July 17, 1962 R. A. RUSSELL 3,044,478

TILTABLE UMBRELLA

Filed April 25, 1961

FIG. 1.

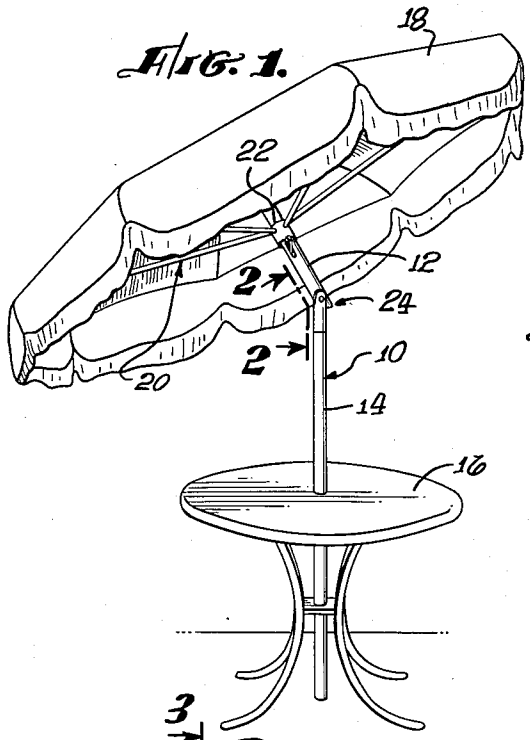



FIG. 4.

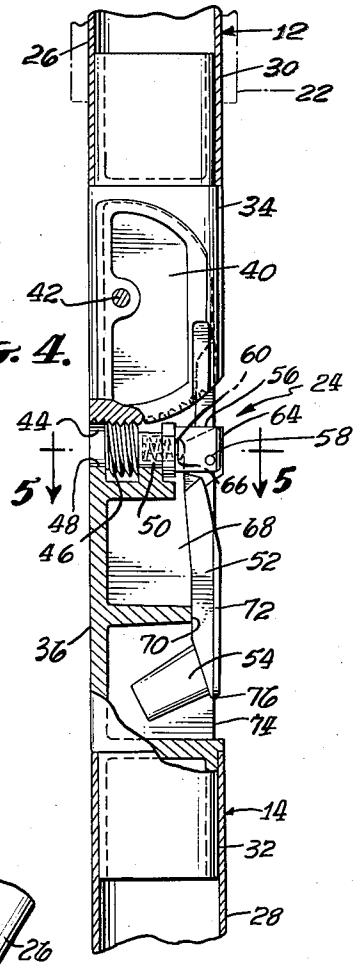



FIG. 2.

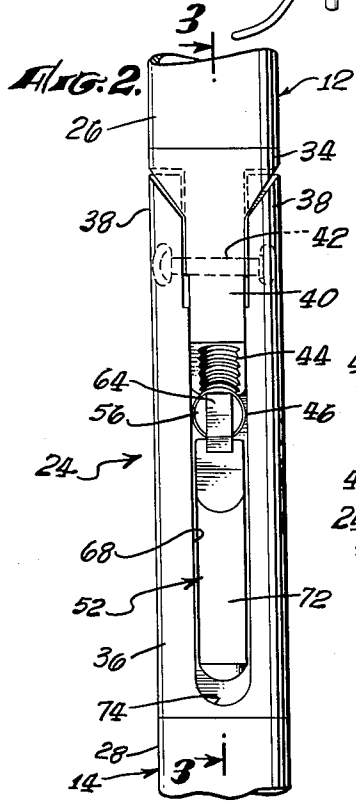



FIG. 3.

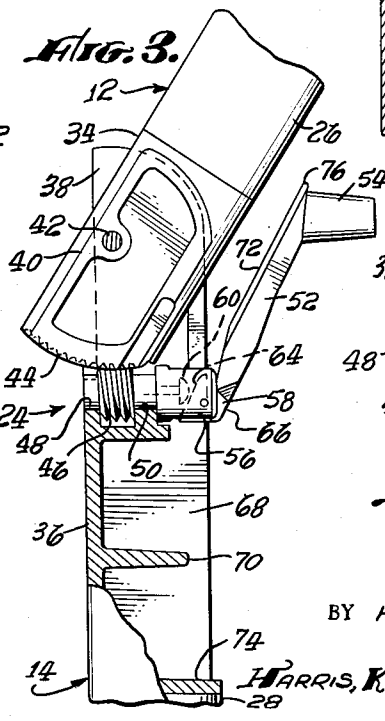
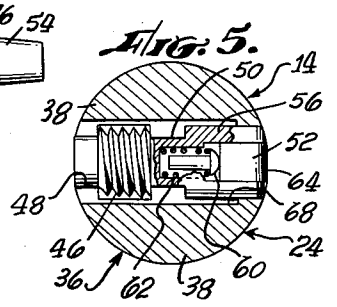



FIG. 5.




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3,044,478

# TILTABLE UMBRELLA

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4 Claims. (Cl. 135—20)

The present invention relates in general to umbrellas, especially large umbrellas of the so-called beach, garden or patio variety, and relates more particularly to a tiltable umbrella of this type having improved means for varying the angle of the canopy thereof as desired to suit existing conditions of sun angle, wind direction, or the like.

The usual tiltable umbrella includes as articulate staff having an upper staff member which carries the canopy and a lower staff member which may be anchored by inserting it into a socket in a patio table, into the ground in a garden, into the sand at the beach, or the like. The adjacent ends of the upper and lower staff members are pivotally interconnected so that the angle of the canopy on the upper staff member may be varied as hereinbefore outlined. Assuming that the lower staff member is vertical, the canopy is in a horizontal position when the upper staff member is aligned with the lower staff member. When the lower staff member is pivoted relative to the lower into an angularly misaigned position, the canopy on the upper staff member is correspondingly tilted.

A primary object of the invention is to provide a pivotal interconnection or pivoted joint between the upper and lower staff members which incorporates directly therein very simple and positive means for controlling and varying the angle of tilt of the upper staff member.

An important object of the invention is to provide a pivotal interconnection between two staff members which incorporates directly therein gear means for controlling and varying the angle between the staff members.

Another object of the invention is to provide a tiltable umbrella staff, or similar structure, which includes: two staff members; means pivotally interconnecting adjacent ends of the staff members for relative pivotal movement between aligned and misaligned positions about a pivot axis; a driven gear segment carried by one of the staff members and having its axis on the pivot axis; and a driving gear carried by the other of the staff members and meshed with the driven gear segment.

Another object of importance is to provide a structure of the foregoing nature wherein the driven gear segment is a worm wheel segment and wherein the driving gear is a worm. With this construction, the worm gearing automatically maintains the desired angular relation between the upper staff member and the lower staff member, no auxiliary lockintg means being required, which is an important feature.

Another important object of the invention is to provide a pivotal interconnection between two umbrella staff members wherein the worm is completely housed within the staff member by which it is carried, and wherein the worm wheel segment lies completely within the lateral confines of the staff when the two staff members are aligned. With this construction, a collar forming part of a collapsible canopy frame may slide over the pivotal interconnection between the staff members in collapsing the canopy, which is an important feature.

A further object is to provide a crank connected to the driving worm and pivotable relative thereto between extended and retracted positions, and to provide a recess in the staff member carrying the driving worm which receives the entire crank therein when the crank is in its retracted position. Again, this construction permits the collar of the canopy frame to slide downwardly over the pivoted joint and the retracted crank when collapsing the



canopy. Thus, the pivoted joint, and the tilting means incorporated therein, offer no obstruction to the sliding collar of the collapsible canopy frame when the two staff members are angularly aligned and when the crank is retracted, which is an important feature of the invention.

Another object of the invention is to provide detent means acting between the driving worm and the crank for releasably retaining the crank in either of its extended and retracted positions.

Still another object is to provide a relationship between the crank and the recess which permits ready extension of the crank when desired.

The foregoing objects, advantages, features and results of the present invention, together with various other objects, advantages, features and results thereof which will be evident to those skilled in the art to which the invention relates in the light of this disclosure, may be achieved with the exemplary embodiment of the invention described in detail hereinafter and illustrated in the accompanying drawing, in which:

FIG. 1 is a perspective view of a tiltable umbrella which embodies the invention;

FIG. 2 is an enlarged, fragmentary side elevational view taken as indicated by the arrowed line 2—2 of FIG. 1;

FIG. 3 is a view, partially in longitudinal section and partially in side elevation, taken as indicated by the arrowed line 3—3 of FIG. 2;

FIG. 4 is a view similar to FIG. 3, but showing parts in different operating positions; and

FIG. 5 is a transverse sectional view, on an enlarged scale, taken as indicated by the arrowed line 5—5 of FIG. 4 of the drawing.

In the drawing, the numeral 10 designates an articulate umbrella staff which includes tubular upper and lower staff members 12 and 14. The lower staff member 14 may be supported in a vertical position in any suitable manner, as by inserting it into a central socket in patio table 16.

The umbrella includes a canopy 18 mounted on a collapsible canopy frame 20 of conventional construction, such a canopy frame being shown, for example, in my Patent No. 2,914,154, granted November 24, 1959. As disclosed in that patent, the collapsible canopy frame 20 includes a slidable collar 22 on the staff 10. As will be apparent, when the canopy 18 is collapsed, the collar 22 slides downwardly along the staff 10. The canopy frame 20 may be held in its extended position in any suitable manner, such as, for example, that shown in the patent mentioned. Alternatively, the canopy frame 20 may be latched in its extended position by a latch, not shown, on the staff 10 on which the collar 22 is seatable.

As is conventional in umbrellas of this type, and as shown in FIG. 1 of the drawing, the upper staff member 12 may be tilted relative to the lower staff member 14 to vary the angle of the canopy 18 as desired to suit conditions of use. To accomplish this, the two staff members 12 and 14 are pivotally interconnected by a pivoted or tilting joint 24 in which the present invention is incorporated and which will now be considered.

The upper and lower staff members 12 and 14 respectively include upper and lower tubes 26 and 28, the adjacent ends of which are respectively telescoped over and suitably secured to cylindrical extensions 30 and 32 of fittings 34 and 36, respectively. The lower fitting 36 is provided with a bifurcated upper end having laterally spaced arms 38 which receive therebetween a depending arm 40 of the upper fitting 34. A pivot pin 42 extends through the arms 38 and 40 to pivotally interconnect the upper and lower fittings 34 and 36, and thus the adjacent ends of the upper and lower staff members 12 and 14.

As will be apparent, the upper staff member 12 may be pivoted, about the pivot axis provided by the pin 42, from a position wherein the staff members are aligned to positions wherein they are angularly misaligned. In other words, the angle of tilt of the upper staff member 12 relative to the lower staff member 14 may be varied from zero to vary correspondingly the angle of tilt of the canopy 18 from the horizontal.

The depending arm 40 of the upper fitting 34 provides at its lower end a driven gear segment, preferably a worm wheel segment 44, the axis of which coincides with the axis of the pivot pin 42. As will readily be apparent from FIGS. 3 and 4, the worm wheel segment 44 swings, about the axis of the pivot pin 42, into and out of the space between the arms 38 of the lower fitting 36 as the inclination of the upper staff member 12 is decreased and increased, respectively. When the upper staff member 12 is aligned with the lower staff member 14, the worm wheel segment 44 is entirely housed within the space between the arms 38 of the lower fitting 36.

The lower fitting 36 carries a driving gear, preferably a worm 46, which is rotatable in bearings 48 and 50 shown as formed integrally with the lower fitting 36. The worm 46 is meshed with the worm wheel segment 44, the teeth on these gears being shown as simple threads for convenience in and economy of manufacture.

As will be apparent, by rotating the worm 46, the worm wheel segment 44 is caused to pivot about the axis of the pin 42 to correspondingly pivot the upper staff member 12 relative to the lower staff member 14, and thus correspondingly change the angle of tilt of the canopy 18. Since worm gearing is irreversible, the canopy 18 will remain in any position to which it is tilted, or in an untilted position, without any auxiliary locking means, which is an important feature of the invention. Further, by incorporating this worm gearing directly in the tilting joint 24 in the manner disclosed, a very simple, compact and inexpensive structure results, which is another important feature.

The worm 46 is actuated by a crank 52 which is provided with a handle 54 at its outer end and which is pivotally connected to the worm at its inner end. More particularly, the worm 46 is provided with a bifurcated axial extension 56 into which the inner end of the crank 52 is inserted and to which it is connected by a pivot pin 58.

As will be apparent from FIGS. 3 and 4 of the drawing, the crank 52 is pivotable about the axis of the pin 58 between an extended, operative position, shown in FIG. 3, and a retracted, inoperative position, shown in FIG. 4. The crank 52 is retained in each of these positions in a releasable manner by a detent means comprising a detent pin 60 carried by the worm 46 and biased axially thereof by a compression spring 62. The detent pin 60 is engageable with a surface 64 of the crank 52 to releasably retain the crank in its extended position, and is engageable with a surface 66 of the crank to releasably retain it in its retracted position. The crank 52 itself holds the detent pin 60 in place against the action of the spring 62.

The fitting 36 of the lower staff member 14 is provided therein with a cavity or recess 68 which completely houses the crank 52 when the latter is in its retracted position, inward pivotal movement of the crank beyond its retracted position being prevented by an integral stop 70 on the lower fitting 36 within the recess 68. The external surface 72 of the crank 52 is substantially flush with the external surface of the lower fitting 36 when the crank is retracted, the external surface 72 of the crank preferably being of arcuate cross section corresponding to the arcuate cross section of the fitting 36 itself.

It will be apparent that, with the foregoing construction, the sliding collar 22 of the canopy frame 20 may slide freely past the tilting joint 24, and the crank 52 incorporated therein, when the staff members 12 and 14 are aligned and when the crank is in its retracted position. Thus, the present invention provides no obstruction whatsoever to sliding movement of the collar 22 in collapsing or extending the canopy frame 20, which is an important feature of the invention.

As will be apparent from FIG. 4 of the drawing, the axial length of the recess 68 exceeds the axial length of the crank 52, when it is in its retracted position, sufficiently to provide a gap 74 for insertion of a finger under a projecting lip 76 on the crank adjacent the handle 54. Thus, the crank 52 may readily be withdrawn from the recess 68 and pivoted outwardly into its extended, operative position. Of course, the crank 52 may be retracted simply by pivoting it about the axis of the pin 58 in opposition to the action of the detent pin 60, and then pressing it into the recess with a thumb or finger.

Although an exemplary embodiment of the invention has been disclosed herein for purposes of illustration, it will be understood that various changes, modifications and substitutions may be incorporated in such embodiment without departing from the spirit of the invention as defined by the claims which follow.

I claim:

1. An articulate staff having substantially constant lateral dimensions longitudinally thereof and including:

(*a*) two staff members having adjacent ends and having lateral dimensions which are substantially the same and which are substantially constant longitudinally thereof;

(*b*) pivot means entirely within the lateral confines of said staff members pivotally interconnecting said adjacent ends of said staff members for relative pivotal movement between aligned and misaligned positions about a pivot axis provided by said pivot means;

(*c*) a driven gear segment carried by one of said staff members entirely within the lateral confines thereof and having its axis on said pivot axis;

(*d*) a driving gear carried by the other of said staff members entirely within the lateral confines thereof and meshed with said driven gear segment, rotation of said driving gear causing said driven gear segment to pivot said staff members between their aligned and misaligned positions;

(*e*) a crank for rotating said driving gear pivotally connected directly to said driving gear and pivotable relative thereto between extended and retracted positions;

(*f*) said other staff member being provided with a recess of a size to completely receive said crank therein when it is in its retracted position; and

(*g*) whereby said staff has substantially constant lateral dimensions longitudinally thereof when said staff members are in their aligned positions and when said crank is in its retracted position within said recess.

2. An articulate staff having a substantially constant diameter and including:

(*a*) two staff members having adjacent ends and having diameters which are substantially the same and which are substantially constant;

(*b*) pivot means entirely within the lateral confines of said staff members pivotally interconnecting said adjacent ends of said staff members for relative pivotal movement between aligned and misaligned positions about a pivot axis provided by said pivot means;

(*c*) a worm wheel segment carried by one of said staff members entirely within the lateral confines thereof and having its axis on said pivot axis;

(*d*) a worm carried by the other of said staff members entirely within the lateral confines thereof and meshed with said worm wheel segment, rotation of said worm causing said worm wheel segment to pivot said staff members between their aligned and misaligned positions;

(*e*) a crank for rotating said worm pivotally connected

directly to said worm and pivotable relative thereto between extended and retracted positions;

(*f*) said other staff member being provided with a recess of a size to completely receive said crank therein when it is in its retracted position; and

(*g*) whereby said staff has a substantially constant diameter when said staff members are in their aligned positions and when said crank is in its retracted position within said recess.

3. An articulate staff having a substantially constant diameter and including:

(*a*) two staff members having adjacent ends and having diameters which are substantially the same and which are substantially constant;

(*b*) pivot means entirely within the lateral confines of said staff members pivotally interconnecting said adjacent ends of said staff members for relative pivotal movement between aligned and misaligned positions about a pivot axis provided by said pivot means;

(*c*) a worm wheel segment carried by one of said staff members entirely within the lateral confines thereof and having its axis on said pivot axis;

(*d*) a worm carried by the other of said staff members entirely within the lateral confines thereof and meshed with said worm wheel segment, rotation of said worm causing said worm wheel segment to pivot said staff members between their aligned and misaligned positions;

(*e*) said worm wheel segment and said worm having meshed teeth in the form of threads;

(*f*) a crank for rotating said worm pivotally connected directly to said worm and pivotable relative thereto between extended and retracted positions;



(*g*) said other staff member being provided with a recess of a size to completely receive said crank therein when it is in its retracted position; and

(*h*) whereby said staff has a substantially constant diameter when said staff members are in their aligned positions and when said crank is in its retracted position within said recess.

4. In a tiltable umbrella, the combination of:

(*a*) an articulate staff as set forth in claim 2 wherein said one staff member is an upper staff member and wherein said other staff member is a lower staff member;

(*b*) a collapsible canopy frame connected to said upper staff member;

(*c*) said canopy frame including a collar encircling said staff and having an inside diameter substantially equal to, but slightly larger than, the diameter of said staff; and

(*d*) whereby said collar is slidable from either of said staff members onto the other when said staff members are in their aligned positions and when said crank is in its retracted position within said recess.

**References Cited** in the file of this patent

UNITED STATES PATENTS

| | | |
|---|---|---|
| 2,278,534 | Dickason | Apr. 7, 1932 |
| 2,346,615 | Santon | Apr. 11, 1944 |
| 2,427,386 | Claud-Mantle | Sept. 16, 1947 |
| 2,595,697 | Pereira | May 6, 1952 |
| 2,721,569 | Militano | Oct. 25, 1955 |

FOREIGN PATENTS

| | | |
|---|---|---|
| 119,883 | Australia | Apr. 26, 1945 |