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I. W. SEARS, JR., ET AL

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UMBRELLA STRUCTURE

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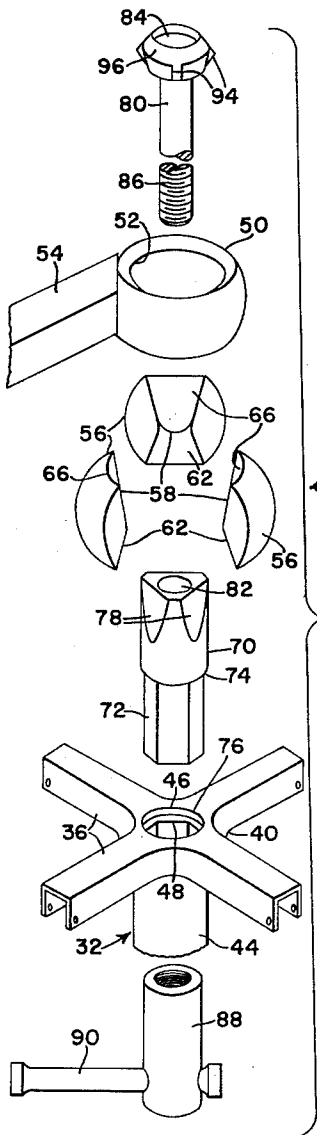


FIG. 1

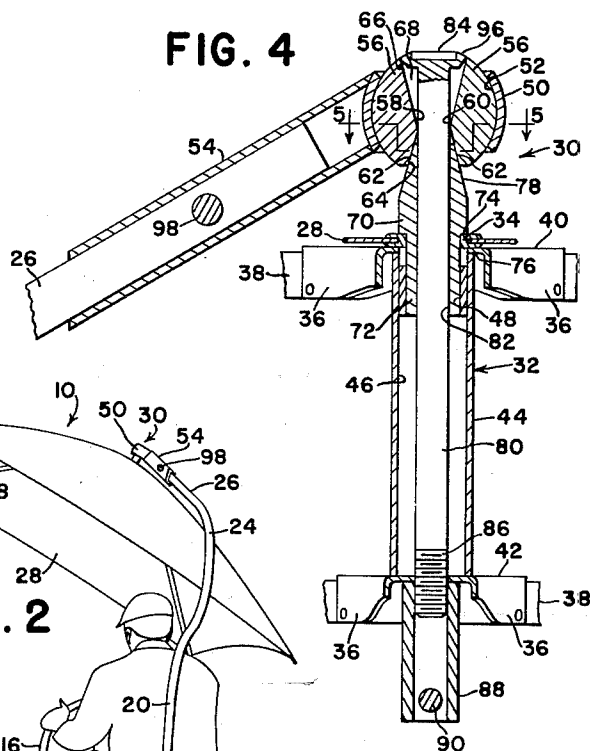


FIG. 2

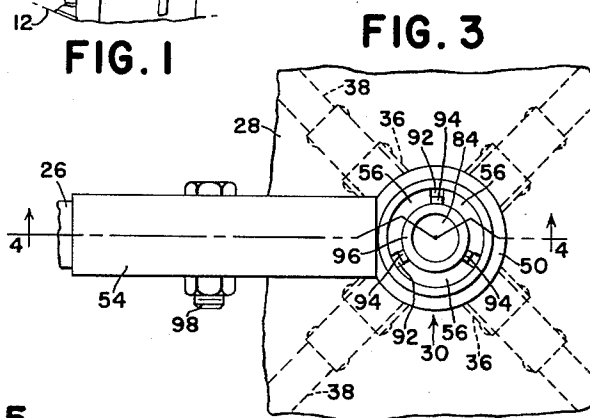


FIG. 3

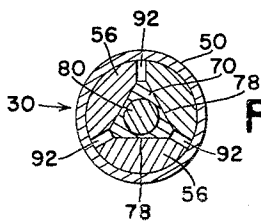


FIG. 4

INVENTORS
I. W. SEARS, JR.
V. H. NELSON

BY

Howard Nelson

ATTORNEY

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UMBRELLA STRUCTURE

Isaac W. Sears, Jr., 1718 S. Concord, Davenport, Iowa,
and Vernon H. Nelson, % Viola Sales & Engineering
Co., Viola, Ill.

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This invention relates to an umbrella and more particularly to an umbrella for use on vehicles such as farm tractors and the like.

In such environment, a satisfactory umbrella structure should include means for supporting the umbrella canvas or shade in proper protective relation to the operator and the support means should include not only provision for enabling tilting of the umbrella but should also be out of the way of the operator so as not to interfere with the operator as he changes position on the vehicle, as between sitting and standing, mounting and dismounting etc. Tilting adjustability is required to accommodate change in the relation of the vehicle to the sun, as when the vehicle changes direction in moving up and down a field, for example.

In general, the above requirements have been met heretofore but the use of an overhanging support, employed to place the supporting standard out of the operator's way, has also involved an adjustable shade mounting in which the adjusting means could not be reached from beneath the shade. According to the present invention, this disadvantage is overcome by the provision of novel adjusting means readily accessible from beneath the shade, whereby the operator can conveniently vary the tightness or looseness of the shade-mounting means and can thus more easily select the required tilt of the shade. Other significant features reside in improved ball and socket means, the provision of the ball as a plurality of complementary part-spherical segments received by the socket, novel wedging means for selectively incurring expansion and contraction of the segments in the socket, control means operative from beneath the shade to expand and contract the ball, an improved hub or spider assembly for the shade, and a novel and economical mounting means that is also readily adaptable to existing umbrella structures for converting same in the field if desired.

The foregoing and other important objects and desirable features, inherent in and encompassed by the invention, will become apparent as a preferred embodiment is disclosed, by way of example, in the following description and accompanying sheet of drawings, the several figures of which are described below.

Figure 1 is a fragmentary environmental view showing a tractor-mounted umbrella.

Figure 2 is an exploded, enlarged perspective of the hub and mounting assembly.

Figure 3 is a plan of the assembly.

Figure 4 is a section on the line 4—4 of Figure 3.

Figure 5 is a section on the line 5—5 of Figure 4.

Figure 1 illustrates a typical but by no means exclusive use of the umbrella structure, designated in its entirety at 10, on a popular type of farm tractor having an operator's station including a floor or platform 12, a seat 14 and a steering wheel 16. The umbrella structure is carried by the tractor via a mounting bracket 18, here carried by the back of the seat 14, and includes

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a support or standard 20 having a lower upright part 22 received in the bracket 18 and an upper gooseneck portion 24 including a support part 26 in overhanging relation to an umbrella shade 28. The shade is carried by the support part 26 by mounting means, denoted generally by the numeral 30, which cooperates with a central spider or hub 32 (Figures 2 and 4) beneath the shade. The shade of course has a central grommeted aperture 34 coaxial with the hub and the hub has a plurality of upper and lower radial arms 36 which carry ribs or braces 38 to expand and maintain the shape of the shade. These arms are on upper and lower members 40 and 42 which are rigidly secured, as by welding, to a central tubular core 44; although, the detailed construction of the hub as such may be other than the representative form illustrated. The core 44, being tubular, gives the hub an axial aperture 46 which is of course normally in axial register with the shade aperture 34. The upper portion of the aperture 46 is of reduced size and of non-circular shape, here hexagonal as shown at 48 (Figure 2).

The mounting means 30 is a ball and socket means made up of a socket element 50 in the form of a ring having an internal part-spherical annular surface 52 and rigidly secured, as by welding, to a tubular mount 54 which receives and forms a removable extension of the standard overhanging part 26. The ball and socket means further includes a multi-piece ball element made up of a plurality—here three—of part-spherical segments 56 normally circumferentially grouped about a common axis coaxial with the hub 32 and received in the socket 50 to ride in the part-spherical socket surface 52. Each segment has an inner configured recess 58 and when the segments are assembled to form a ball these recesses provide an axial passage 60 (Figure 4) through the ball. Each segment recess further has a lower downwardly and outwardly flared face 62 and these faces combine, when the segments are assembled, to afford a lower downwardly convergent, three-sided wedge-receiving pocket 64 (Figure 4). The recesses 58 also respectively have upper faces flared upwardly and outwardly as part-conical faces 66 which combine to provide an upper, conical, wedge-receiving pocket 68 (Figure 4).

The upper part of the hub 32 carries coaxially and removably therein a lower wedge 70 which has a depending non-circular shank 72, here hexagonal in section to mate with the hexagonal aperture portion 48 in the hub. Because of the differences in diametrical dimensions, a shoulder 74 results on the wedge, which abuts the top part of the hub at 76.

The upper portion of the wedge has a plurality—here three—of upwardly converging wedge sides or faces 78 which cooperate with the lower wedge faces 62 of the segments 56 when assembled. Or, the wedge-shaped part of the wedge is received in the lower pocket 64, from which it will be seen that an upper axial force applied to the wedge will radially expand the segments into tighter engagement with the socket surface 52.

As shown in Figure 4, the grommeted shade aperture 34 is received between the top of the hub and the shoulder 74.

In order to achieve and balance this expansion, control means is employed, including a rod-like connecting member 80 passed downwardly through the ball passage 60, through an axial opening 82 in the wedge 70 and through the hub core 44. This member has an upper headed end 84, of partly conical shape to complement the upper conical pocket 68 established by the assembled segments 56, and a lower threaded end 86 that extends below the hub 32 when assembled. An

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internally threaded control member 88, having a handle 90 is threaded onto this lower threaded end 86 and abuts the bottom of the hub 32. When the control member is tightened, it draws the headed end 84 of the rod downwardly into the upper pocket 68 of the ball and simultaneously forces the wedge 70 upwardly into the lower pocket 64 of the ball, thus applying axially opposed forces to the rod and wedge to radially expand the segments and thus to tighten the ball and socket means. Reversing the control member will reverse these forces and thus will incur contraction of the segments as the faces 62 and 66 slip axially because of the weight of the umbrella shade and hub, plus the manual force applied by the operator as he grasps and tilts the shade. Hence, loosening of the ball and socket means enables easy selection of a desired tilted position and tightening of said means secures the selected position, all from beneath the shade and thus extremely convenient to the operator.

The angular dimension of each segment 56 is such that the segments are so arranged and proportioned when grouped about the headed end of the rod 80 that radial gaps 92 occur between neighboring segments (Figure 5). Radial lugs 94 on the head 84 respectively interfit with and partly fill these gaps to equalize the segments and to maintain the proper circumferential grouping thereof. The head 84 is annularly chamfered at 96 so as to contribute to the recessing of the head in the segments so that the range of tiltability is increased; that is, the head does not interfere with the internal socket surface 52.

As an expedient in assembly and disassembly, the extension 54 is removably secured to the overhanging support part 26 as by a bolt 98.

The several components are easily and economically designed for ready assembly and disassembly and in addition to affording a novel mounting assembly as described, in which any part may be easily replaced if damaged or worn, provides a conversion kit for modifying existing umbrellas that do not have the control means accessible from below, as via the member 88. Other features and advantages will readily occur to those versed in the art, as will many modifications of the preferred embodiment disclosed, all of which may be achieved without departure from the spirit and scope of the invention.

What is claimed is:

1. In an umbrella structure including a shade having a coaxial vertically apertured central hub, a support above and in overhanging relation to the shade and having a support part above the shade and in vertical alinement with the hub, the improvement comprising ball and socket means interconnecting the hub and the support part to mount the shade on the support and including complementary ball and socket elements, one of said elements being selectively expansible and contractible relative to the other to vary the tightness of said ball and socket means so that the shade is selectively movable to and fixable in different tilted positions; and central means beneath the shade and extending upwardly completely through the hub and shade and operatively connected to and for selectively expanding and contracting said expansible and contractible element relative to the other element, said control means including a control member beneath said shade for operating said control means.

2. The invention defined in claim 1, in which: said selectively expansible and contractible element is the ball element and comprises a plurality of part-spherical segments circumferentially grouped about a common axis, and the socket element has an annulus surrounding the grouped ball element segments and having an interior part-spherical surface receiving said ball element; said segments respectively have interior surfaces grouped about said axis to afford a coaxial passage through said ball element; and the control means includes a headed member passed downwardly through the passage and hub and adapted selectively to incur radial expansion of

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the segments within the socket element, and said control member is operative to apply axial forces to the headed member to incur said expansion and contraction of the segments.

3. In an umbrella structure including a centrally apertured umbrella shade having a vertically apertured central hub, a support above and in overhanging relation to the shade and having a support part above the shade and in vertical alinement with the hub, the improvement comprising: articulate mounting means between the hub and the support part and interconnecting the hub and support part to mount the shade on the support for tilting adjustment of the shade and hub relative to the support, said means including complementary clamping elements capable of being selectively loosened and tightened to vary the tightness of said mounting means so that the shade is selectively fixable in different tilted positions; and control means beneath the shade and extending upwardly through the shade and through the apertured hub and operatively connected to said mounting means for selectively tightening and loosening same, said control means including a control member beneath said shade for operating said control means.

4. In an umbrella structure including an umbrella shade having a central hub, a support above and in overhanging relation to the shade and having a support part in vertical alinement with the hub, the improvement comprising: articulate mounting means between the hub and the support part and above the shade and interconnecting the hub and support part to mount the shade on the support for tilting adjustment of the shade and hub relative to the support, said means including complementary clamping elements capable of being selectively loosened and tightened to vary the tightness of said mounting means so that the shade is selectively fixable in different tilted positions; and control means connected to said mounting means above the shade for selectively tightening and loosening said mounting means, said control means including a control member beneath said shade and closely adjacent to the hub for operating said control means.

5. In an umbrella structure including a centrally apertured umbrella shade having a central hub provided with a vertical aperture therethrough opening upwardly through the shade aperture, a support above and in overhanging relation to the shade and having a support part above the shade and in vertical alinement with the hub aperture, the improvement comprising a socket element on the support part generally coaxial with said hub aperture and including an interior part-spherical surface; a plurality of part-spherical segments grouped circumferentially about a common axis coaxial with the hub aperture and complementarily cooperative to afford a ball received in the socket element, each segment having an interior recess and said recesses complementing each other to provide a vertical passage through the ball, each recess having an upper face diverging upwardly and a lower face diverging downwardly, said upper faces providing an upper wedge pocket and said lower faces providing a lower wedge pocket; a lower wedge coaxially abutting the upper part of the hub and received in the lower wedge pocket, said lower wedge having a coaxial opening therethrough; a rod passing coaxially through the passage, lower wedge opening and hub and shade apertures and having a head providing an upper wedge received in the upper wedge pocket and a lower end extending coaxially below the hub; and a control member below the shade and cooperative with said lower end of the rod for drawing the rod downwardly to apply axially opposed forces to the upper and lower wedge parts for radially expanding the segments in the socket element.

6. In an umbrella structure including a centrally apertured umbrella shade having a central hub provided with a vertical aperture coaxial with the shade aperture, a support in overhanging relation to the shade, a socket ele-

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ment carried by the support above the shade and coaxial with the shade and hub apertures; radially expansible and contractible ball means in the socket; an axially movable connecting member passing downwardly through the ball means and the shade and hub apertures for connecting the ball means to the hub; means on the connecting member above the shade for incurring expansion and contraction of the ball means upon axial movement of the connecting member; and means below the shade for causing axial movement of the connecting member. 10

7. In an umbrella structure including a centrally apertured umbrella shade having a central hub provided with a vertical aperture coaxial with the shade aperture, a support in overhanging relation to the shade, the improvement comprising a socket element carried by the support above the shade and coaxial with the shade and hub apertures; radially expansible and contractible ball means in the socket and means extending upwardly 15

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through the hub and shade for interconnecting the hub and the ball means and selectively operative from beneath the shade to incur expansion and contraction of the ball means within the socket element.

8. The invention defined in claim 7, in which: the means extending upwardly through the hub and shade has an upper headed end recessed in the ball means.

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