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[54] **POCKET UMBRELLA WITH ROTARY OPENING AND CLOSING MECHANISM**

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[58] **Field of Search** 135/20–31

[56] **References Cited**

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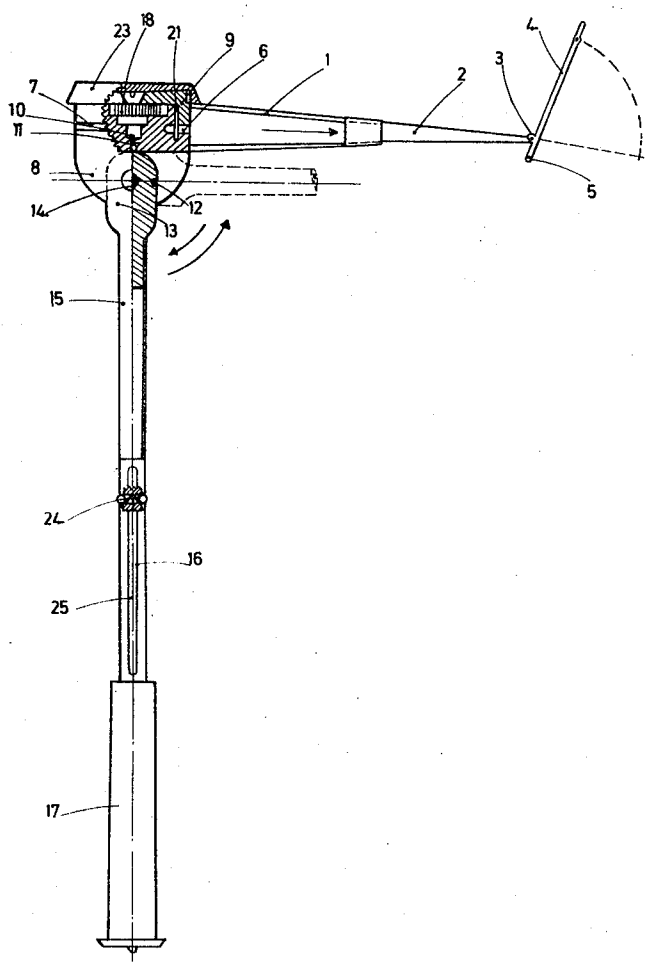
[57] **ABSTRACT**

A collapsible umbrella, having a telescoping main shaft and a unique umbrella cloth supporting rib arrangement, wherein all ribs are telescoping and foldable and are slidable annularly about the shaft; the ribs are slidable between a collapsed condition where all ribs are bunched together and an open condition where the ribs are spread apart.

7 Claims, 3 Drawing Figures



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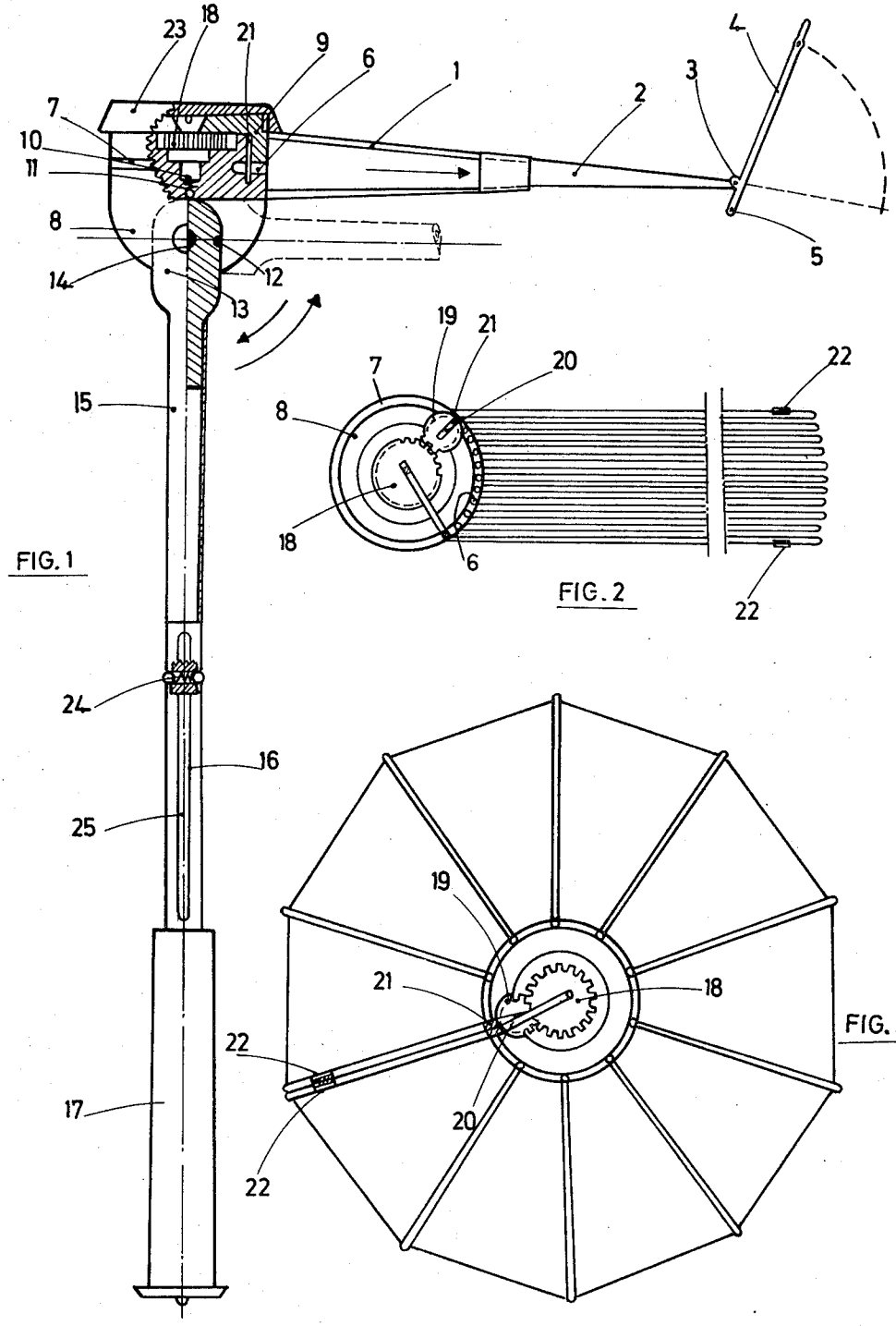

FIG. 1

FIG. 2

FIG. 3

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POCKET UMBRELLA WITH ROTARY OPENING AND CLOSING MECHANISM

The present invention relates to a compactly foldable or pocket umbrella in which both the umbrella cloth supporting ribs and the main shaft are comprised of three sections and the ribs open angularly by means of a gear mechanism with satellite pinion in such a manner that said ribs can be self-supporting with elimination of holders and other customary mechanisms.

Up to now it has been practically impossible, with the use of the customary mechanisms of umbrellas, to reduce them when they were not being used to a size suitable to be carried in the pocket, due primarily to their complexity resulting from the arrangement of the ribs with respect to their corresponding holders since the ribs cannot be self-supporting due to the configuration which they must have and which is to permit them to swing on the ferrule body.

The umbrella of the present invention provides self-supporting ribs which do not swing, but rather slide angularly about an annular chamber provided in the ferrule hub, to which hub the head of the telescopically collapsible shaft is connected also for pivoting.

In addition to the advantages which have been indicated above, note the substantial simplification in manufacture and assembly which is represented by the possibility of obtaining the ribbing by injection-molding of a suitable material and the elimination of the manual operations of connecting and mounting the ribbing, it being easily understood that this mechanization and method lead to a substantial saving.

For a better understanding of the above, reference may be had to the accompanying drawings in which the invention is schematically shown and which will be described in detail below.

In said drawings:

FIG. 1 shows in a cross-sectional elevation view the umbrella in open position;

FIG. 2 is a plan view of the bundle of ribs in the closed position of the assembly;

FIG. 3 is a plan view of the ribbing in open position.

As shown in the drawings, each of the umbrella ribs consists of three different sections. Within a fixed region 1 is telescopically received intermediate section 2 which at its end portion has a pivot 3 to receive a third section of rib 4 which ends in the corresponding hooking head. In order to limit rotation of section 4 upon opening, it is extended by a small lug 5.

Each section 1 of a rib is extended centrally by a pin 6, which passes through an annular groove 7 which has a short radial width, equal to that of pin 6, and which is located at the periphery of the ferrule hub, as shown in FIG. 2. Pins 6, therefore, end in this narrow chamber provided within the ferrule hub. The ribs, therefore, are caused to move only through a closely confined annular pathway that is defined by groove 7. The ferrule hub is formed by the body 8 and the cover 9, which are connected together by a screw 10. Screw 10 tensions a spring which urges a ball 11 to engage in one of the grooves 12 of the head 13 of the shaft which is articulated on the pin 14. The shaft is composed of two telescopic tubes 15 and 16 and a handle 17, which retracts telescopically with respect to tube 16.

The rotary mechanism which effects the opening and closing of the ribbing comprises a ring gear 18 fastened by screw 10 within the chamber of the ferrule hub and of a satellite pinion 19 wedged on gear 18 and connected by a small connecting rod 20 to the needle 21. Needle 21 is the one that prevents the emergence of the pins 6 of the ribs. Upon the pulling provided by the rotation, needle 21 tends to displace the rib with which it is rigidly connected so that the rest of the ribs move apart at an angle under the stress of the cloth, which they support, until two of the said ribs come laterally against each other, at which time the surface of the cloth is continuous. This position of maximum opening is maintained by the incorporation of a few small fasteners, which most simply may comprise magnetic blocks 22, which face each other.

The screw connecting the elements which form the ferrule hub is concealed and protected by a ferrule cover 23 threaded on the outside of the cover 9. The telescopic mechanism of the shaft contains elastic means 24 which limit the extreme positions as well as longitudinal channels 25 which prevent relative rotation.

The shape, dimensions and materials may vary and, in general, whatever is secondary or subsidiary, provided that it does not alter, change or modify the essence of the object described.

I claim:

1. A collapsible umbrella, comprising a shaft, an umbrella covering and a plurality of ribs to which such covering is secured for being supported by said ribs;

said umbrella shaft including a ferrule hub; an annular short radial width groove in said hub; each said rib ending in a respective pin of a size to fit in said hub groove sufficiently tightly so that said pins and thus said ribs are displaceable only annularly around said shaft between a position where said ribs are bunched together and a position where said ribs are spaced apart around said shaft.

2. The umbrella of claim 1, wherein each said rib is comprised of a first section which includes its said secured end, a second section which telescopes with respect to said first section, and a third section pivotally connected at the free end of said second section to pivot open and closed with respect to said second section; and a lug on said rib for engaging and limiting the pivoting of said third section.

3. The collapsible umbrella of claim 1, wherein said shaft is comprised of a plurality of telescoping sections; an elastic delimiting mechanism for retaining said shaft sections in the extreme open and retracted positions, and including an end section into which the entire said shaft is retractable.

4. A collapsible umbrella, comprising a shaft, an umbrella covering and a plurality of ribs to which said covering is secured for being supported by said ribs;

each said rib having an end, which is secured to said shaft and which end is displaceable annularly around said shaft between a position where said ribs are bunched together and a position where said ribs are spaced apart around said shaft;

said shaft including a hub, with a chamber therein; each said rib secured end including a rib support which extends into and is supported within said hub chamber;

a ring gear within said chamber; a rotatable shaft connected to said ring gear for rotating same;

a satellite pinion gear within said chamber and meshing with said ring gear, to be moved about said ring gear as the latter is rotated; one of said rib supports being connected to said satellite pinion gear, thereby enabling said ribs to be moved upon movement of said pinion gear.

5. The umbrella of claim 3, wherein it is one of the ribs at one end of the bunch thereof, when said ribs are bunched together, that is connected with said pinion gear; said rib at the other end of the bunch thereof being connected with said shaft so as to rotate therewith.

6. A collapsible umbrella, comprising a shaft, an umbrella covering and a plurality of ribs to which said covering is secured for being supported by said ribs;

each said rib having an end, which is secured to said

shaft and which end is displaceable annularly around said shaft between a position where said ribs are bunched together and a position where said ribs are spaced apart around said shaft;

said shaft is pivotable with respect to said plurality of ribs between two extreme positions; a spring biased ball biased toward said shaft; said shaft having two detents for being engaged by said ball to define the said extreme positions of said shaft.

7. The collapsible umbrella of claim 6, wherein said shaft is comprised of a plurality of telescoping sections; an elastic delimiting mechanism for retaining said handle sections in the extreme open and retracted positions, and including an end section into which the entire said shaft is retractable.

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