloves. This construction makes the device readily usable in severe arctic conditions.

While a specific embodiment of the invention has been shown and described in detail to illustrate the application of the invention principles, it will be understood that the invention may be embodied otherwise without departing from such principles.

What is claimed is:

1. A telescopic pole comprising an outer, hollow cylindrical member, a cylindrical sleeve connected to said outer member and positioned therein said sleeve having a ledge formed on one end adjacent the end of said outer member, an intermediate sleeve member positioned in said outer member in alignment with said sleeve, an inner member positioned within said outer member and said sleeve, each of said outer, inner and intermediate members being axially relatively movable, said inner member having at least one annular protuberance, a resilient ring carried by said inner member, said inner member being retractable to position said protuberance above said sleeve ledge, said resilient member being movable down along the walls of said inner member to position the latter between the ledge and said protuberance whereby to lock said inner member in an extended position.

2. A telescopic pole according to claim 1 wherein said intermediate member is provided with an annular protuberance and said outer member is provided with a ledge portion adjacent its bottom edge, said intermediate member carrying a resilient ring, said ring being slidable along said intermediate member to position the latter between said protuberance and, said ledge whereby to support said intermediate member from said outer member in an extended position.

3. A telescopic pole according to claim 2 including resilient caps for each of the ends of said intermediate member.

4. A telescopic pole according to claim 1 wherein said inner member is provided with a key and said sleeve is provided with a keyway along which said key may slide when said inner member is in a retracted position.

5. A telescopic pole comprising an outer elongated hollow member having a ledge formed therein, an inner member positioned within said outer member and being relatively movable with respect thereto, a protuberance formed on said inner member, a resilient ring member carried by said inner member and slidable therealong, said ring member adapted to be positioned between the ledge of said outer member and said protuberance when the inner member is extended outwardly from said inner member whereby to lock said members against relative collapsing movement, and an intermediate member positioned between said inner member and said outer member, said intermediate member having at least one second protuberance thereon, said outer member having a second ledge formed at the bottom end thereof, said members being relatively shiftable to present said second protuberance outwardly of said second ledge, said resilient member being shiftable to a position between said ledge and said protuberance.

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