Dec. 6, 1955 J. W. PLANO ET AL 2,725,959

PORTABLE COLLAPSIBLE SPAR TREE

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Fig. 1

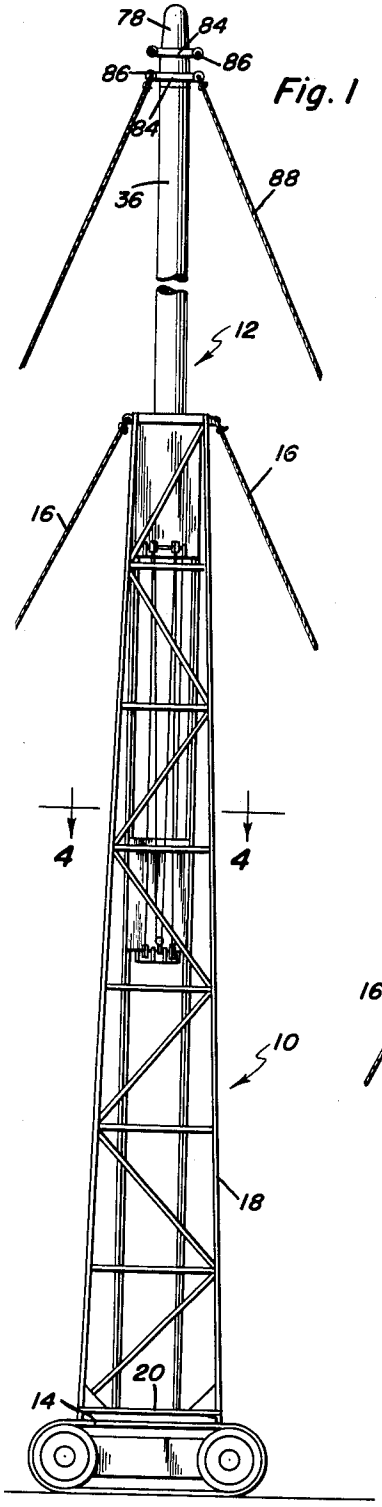


Fig. 2

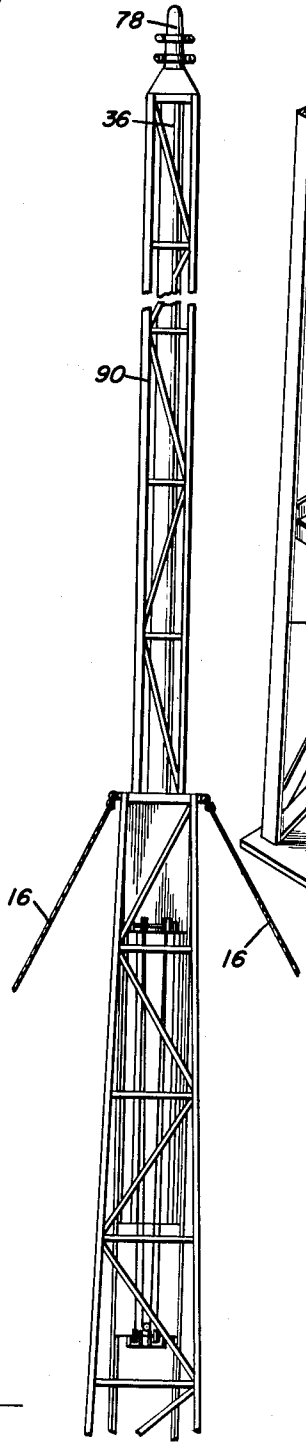
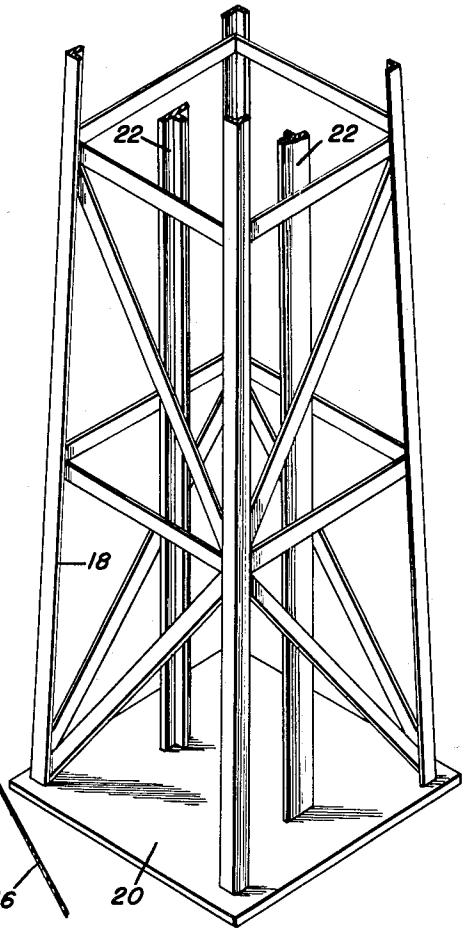


Fig. 3



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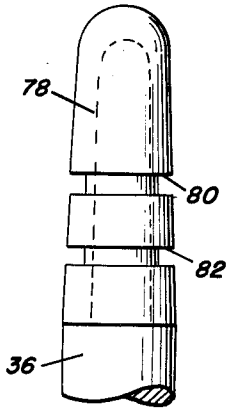
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PORTABLE COLLAPSIBLE SPAR TREE

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Fig. 7



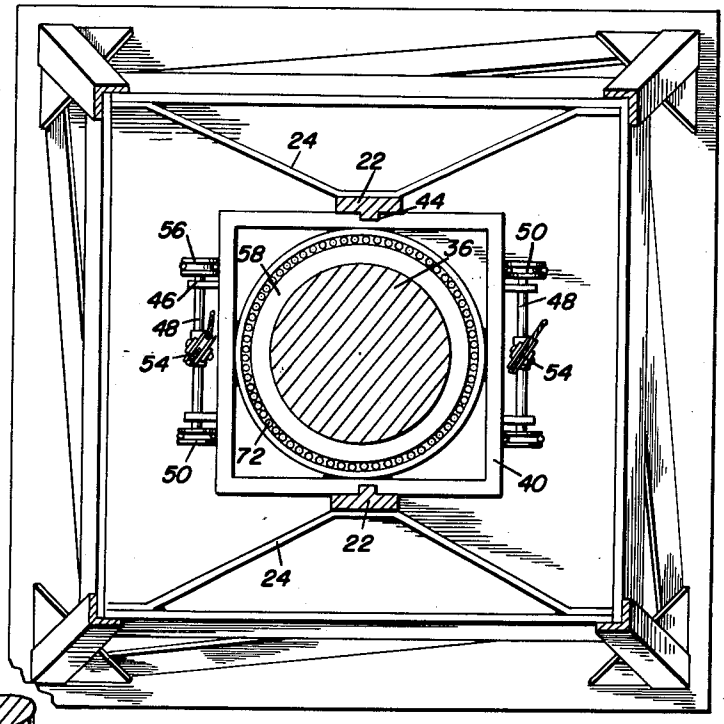


Fig. 4

Fig. 5

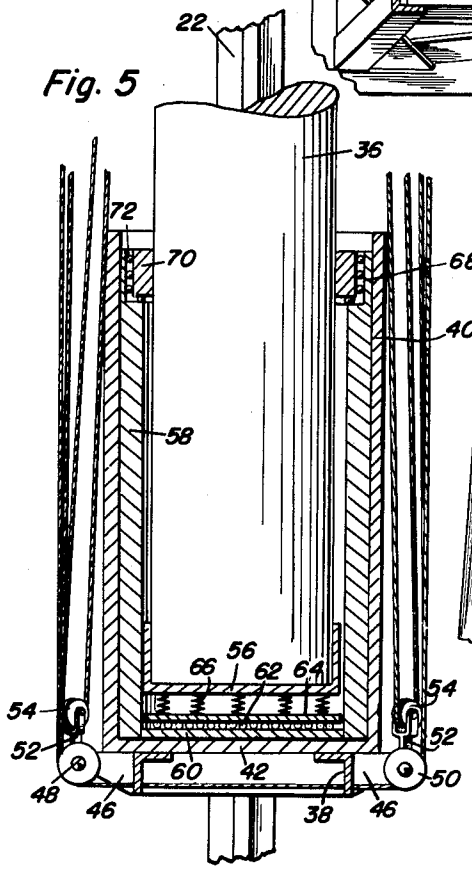
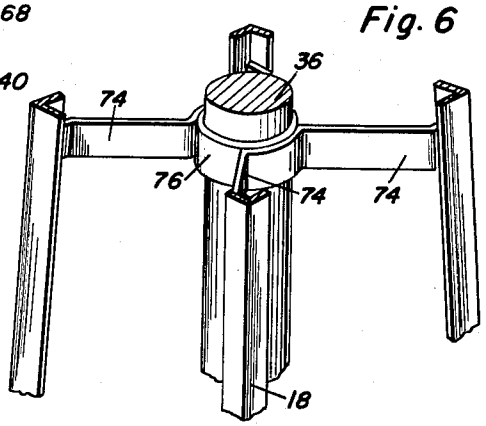


Fig. 6



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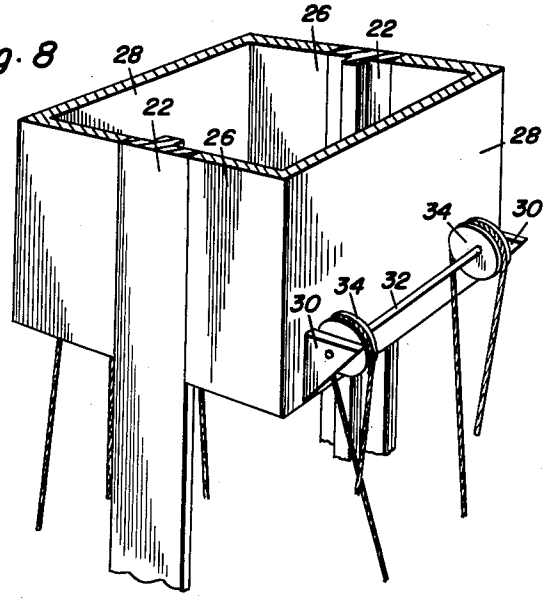
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Fig. 8



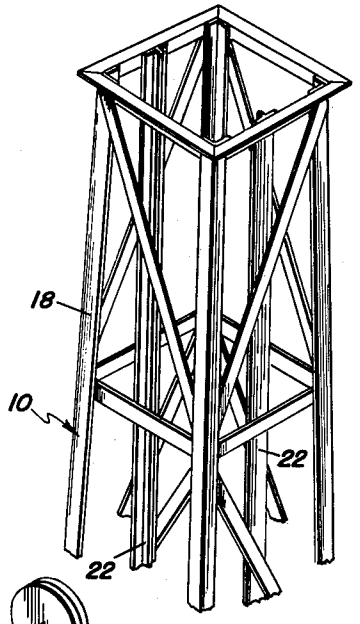


Fig. 9

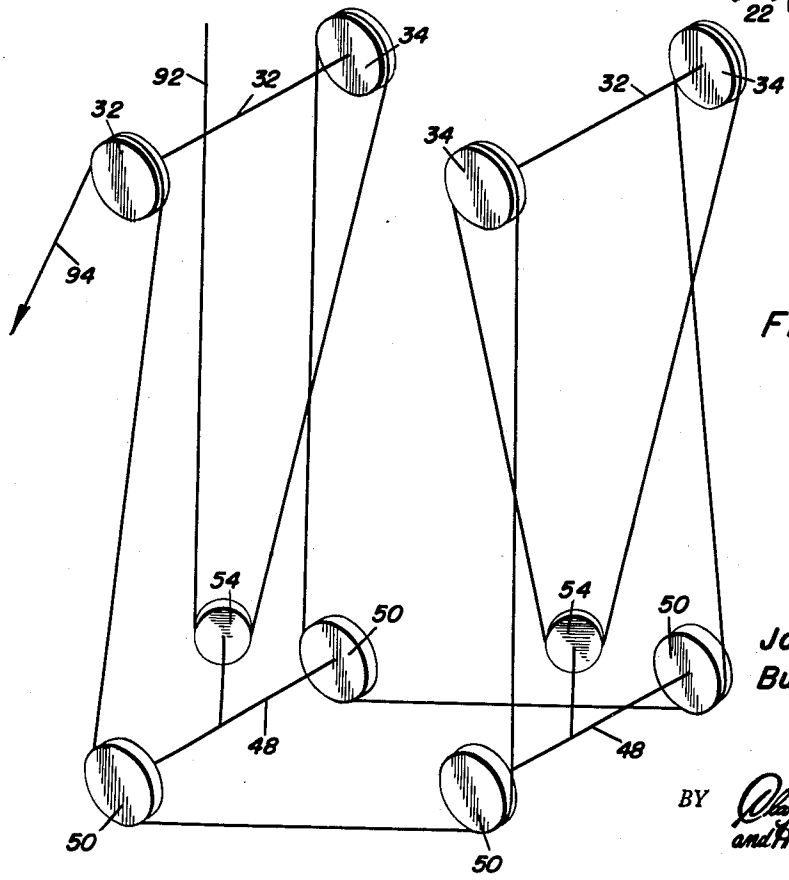


Fig. 10

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PORTABLE COLLAPSIBLE SPAR TREE

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Application June 30, 1950, Serial No. 171,338

5 Claims. (Cl. 189—14)

This invention comprises novel and useful improvements in a portable collapsible spar tree and more specifically pertains to an improved construction of a longitudinally adjustable spar comprising telescoping slidable and relatively rotatable sections.

The primary object of this invention is to provide a longitudinally extensible spar having telescoping sections which are guided for longitudinal sliding movement with respect to each other in an improved manner.

A further object of the invention is to provide a spar assembly in conformity with the foregoing object wherein the sections are also capable of relative rotatable movement with respect to each other.

A still further object of the invention is to provide an improved longitudinally extensible spar assembly having an improved means for selectively extending or collapsing the spar as desired.

These, together with various ancillary features and objects of the invention which will later become apparent as the following description proceeds, are attained by the present invention, preferred embodiments of which have been illustrated, by way of example only, in the accompanying drawings, wherein:

Figure 1 is a side elevational view of one embodiment of a collapsible and extensible spar assembly incorporating therein the principles of this invention, parts being broken away and the spar assembly being shown in its partially extended position;

Figure 2 is a side elevational view of a second embodiment of a longitudinally extensible and collapsible spar assembly, the upper portion of the base section of the assembly being shown therein;

Figure 3 is a fragmentary perspective view showing the lower portion of the base member of the spar assembly;

Figure 4 is a horizontal sectional view taken substantially upon the plane indicated by the section line 4—4 of Figure 1;

Figure 5 is an enlarged detail view, parts being broken away and shown in section, of the carriage assembly forming a part of the novel spar assembly of this invention;

Figure 6 is a fragmentary perspective view showing a guiding construction of the invention;

Figure 7 is a fragmentary side elevational view of a cap member forming a part of the spar assembly;

Figure 8 is a fragmentary perspective view of a portion of a head block assembly at the upper end of the base section of the spar assembly;

Figure 9 is a fragmentary perspective view of the upper end of the base section of the spar assembly with the head block removed therefrom; and

Figure 10 is a diagrammatic view illustrating a cable and pulley linkage for effecting longitudinal extensible movement of the sections of the spar assembly.

Referring now more specifically to the accompanying drawings, wherein like numerals designate similar parts throughout the various views, attention is directed first to Figure 1, wherein it will be seen that the novel

longitudinally extensible spar assembly forming the subject of this invention consists of telescoping base and upper sections indicated generally at **10** and **12**, the former being mounted upon a wheel support which may include the so-called caterpillar or endless tread supporting arrangement, indicated generally by the numeral **14**.

In each of the two modified constructions of extensible spars shown in Figures 1 and 2, there is provided a hollow base section **10** which may be formed of open structural steel elements to provide a derrick type of supporting structure suitably braced and at its upper end provided with guy wires **16** whereby the extensible spar may be rigidly secured in place once the same has been positioned by means of its supporting treads **14**. The above mentioned steel framework, indicated by the numeral **18**, may rest upon or be secured to a suitable platform or plate **20** forming a base, and a pair of parallel, vertically extending guide rails or guideways **22** are mounted upon the base plate **20** within the hollow framework **18** and extend throughout substantially the entire or, if desired, any preferred portion of the height of the base section **10**. As shown best in Figure 4, suitable lateral brace members **24** may be attached to the supporting framework **18** and to the guideways **22** throughout the length of the same for rigidly mounting these guideways in vertical, parallel position.

At its upper end, the base member **10** is provided with a head block which, as shown in Figures 1 and 8, consists of a casing having side walls **26** receiving the guide rails or guideways **22**, and other opposite side walls **28** provided with laterally extending supporting brackets **30** between which are journaled horizontally disposed axles **32** having pulleys **34** fixedly secured thereto. The head block assembly thus constitutes the upper and anchor portion of an elevating mechanism for raising or lowering the movable or top section of the spar assembly as set forth hereinafter.

The upper member **12** of the spar assembly is adapted to be vertically raised or lowered with respect to the stationary base section **10**, through the agency of a supporting carriage which is guidingly and slidingly received within the base section **10**. This carriage yieldingly and rotatably supports, in a manner set forth hereinafter, a spar member **36**, which, as shown in Figures 1, 4–6, is preferably circular in cross-section and may consist of a steel shaft, of either solid or tubular construction as desired; or may consist of a wooden shaft of circular cross-section, upon the upper end of which is fixed a cap or crown, this latter construction being illustrated in Figures 1, 4–7.

The supporting carriage includes a suitable supporting platform of framework **38** upon which is fixedly secured a cage **40** which is preferably square in cross-section and which is provided with a base **42**, this base being suitably secured to and mounted upon the supporting framework **38**.

Vertically and longitudinally disposed channels or grooves **44**, see Figure 4, are provided in opposite sides of the cage **40** for sliding engagement upon the guideways **22**, while the supporting framework **38** is provided upon opposite sides with laterally extending support brackets **46** in which are journaled shafts **48** having pulleys **50** fixedly secured thereto and intermediate their ends having a tackle block **52** swivelled, this block having a pulley **54** journaled thereon. The pulleys **50** and **54** cooperate with the previously mentioned pulleys **34** through the agency of a cable in the manner diagrammatically shown in Figure 10, whereby the carriage may be raised or lowered, carrying with it the spar member **36**.

The bottom end of the spar member **36** is received in a cup **56** which constitutes a seat for the lower end of

this member. This cup is vertically slidable and is rotatable within a cylindrical member **58** which is snugly fitted into the cage **40** and attached thereto in any desired manner. Resting upon the bottom **42** of the cage **40** and within the cylindrical member **58** is a plate **60** constituting a lower bearing member and upon which rests a plurality of anti-friction elements such as ball bearings **62**, upon which is supported an upper bearing plate **64**. A plurality of compression springs **66** are positioned between the upper plate **64** and the bottom of the cup **56**. It will thus be seen that the lower end of the spar member **36** rests in the cup **56**; the latter is cushioned and yieldingly supported upon an anti-friction bearing assembly consisting of upper and lower pressure plates **64** and **60** separated by balls **62**. By this means, the spar member **36** is rotatably journaled in and yieldingly supported by the carriage for vertical movement therewith.

In order to further center the lower end of the spar member in the carriage, the upper internal surface of the cylindrical member **58** is diametrically enlarged or counterbored as at **68** and a bearing ring **70** is received within this counterbored portion and is spaced therefrom as by a series of balls **72** which are disposed between the adjacent cylindrical surfaces of the ring **70** and the counterbore **68** and between the adjacent horizontal surfaces of these elements. Received within the bore of the ring **70** is the exterior surface of the spar member **36**. In order to further guide the spar in its longitudinal movement with respect to the base section **10**, the framework **18** of the base section **10** is provided adjacent the top end thereof with brace members **74**, see Figure 6, which support a guide bearing or ring **76** which slidably and rotatably receives the spar member **36**.

Referring now more particularly to Figures 1 and 7, it will be seen that the upper end of the spar member **36** is provided with a metallic crown or cap **78** which is provided with a pair of annular or circumferential grooves **80** and **82** which are adapted to receive bands or rings **84** provided with suitable eyes **86** by means of which guy wires or the like **88** may be secured for steadying and bracing the assembly.

It will be understood that when the spar member **36** is formed of a solid or a tubular metal shaft, the crown plate **78** will be unnecessary and the annular rings may be formed directly in the upper end of the spar member.

The modified construction shown in Figure 2 is identical with that set forth in connection with Figure 1 in all respects except that the spar member **36** may be braced or reinforced by an enclosing framework **90** of any desired character for imparting rigidity and strength to the same. The upper end of this frame-work will have attached thereto or will merge into the above-mentioned cap pieces **78** with the associated structure previously described, while the lower end of the same will be rotatably received and carried by the previously described carriage structure.

Referring now especially to Figure 10, it will be seen that the two upper axles **32** rotate about fixed axes, while the two lower axles **48** are rotatably journaled upon the movable carriage of the device. A single endless cable is entrained over the series of pulleys as shown in Figure 10, this cable having one end indicated by the numeral **92** fixedly secured to any desired portion of the crown block or upper end of the base section, and thence being entrained over one of the block pulleys **54**, then upwardly over a pulley **34** on the shaft **32**, then downwardly over a pulley **50** on the shaft **48**. From thence, the cable passes beneath the carriage to the other side of the same and is entrained over a pulley **50** on the other of the lower axles **48**, then up over a pulley **34** on the other of the upper axles **32**, then downwardly over the other block pulley **54**, then upwardly over the other pulley **34** on the other shaft **32**, then downwardly over the other of the pulleys **50** on the shaft **48**. From thence the cable is entrained underneath the carriage again to the first side of the same, being passed around the pulley **50** and then upwardly over the other of the top pulleys **34** on the shaft **32**, from whence the end of the cable, indicated at **94**, is connected to any suitable source of power, not shown.

It will now be apparent that as the cable **94** is moved in the direction of the arrows shown in Figure 10, the carriage assembly will be raised carrying with it the spar member.

It will be apparent that there has been herein disclosed a spar assembly which is portable in nature whereby the same, when collapsed, may be readily transported to a location as desired; which may be quickly anchored in position by guy wires; which is provided with a vertically extensible spar top section which is telescopingly and guidingly received in the lower section and is raised or lowered by an improved mechanism and in an improved and guided manner. Further, the upper section is cushioned in its supporting carriage and is freely rotatable therein and is guided for rotation throughout its length.

In view of the foregoing description taken in conjunction with the accompanying drawings, it is believed that a clear understanding of the device will be quite apparent to those skilled in the art. A more detailed description is accordingly deemed unnecessary.

It is to be understood, however, that even though there is herein shown and described a preferred embodiment of the invention, the same is susceptible to certain changes fully comprehended by the spirit of the invention as herein described and within the scope of the appended claims.

Having described the invention, what is claimed as new is as follows:

1. For use in an extensible spar having a base section and a spar section telescopingly received in the base section, guide means comprising a pair of spaced parallel track members longitudinally and vertically disposed in said base, a cage slidably mounted on said track members, a bottom in said cage, a right circular cylindrical member mounted in and secured to said cage, an upwardly opening cup rotatably and resiliently mounted within said cylindrical member and on the bottom of said cage, said cup being substantially the same outside diameter as the inside diameter of the cylindrical member to support said spar section.

2. For use with an extensible spar having a base section and a spar section telescopingly received in the base section, guide means comprising a pair of spaced parallel track members longitudinally and vertically disposed in said base, a cage slidably mounted on said track members, a bottom in said cage, a right circular cylindrical member mounted in and secured to said cage, an upwardly opening cup rotatably and resiliently mounted within said cylindrical member and on the bottom of said cage, said cup being substantially the same outside diameter as the inside diameter of the cylindrical member to support said spar section, a bearing ring surrounding said spar and journaled in said cylindrical member in spaced relation to said cup.

3. For use in an extensible spar having a base section and a spar section telescopingly received in the base section, guide means comprising a pair of spaced parallel track members longitudinally and vertically disposed in said base, a cage slidably mounted on said track members, a bottom in said cage, a right circular cylindrical member mounted in and secured to said cage, a spar supporting upwardly opening cup slidably and rotatably received in said cylindrical member, said cup being substantially the same outside diameter as the inside diameter of the cylindrical member, a bearing assembly interposed between and cooperating with said cup and said bottom.

4. For use in an extensible spar having a base section

and a spar section telescopingly received in the base section, guide means comprising a pair of spaced parallel track members longitudinally and vertically disposed in said base, a cage slidably mounted on said track members, a bottom in said cage, a right circular cylindrical member mounted in and secured to said cage, a spar supporting upwardly opening cup slidably and rotatably received in said cylindrical member, said cup being substantially the same outside diameter as the inside diameter of the cylindrical member, a bearing assembly interposed between and cooperating with said cup and said bottom, resilient means interposed between and cooperating with said cup and said bearing assembly.

5. For use in an extensible spar having a base section and a spar section telescopingly received in the base section, guide means comprising a pair of spaced parallel track members longitudinally and vertically disposed in said base, a cage slidably mounted on said track members, a bottom in said cage, a right circular cylindrical member mounted in and secured to said cage, a spar supporting upwardly opening cup slidably and rotatably received in said cylindrical member, said cup being substantially the same outside diameter as the inside diameter of the cylindrical member, a bearing assembly interposed between and cooperating with said cup and said

bottom, resilient means interposed between and cooperating with said cup and said bearing assembly, a guide bearing mounted adjacent the end of the base section and aligned with said cylindrical member, said guide bearing being adapted to slidably and rotatably receive the spar section.

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