

[54] COLLAPSIBLE UMBRELLA

[76] Inventor: **Vernon Harrell**, 13875 N.W. 22 Ave., Opalocka, Fla. 33054

[22] Filed: **Oct. 9, 1973**

[21] Appl. No.: **404,216**

[52] U.S. Cl. **135/20 R, 135/34**

[51] Int. Cl. **A45b 19/00**

[58] Field of Search **61/20 R, 34, 36 F**

[56] **References Cited**

UNITED STATES PATENTS

3,534,752	10/1970	Vanzini	135/20 R
3,706,160	12/1972	Deibert	135/20 R
3,709,238	1/1973	Leopoldi et al.....	135/20 R

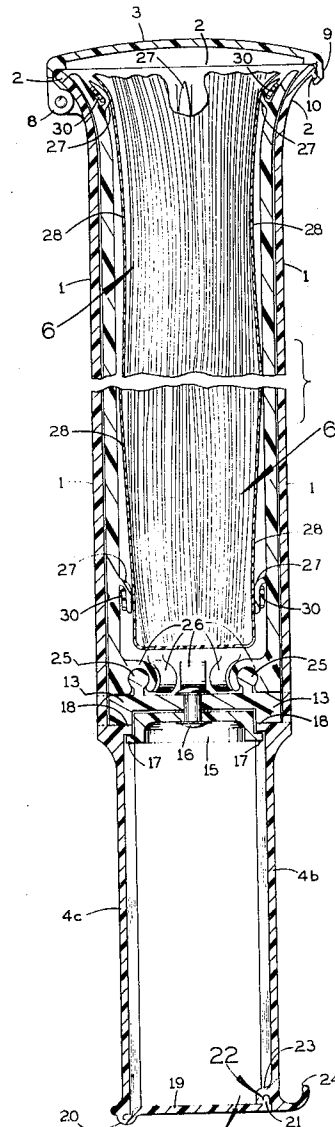
Primary Examiner—W. C. Reynolds

Assistant Examiner—Alex Grosz

[57] **ABSTRACT**

A collapsible umbrella having a plastic frame forming an elongated cage for compacting and folding the cover canopy therein. The main frame is dual U shaped and includes an integral handle in which a control member is manually reciprocated for opening the canopy and retracting same into the main frame. The frame includes a closure at both ends for protecting the folded canopy. The fabric or plastic canopy is supported by a plurality of flexible ribs which are sprung into a conventional sheet plastic or fabric canopy or a transparent plastic for a bubble type canopy.

5 Claims, 13 Drawing Figures



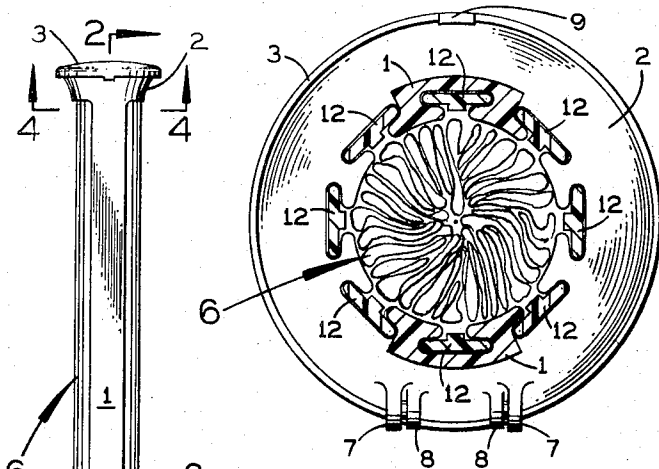


FIG. 4

FIG. 1

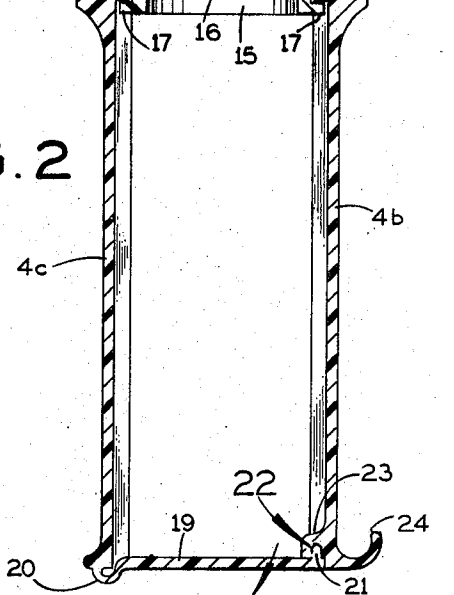
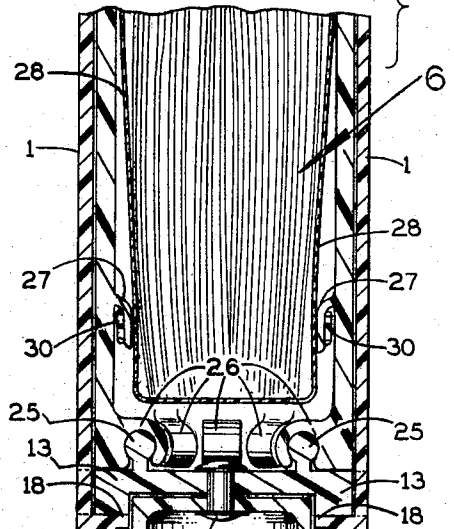
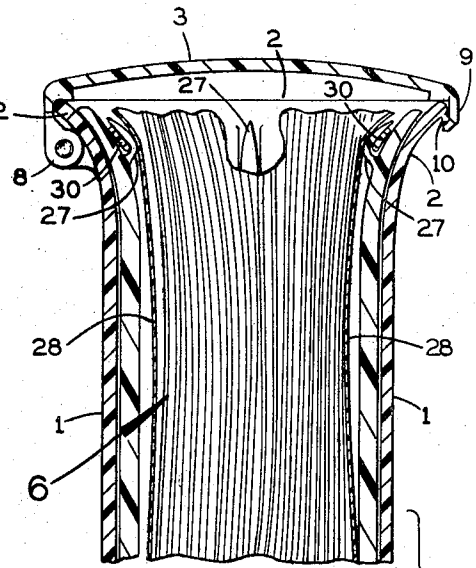


FIG. 2

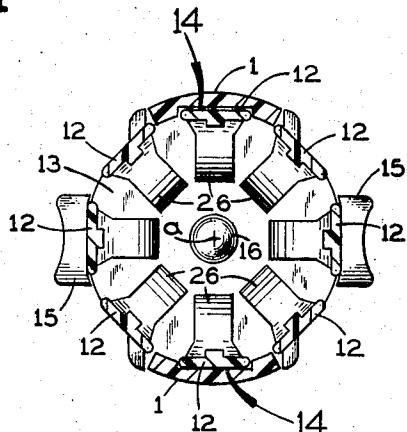


FIG. 5

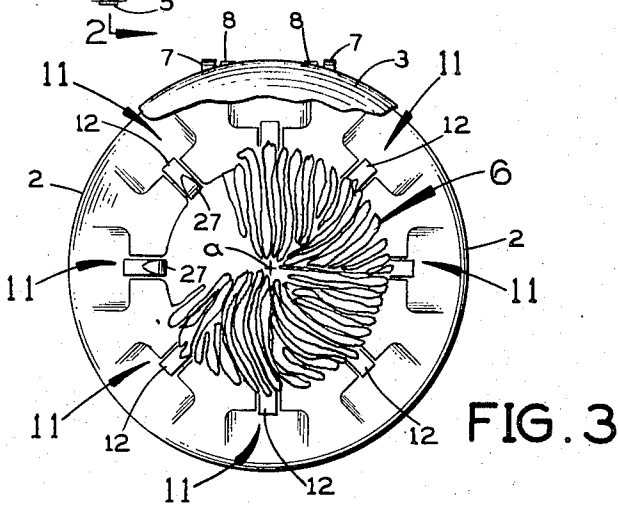


FIG. 3

FIG. 7

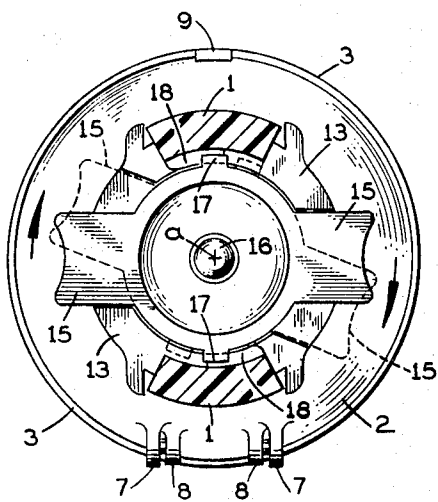
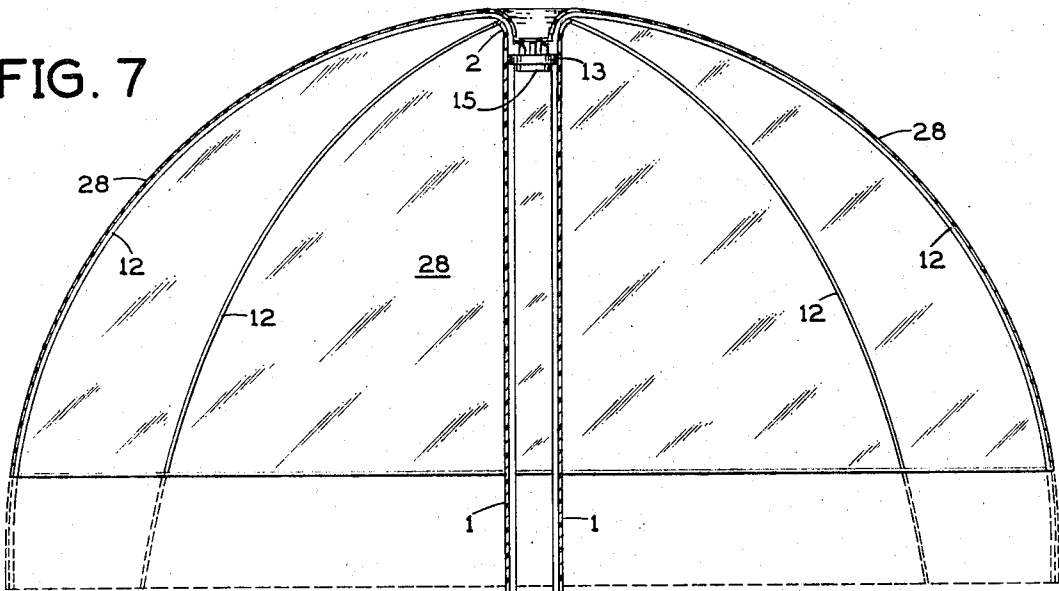


FIG. 6

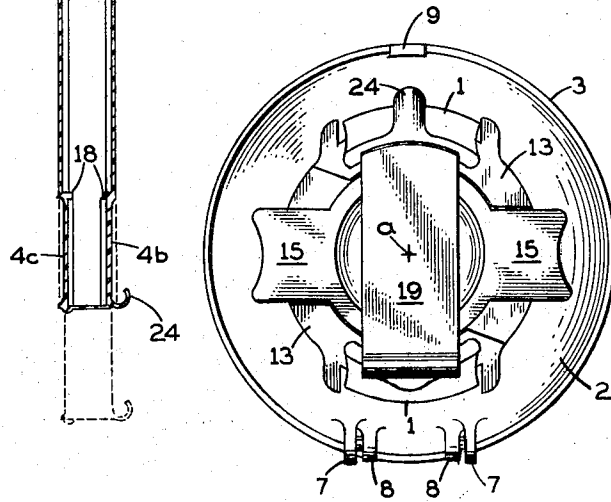


FIG. 8

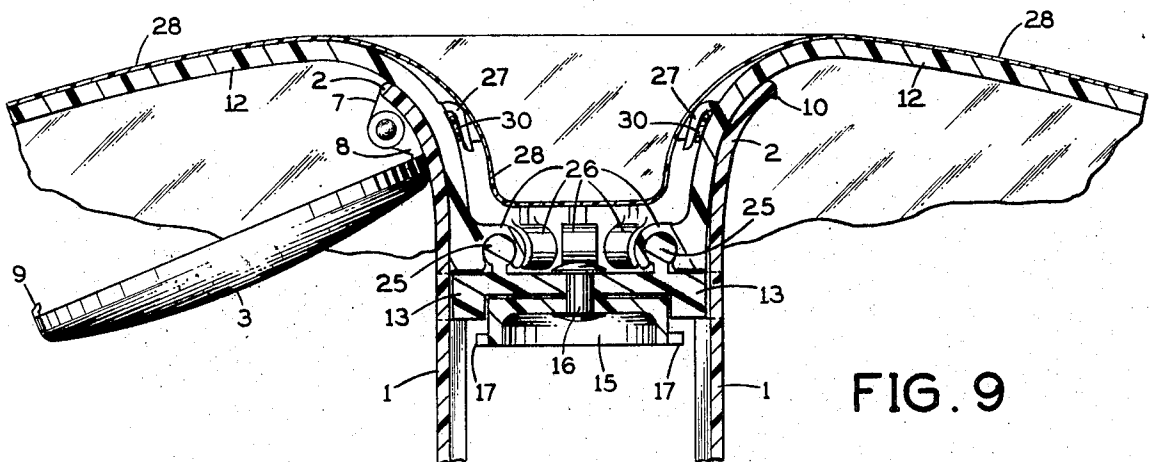


FIG. 9

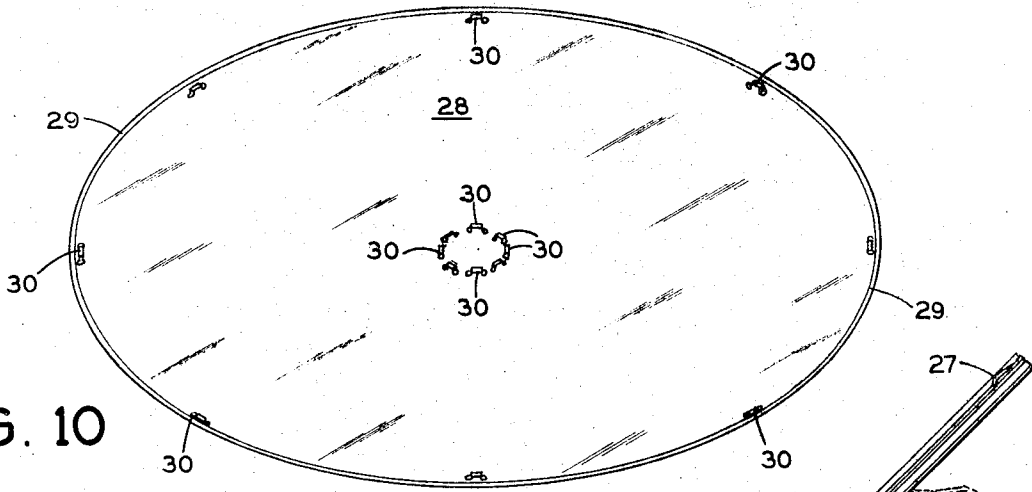


FIG. 10

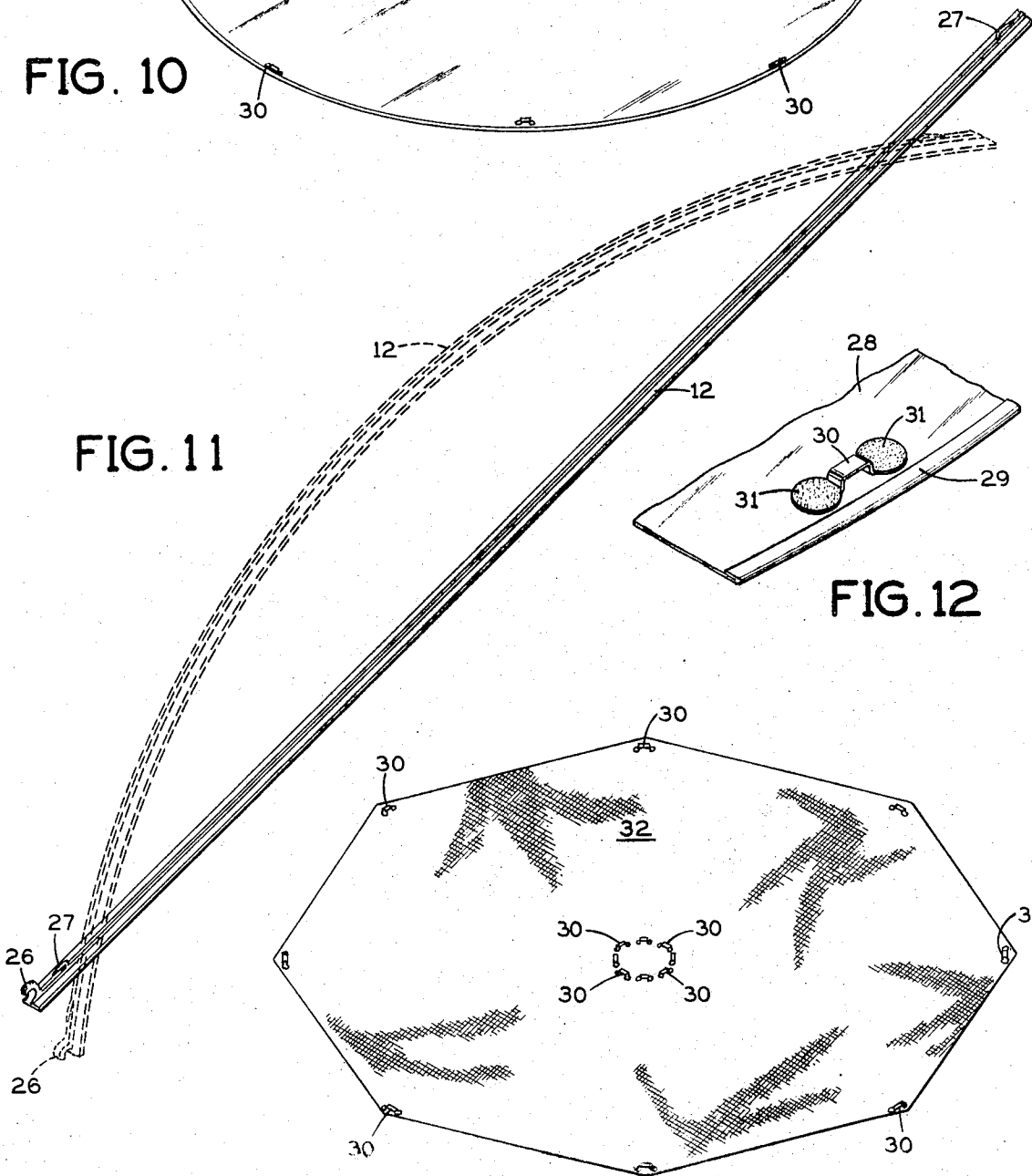


FIG. 11

FIG. 12

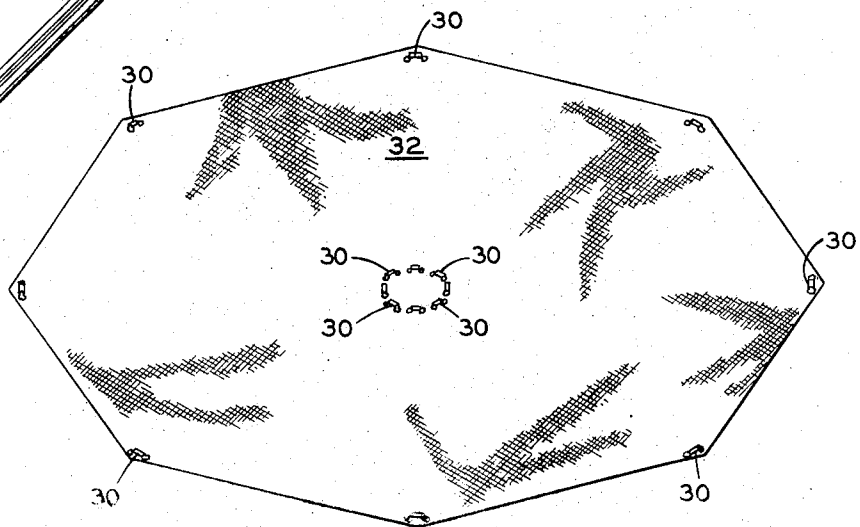


FIG. 13

COLLAPSIBLE UMBRELLA

This invention relates in general to umbrellas and more particularly to a collapsible umbrella entirely molded from plastic elements which may include a fabric or transparent sheet fabric cover canopy and may be quickly operated from a closed position to a locked open position by the simple reciprocation and rotation of a member confined within the handle.

Conventional umbrellas require the mechanical assembly of many metal parts made to close mechanical tolerances and because of the precise operation required includes inherent weakness in the rib and other structures for preventing the cover from turning inside out when the subject to gusts of wind, which often damages fragile parts in a conventional umbrella.

Furthermore, the metal assembly of conventional umbrellas requires special metal forming tools for parts manufacture and costly time expenditures for assembly, whereas the present invention may be made in quantity from injection molded plastic parts which may be securely snapped together in a fraction of the time required to assemble a well known metal frame umbrella, and results in a wind resistant long life new type umbrella.

These and other objects and advantages in one embodiment of the invention are described and shown in the following specification and drawings, in which:

FIG. 1 is a side elevation of the umbrella in reduced scale.

FIG. 2 is an enlarged fragmentary cross sectional side view of the umbrella taken through section line 2—2, FIG. 1.

FIG. 3 is a top plan view with a portion of the circular cover therefor broken away.

FIG. 4 is an enlarged cross sectional bottom plan view taken through section line 4—4, FIG. 1.

FIG. 5 is an enlarged cross sectional top plan view taken through section line 5—5, FIG. 1.

FIG. 6 is an enlarged cross sectional bottom plan view taken through section line 6—6, FIG. 1.

FIG. 7 is a central cross sectional view in reduced scale of the umbrella in open position.

FIG. 8 is an enlarged bottom plan view of the umbrella in closed position, shown in FIG. 1.

FIG. 9 is a central enlarged fragmentary cross sectional view of an upper portion of the elements shown in FIG. 7.

FIG. 10 is a perspective view of the inner side of the fabric or transparent plastic canopy.

FIG. 11 illustrates one of the eight flexible ribs in arcuate shape illustrated in FIG. 7.

FIG. 12 is a fragmentary enlarged view of a rib retaining clevis shown in FIG. 11.

FIG. 13 illustrates a perspective view of the umbrella canopy made in regular octagonal shape.

Referring to the drawings, FIG. 1 is a side elevation in reduced scale of the molded plastic umbrella in closed position, showing one of a pair of parallel straight longitudinal frame bars 1 having cylindrical inner and outer surfaces, forming the main portion of the frame with a divergent circular ring 2 integral at opposite sides thereof with each of the bars 1. The open upper end thereof has a hinged cap 3 covering same. The lower end of each bar 1 has extended handle members 4a and 4b integral and parallel with bars 1 respectively and with predetermined spacing therebetween. Each handle member has a cylindrical outer surface for

convenient hand grasping. The lower end of each handle member is laterally secured by a clamp 5, to be hereinafter described. FIG. 1 also illustrates the collapsed side positions of a canopy assembly 6, to be hereinafter described.

FIG. 2 is a fragmentary enlarged illustration showing the umbrella in its closed position with the cap 3 covering the upper open end thereof. The cap includes a pair of integral clevis members 7—7, better shown in FIG. 4, which includes short pins for pressure insertion in coaxial cavities in clevis members 8—8 which are integral with the ring 2. A snap latch 9 extends downward from the cap 3 for frictionally engaging a mating projection 10 on the outer surface of the ring.

Referring to FIG. 3, the ring 2 is provided with eight equi-spaced generally T-shaped slots 11 with the central portion thereof opening inwardly radially toward the principal axis -a-. The slots 11 are provided for slidably guiding the canopy ribs 12, which ribs are shown in FIG. 11, with each having short central projections and the upper ends shown in the plan view in FIG. 3 and in cross section in FIG. 4 and molded from flexible plastic material, such as vinyl-chloride compound with controlled filler to obtain desired flexibility.

Referring to FIGS. 2 and 5, the rib control member 13 is slidably positioned to reciprocate between bars 1—1 in opposite grooves 14—14 which permit the control member to move to a predetermined upper "open" position, to be hereinafter described. The control member is provided with a transverse manual handle 15 which projects outward from opposite each open space between the bars 1—1. The handle is secured for rotary movement with respect to the control member 13 by a double headed rivet 16. It is to be noted that the handle is in its downward locked position by the engagement of integral lugs 17—17 which are mated to projections 18—18, which locked position is shown in FIG. 2.

The lower end of the handle member 4c-4b is locked in its normal parallel position by a transverse bridge member 19 which is secured to member 4c by a flexible hinge 20 and the engagement of pin 21 in a high friction cavity 22 in an integral projection 23 on handle member 4b. The member 4b also includes an integral hook 24 at the lower outer end thereof for hanging the umbrella when not in use.

The upper side of the control member 13 has eight integral spherical ball projections 25 supported by a short connecting portion, as shown in FIG. 2. Each ball projection 25 is retained in a snap-on socket 26 at one end of each rib 12, shown in FIGS. 2 and 11, by the forced snap action of the socket over each ball.

FIG. 6 illustrates a pair of transverse lugs 17 extending from the handle 15 for manual rotary engagement with fixed projections 18—18 on bars 1—1 for locking the handle with the umbrella in its closed position. FIG. 6 also shows the clockwise movement for releasing the lugs 17—17 from the projections 18 and thus permitting the entire control member and the handle 15 to be raised, which simultaneously raises the eight ribs through their respective T-slots for opening the umbrella.

Referring to FIG. 11, as previously stated, each rib terminates in a snap-on socket 26 pivotally engaged on corresponding ball projections 25. It will be noted that an outward extending hook 27 is integral with the T element of each rib 12 a short predetermined distance from the socket 26 with the end thereof toward the

socket. A like hook 27 is integral with the opposite end portion of the rib with its end extending outward therefrom. It is to be noted that the plastic material used for the molding of each rib has a relatively high flexibility, such as indicated by dotted lines in FIG. 11.

FIG. 10 is a perspective view of a circular canopy member 28, made from one of several transparent sheet compounds such as thin gauge polyvinylidene chloride, with a margin or hem of predetermined width around the entire periphery thereof folded and heat or adhesive sealed for increased strength, better shown in FIG. 12. A plastic clevis 30, of the character illustrated in FIG. 12 includes a pair of planar integral discs 31 which may be heat or adhesive sealed in six uniform positions around the outer margins of the canopy members, as shown. Six like inner clevises are secured in circular relation a predetermined distance from the center of the canopy member with each one in radial alignment with a mating clevis at the outer margin of the canopy. An octagonal alternate canopy 32 is shown in FIG. 13 which provides an alternate appearance when the umbrella is opened.

FIG. 7 is a central cross sectional view of the umbrella when opened, with dotted lines illustrating an enlargement toward the bubble type umbrella and also illustrating the position of the control member 13 when the umbrella is in "open" position.

FIG. 9 clearly illustrates each hook 27 for retaining a canopy member 28 in proper position.

In operation and assuming that the canopy is folded and contained between the frame bars 1-1 and is secured to each of the six ribs 12 by hooks 27 which engage the two groups of six inner and outer clevises 30 and the handle 15 is in its closed locked position, then the cap covering the open end and the transverse member of the handle is secured in locked position and the umbrella is compacted for transport or may be hung in an inverted vertical position by the use of hook 24.

When opening the umbrella, the handle 15 is rotated clockwise and then moved upward between the bars 1-1 which will force the six ribs through the slots 11 over the curvature of ring 2 which will guide the ribs in an outward direction and simultaneously retrieve the folded canopy from between the bars 1. When the control member has moved into close proximity with the ring 2 then the ribs will constrain the canopy material into a taut position and the now generally spherical and octangular shape is ready for its normal use by hand grasping the handle member 4b-4c. It is apparent that a plasticized or water resistant fabric may be substituted for the transparent sheet plastic canopy material in which case the clevises would be more securely fastened to the canopy material by rivets or stitching.

The entire frame, with the exception of the ribs 12, can be made from high tensile strength material, such as a rigid form of vinylchloride or vinylchloride-acetate or other well known plastic material. Other plastic material of desired flexure is well known for molding the ribs, which must flex to assure proper operation.

It is apparent that the bridge member 19 may be secured to the lower ends of the handle members 4c-4b by a high frictional snap pin and socket at each end of the bridge member, instead of the hinged portion shown at one end. It is also apparent that the bridge member may be firmly secured to the handle members by well known screw means.

Certain modifications in construction are intended to come within the teachings and scope of the above specification.

Having described my invention, I claim:

1. A collapsible umbrella having all elements made from plastic material comprising a main frame molded from relatively rigid plastic material having a pair of longitudinal side bars of predetermined length and in spaced parallel relation with an inner and outer spherical surface with relation to a central longitudinal axis having the opposite upper end of said bars integral with the opposite sides of the lower edge of a circular ring member which is coaxial with a central axis between said bars,

the outer side of said ring member having a predetermined outward divergent surface and uniform cross section and uniform predetermined width and the inner side having an outward curved surface including a plurality of T shaped grooves in equi-spaced relation around the inner side portion thereof with the central opening of each said T of each of said grooves radial to the said axis,

a hand grip member formed by integral longitudinal parallel extensions of the lower end of said bars and having a cylindrical inner and outer surfaces of predetermined radii with respect to said axis for holding the said umbrella,

a circular projection of predetermined width around the inner side integral with the junction of each said bars and each said grip member forming opposite upper and lower planar shoulders normal said axis,

a plastic bridge member secured at each end thereof to the end of each said grip member for retaining said bars and said grip members in parallel relation,

a circular canopy control member positioned coaxial with said axis between and normal thereto with opposite projections slidably engaged in opposite sides of facing grooves along the inner side of each of said bars for movement from a low position on said upper side of said projection to a predetermined upper high position between said bars,

a manual operating handle means pivotally secured to the under side of said control member for predetermined angular oscillation about said axis including a manual handle means extending outward from the opening between said bars for moving said control member from said low to said high position including a portion thereof adapted to engage the under side of said projection when said handle means is rotated a predetermined angle for locking said control member in its low position,

a plurality of spherical upstanding equi-spaced pivots integral with the upper side of said control member in circular formation a predetermined distance from said axis for engaging the ends of a corresponding number of canopy ribs,

a circular canopy sheet of flexible material of predetermined diameter and uniform thickness and having a plurality of outer clevises equi-spaced around the outer margin thereof and a like plurality of inner clevises equi-spaced a predetermined short distance from the center of said circular sheet with each pair of said inner and outer clevises positioned in radial relation to said center,

5

6

a number of canopy ribs equal to the number of said canopy pivots with each of said ribs formed from plastic material of predetermined flexibility and having an integral socket at one end thereof in forced engagement on each said spherical pivot and each of said ribs having a pair of canopy hooks projecting from one side thereof a predetermined distance from the outer end of each of said ribs, each of said ribs secured to said canopy sheet by said hooks on the under side of said canopy ribs in equispaced radial relation to the center of said canopy sheet forming an assembly thereof whereby when said umbrella is in closed idle position each of said ribs is slidably engaged in each of said corresponding T shaped grooves and said control member is locked against the upper side of said circular projection by said handle means with the said canopy sheet in folded random position between each rib and said bars and whereby said umbrella is operated to its open position by the angular axial rotation of said handle means for unlocking said control member and the upward movement thereof will force said ribs through said T shaped grooves until said control member is in said upper position restrained by the opened said canopy assembly which is generally spherical equal multi-wedge sections between said ribs.

2. The construction recited in claim 1 wherein said canopy sheet is formed from flexible plastic high tensile strength material.

3. The construction recited in claim 1 wherein said canopy sheet is formed from water resistant fabric material.

4. The construction recited in claim 1 including a circular plastic cap having a pivotal hinge means extending from one side thereof secured to the outer side of said ring member for movement of said cap from an open to a closed position over said ring member including an integral latch means opposite said hinge means for frictionally holding said cap in closed position.

5. A collapsible umbrella made from molded plastic

material comprising a main longitudinal frame means having a central elongated axis and a central compartment for receiving and retaining a collapsed and folded canopy means with the upper end thereof terminating in an integral ring having a predetermined curved inner divergent surface coaxial with a central longitudinal axis of said frame including a plurality of integral equispaced rib apertures positioned around the said curved surface equidistant from said axis,

a hand grip means extending from the lower end of said frame coaxial with said axis,

a control member in said compartment adapted and constructed for coaxial predetermined reciprocal movement from a lower and upper position for moving said canopy from a collapsed form in said frame to an open position projected from said compartment,

a manual operating member pivotally secured to said control member including manual locking means for locking said operating member to said frame in said lower portion by angular rotation thereof,

a plurality of canopy ribs of predetermined length and uniform predetermined cross section with the end of each of said ribs having a snap-in pivot socket means extending from one end thereof and slidably retained in each of said apertures,

a plurality of pivots in circular equispaced formation on the upper side of said control member around a predetermined radius from said axis with each of said socket means engaged with each of said pivots for movement in a radial path with respect to said axis,

a circular flexible cover sheet with the center thereof coaxial with the inner side secured to said ribs when said ribs are in a planar position for forming a canopy assembly which has a wedge shaped portion of elastic sheet between each said rib formed into semi-spherical shape when said operating member is moved from its said lock position to a predetermined upper position.

* * * * *

45

50

55

60

65