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Clark et al.

[11] **3,789,903**

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[54] **HIGHLY COMPACT STABLE AWNING FOR TRAVEL TRAILERS, MOTOR HOMES AND/OR CAMPERS**

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[52] **U.S. Cl.** ..... **160/75,** 135/5 AT

[51] **Int. Cl.** **E04f 10/06**

[58] **Field of Search** ..... 160/22, 66–75, 160/82; 135/5 A, 5 AT, 25, 26, 29, 32

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Primary Examiner—Peter M. Caun

[57] **ABSTRACT**

Compact stabilized awning unit and support structure therefor having triangulated tension and/or compression bearing support elements for collapsible awning units that are adjustable for variable extended positions or collapsible into a nesting integrated unit are provided for, and attached to vehicles such as travel trailers, motor homes and/or campers. The awning unit and/or the support structure is comprised of a vertical slide adapted to be fixed to a wall, a main support secured in sliding relation at a first end thereof to said slide, an auxiliary support secured at one end thereof to the main support intermediate the ends thereof and at its other end adapted to be secured to the wall above said main support first end, a torque spring loaded roller supported by said main support at its second end, and a flexible cover having its outer end windably secured to said roller and its inner end adapted to be secured to said wall.

3 Claims, 6 Drawing Figures

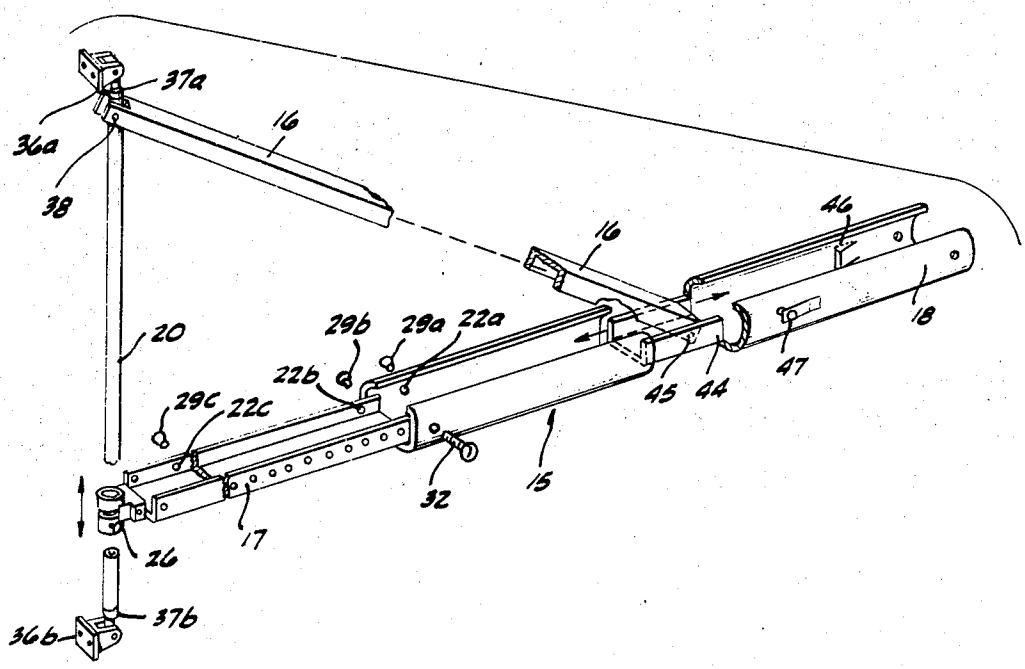
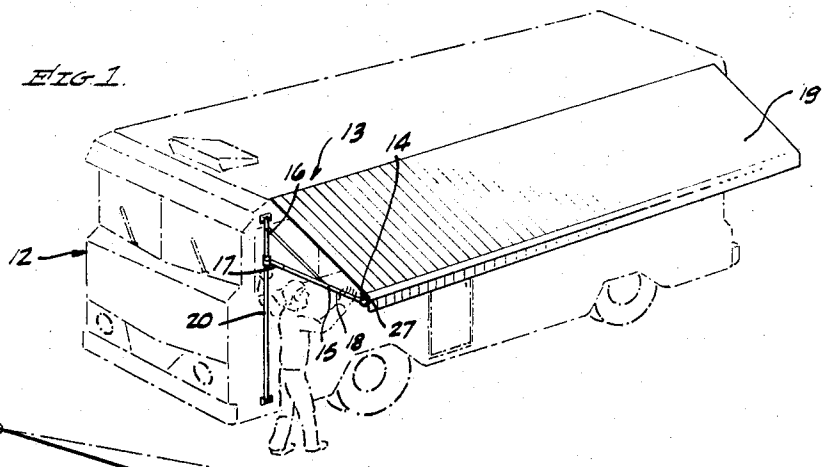


FIG. 1.



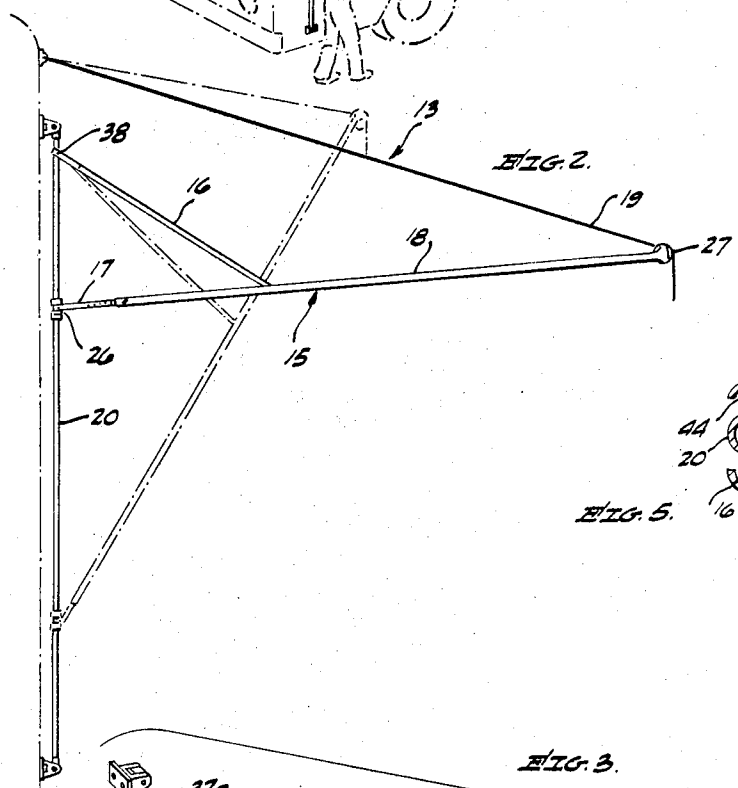


FIG. 2.

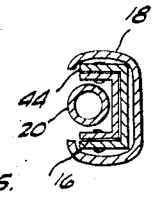


FIG. 5.

FIG. 4.

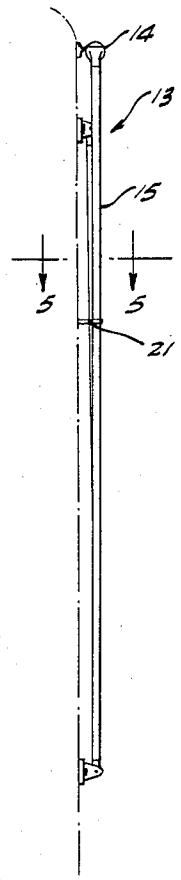


FIG. 3.

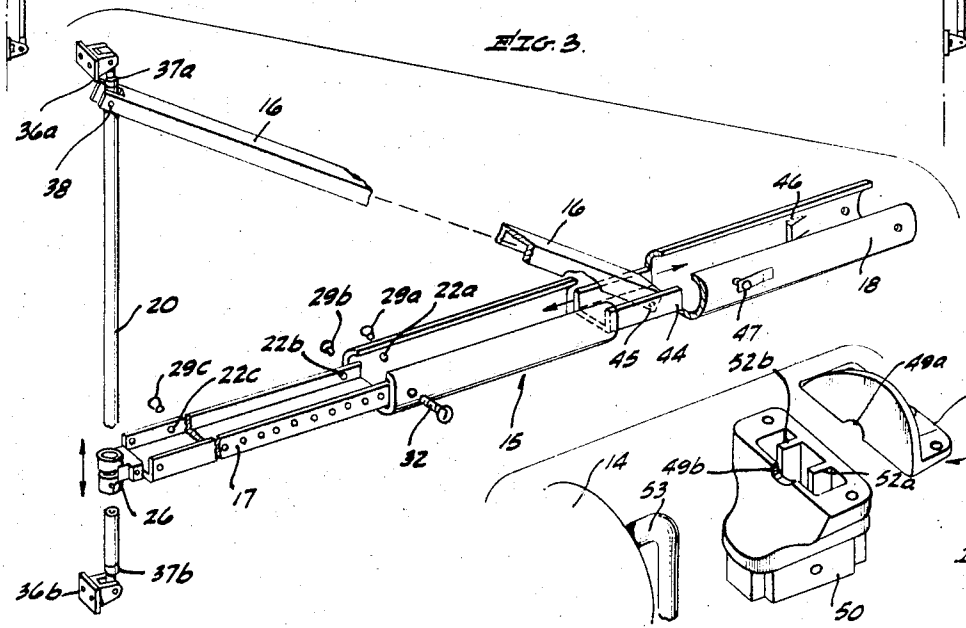


FIG. 6.

HIGHLY COMPACT STABLE AWNING FOR TRAVEL TRAILERS, MOTOR HOMES AND/OR CAMPERS

BACKGROUND OF THE INVENTION

In equipment providing collapsible protective covering, a support that is stable when it is opened and compact when it is closed is desired. For a collapsible awning unit attached to the side of a travel trailer, motor home and/or camper (popularly referred to as a Recreational Vehicle or a Rec-V), the parts thereof must operate as the awning extends or retracts and must meet the above criteria for stability and compactness.

Integrated nesting and rigid strength of the support structure for collapsible units providing protective covering and for other equipment, such as compact collapsible umbrellas and sun shades, prevents any oversize aspects of the collapsed unit as well as the untimely collapse of the erected unit. In collapsible awning units for a Rec-V, however, the importance of both rigid strength and nestable construction for the support element is greatly accentuated by certain circumstances that, if the awning lacked compact stability, would operate to make it relatively unsatisfactory and in certain cases extremely dangerous. For example, vibrations of non-nesting parts while the support structure is collapsed against the Rec-V, that result from the windstream caused while the Rec-V is traveling at about 60 mph would create destructive torques and sheer stesses that would wrest the awning unit from the side of the Rec-V; compact stability of the support structure would prevent any damage or destruction due to this cause. It is also typical that a collapsible awning for a Rec-V carries a large heavy flexible cover and 8 to 21 feet long multiribbed, heavy torque spring loaded roller lement that by itself demands that rigid strength be provided by the support elements when the awning is extended to an open position. In addition, the operators of a Rec-V customarily frequent the wide open outdoor camping areas where strong gusty winds playing against the sail-like awning double or quadruple the downward gravitational force vectors on the support element or attempt to raise the awnings away from its support with similarly strong vectorially upward forces.

It is true that a substantially rigid support structure must be built into a collapsible awning unit for a Rec-V, yet the weight of the support structure must be limited so as not to unduly increase that of the Rec-V nor to cause a problem to the Rec-V operator when attempting either to collapse or open the awning unit. After the Rec-V opearator has driven it to, or decides to leave a temporary campsite a compact stabilized support structure must not have been constructed so that a complex procedure for either erecting or collapsing the awning unit exceeds or taxes the capacity of the Rec-V operator.

SUMMARY OF THE INVENTION

The present invention provides at one and the same time the double function of a high degree of stability for the support elements while it is in an open position and a unique nesting characteristic while it is in a collapsed position to eliminate vibrational destruction and unplanned collapse from high winds and other destructive forces while being able to be opened or collapsed by a very simple procedure. This is accomplished by the use of a uniquely triangulated support structure involving a double tiangular supporting structure with partially shared elements. A vertical slide and the wall of the travel trailer is common to both triangles. A main support is also common to both. An auxiliary support forms with the other two common sides of the triangles an inner triangle. The third side of the outer triangle is a flexible cover of the awning unit.

A triangle from a structural viewpoint provides the greatest strength of any geometrical shape. It is an immutable law of planar geometry that three lines of given length can form one and only one triangle; it is a corallary of this law that the angles of a triangle formed by three lines of a given length are unchangeable. This law from geometry and its corollary when applied to the field of structural or mechanical engineering provides a means of potentially creating with triangles the strongest shape. The potential for this shape is actualized into a tension and compression bearing triangle when rigid material is used to construct it as is the case for our inner support triangle. It is actualized into a tension bearing only triangle when at least one side is constructed from flexible material as is the case for our outer support triangle. In either case its ability to defy deformation exceeds any other shape for the same material.

The requirement for a rigid material for the sides of the triangle can be met by using metal, one of the strongest structural materials, for the sides of the triangle. Another means of meeting the requirement for rigid material is to use a flexible material in tension. The weight penalty imposed by metal can be lessened with no loss and an actual increase in its rigidity is achieved by shaping the metal so that it has a "C" or "U" cross section. Said shaping also produced unexpected results that added to the compact stabilization of the support and ease in its operation. The use of said shaped parts that differ in size so that one fits within the other permits the parts of the support to nest compactly together when the awning is collapsed. The usage of said shaped parts also permits the use of a pivotally slidable shoe on the end of one of the sides of the triangle so that it can be slid into a triangle forming shape from a collapsed to an opened position and vice versa.

The controlled location of the slidable shoe on one end of the auxiliary support of the inner triangle is achieved by a stop and detent means locking it into a fixed location relative to the main support of the triangle while being pivotally attached to the vertical slide of the triangle. The vertical slide and main support of the triangle can then be slidably adjusted with relation to each other and locked into place relative to each other by one of several means well known in the art. The outer triangle is similarly adjusted at the same time and when fully extended acts in its tension bearing capacity.

The auxiliary support of the inner triangle introduces several functional advantages to the support structure of the awning unit. One is due to the fact that it is secured to the main support intermediate the ends thereof; this location results in a reduction of the required strength of the main support since its span distance is thereby reduced. Another results from the elimination of a compression member that is adjacent to the canvas and therefore required to have a long span as is shown in U.S. Pat. No. 3,324,869 to Duda. Still another stems from its capability to be collapsed by a simple procedure and stored in nesting relation

within said main support instead of being removed and stored separately as is necessary for said compression member adjacent to the canvas in said patent to Duda.

The weight penalty for using metal as the material for the support arms is reduced by the use of lightweight non-ferrous metal such as aluminum. In addition metals such as aluminum are conducive to being shaped with said cross sections by an inexpensive extrusion process.

The main support of the triangle can be lengthened by use of a telescoping extension. The main support extends beyond the point where it connects to the auxiliary support and is pivotally attached to the torque spring loaded roller that carries the flexible cover of the awning unit that in turn has its inner end anchored to the wall of the Rec-V.

The vertical slide of the triangle is rigidly attached to the Rec-V at its top and bottom. Therebetween the vertical slide is slightly displaced from the side of the Rec-V to permit the end of the main support to slidably move along thereon. It is also so shaped that both the auxiliary support and main support not only nest within each other but all three, as an integrated system, nest together one on top of the other when the awning is in a collapsed position.

The present invention has the following advantages:

1. to provide a support for facilitating opening, supporting and collapsing of awning units having the foregoing features and benefits;

2. the provision of nesting for the compact stabilization of the awning unit in a collapsed position;

3. to provide a double triangulated support for creating the strongest structural shape to impart compact stabilization to the awning unit in an opened position;

4. the provision of a C or U cross sectional shape for the rigid material of the triangulated support for permitting and controlling the slidable location of parts, adding strength to the supporting parts and giving to the parts the capability to nest in a collapsed position;

5. other advantages and beneficial features will become apparent to those skilled in the art as the disclosure is made of the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a pictorial view of a travel trailer awning unit having a double triangulated tension and/or compression bearing support for a flexible cover for illustrating the operation of the compact stable awning structure of the present invention;

FIG. 2 is a side elevational view showing in full lines the awning unit in fully extended or open position and showing in dotted lines an intermediate position;

FIG. 3 is a selectively fragmented exploded perspective view of the elements of the travel trailer awning structure illustrating the connecting interfaces;

FIG. 4 is a side elevational view showing the awning unit in a collapsed position against the side of the travel trailer;

FIG. 5 is a sectional view of the nested elements taken along 5—5 of FIG. 4;

FIG. 6 is an exploded perspective view of the cap on the main support showing how the roller is attached thereto.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now to FIG. 1 for a more detailed description of the preferred embodiment of the present invention, a conventional travel trailer **12** is shown that is used as a recreational vehicle and for other purposes. Attached to the side of the travel trailer **12** is an awning unit **13** for providing protection or covering from the elements. As indicated in FIG. **1** the awning unit **13** has been placed in an open or extended position. This position resulted from a simple twofold operating procedure involving releasing and positioning functions performed by an operator. If there is more than one set of supporting elements such as a pair — one at each end of the awning unit **13** — then the procedures are duplicated in turn for each set. The operator starts by releasing a conventional holding catch **21** that held the nested support elements in a closed position against the side of the trailer as shown in FIG. **4.** If, after release, roller **14** does not automatically start to fall away from the side of the travel trailer, then the operator merely pulls gently on the main support **15** that was nested together with the other support elements against the side of the travel trailer **12.** This will cause the roller **14** to start to fall away from the side of the travel trailer **12.** Thereupon the weight both of the roller **14** and the flexible cover **19** rolled around it tends to cause it to fall away from the side of the travel trailer **12** into an open or extended position. As the roller **14** approaches a fully extended position two factors tend to slow it down; both offsetting factors are the more pronounced the more the roller **14** has fallen away from the travel trailer **12** for its weight is reduced by the amount the flexible cover **19** has unrolled and a steadily increasing counter force is created in the torque spring in said roller **14** as the spring is wound up. The operator initiates the positioning of the awning in the desired extended position by sliding and locking the auxiliary support **16** into a pivoting position about midway along the main support **15.** The main support **15** can then be lengthened or shortened by slidably telescoping the telescopic first portion **17** and the telescopic second portion **18** of the main support **15** in the desired direction and locking them in place by a conventional adjustment. The final positioning operation involves sliding the main support **15** up along the vertical slide **20.** If this final operation is to bring the outer support triangle into full operation, then the flexible cover **19** must be fully extended so that it is able to act as a tension member of said triangle. To achieve this main support **15** must be raised up on said slide **20** until said cover **19** is fully extended. When raised to this position sleeve **26** on the end of main support **15** is locked into place against vertical slide **20** by any one of the simple conventional means.

Referring now to FIGS. **2** and **3** we will provide a detailed description of the main support **15** of awning structure **13** shown in FIG. **1.** The first end of the main support **15** is pivotally attached to a sleeve **26.** The second end of the main support **15** is rigidly attached to a cap **27.** The main support **15** itself is composed of the above mentioned two portions that telescopically adjust the length of the main support **15.** Telescopic first portion **17** is the inner slidable part of the main support **15** and telescopic second portion **18** is the outer-slidable part thereof. The telescopic first part **17** has a cross sectional U shape. The telescopic second portion **18** has a cross sectional C shape that is adapted to slidably retain within it the telescopic first portion **17.** The adjacent ends of the two portions of main support **15** as shown in FIG. **3** have two holes **22***a* and **22***b* therein.

Telescopic first portion **17** has a similar hole **22***c* towards the end adjacent to the vertical slide **20.** Each of the three holes is adapted to receive conventional detent plug **29***a*, **29***b* and **29***c*. Said detent plugs act as stops to limit the distance that the two said telescopic portions can slidably adjust. To provide for holding said two portions at the adjusted desired length multiple holes are made in the side wall of the telescopic first portion **17** and are adapted to receive therein a fastening device **32** such as a spring actuated button that is placed in the side wall of the telescopic second portion **18.**

In FIG. **3** the vertical slide **20** shown in its entirety in FIGS. **1** and **2** is herein shown only fragmentally but in greater detail for the purpose of emphasizing the details of the elements interfacing with it. In this preferred embodiment vertical slide **20** is a hollow tubular rod. At the top and bottom thereof are conventional brackets **36***a* and **36***b* that are attached to the side wall of the trailer **12** by either being riveted or screwed into said wall. These brackets pivotally hold capping devices **37***a* and **37***b* that are rigidly fixed to the top and bottom of the vertical slide **20.** These said capping devices fixedly hold the vertical slide **20** displaced a sufficient distance from the side wall of the travel trailer **12** in order to permit sleeve **26** to slide therealong without impairment. At the lower end of the vertical slide **20** is sleeve **26** that slidably fits around said vertical slide **20** so that the pivotally attached telescopic first portion **17** of main support **15** can be raised or lowered along said slide to adjust the position of the awning. At the upper end of the vertical slide **20** auxiliary support **16** is pivotally fixed thereto by pin **38.**

Referring again to FIG. **3** the auxiliary support **16** also shown in its entirety in FIGS. **1** and **2** is here fragmentally shown to bring out those details that contribute to the performance of its critical support function. In FIG. **2** the auxiliary support **16** is shown in two of the many different positions it can assume as it pivots on pin **38** while the awning structure **13** is being opened or closed or, after being opened, is adjusted to various elevated positions and/or extensions of the flexible cover **19.** One of the key elements contributing to the simple functioning of the awning structure as it is opened into an extended position or collapsed into a closed position is the slide shoe **44** on the one end of the auxiliary support **16.** This slide shoe **44** has a U shaped cross section that is adapted to be slidably retained in the channel formed by the C shaped cross section of the telescopic second portion **18** of the main support **15.** The slide shoe **44** is pivotally attached to the one end of the auxiliary support **16** by conventional fastening devices such as pins **45** that are adapted to be inserted into holes in the side walls of the slide shoe **44** and in the side walls of auxiliary support **16.** Auxiliary support **16** is fabricated with a U shaped cross section that is adapted to nest around vertical slide **20** and within slide shoe **44** when the awning structure has been collapsed into a closed position as shown in FIGS. **4** and **5** and at the same time provide stability to the awning structure **13** especially when the auxiliary support **16** supports the main support **15** while the awning structure has been extended into an open position. As the operator starts to change the awning structure **13** from the closed position shown in FIG. **4** to the opened position(s) shown in FIGS. **1** and **2** the slide shoe **44** is forced to move up in the channel of the telescopic second portion **18** of main support **15** until one end of it impinges upon and is stopped by a conventional detent **46.** Thereupon when slide shoe **44** has reached this limiting position the operator holds it in said limiting position by activating snap spring **47** adapted to be inserted through a hole in the side wall of telescopic second portion **18** and conventionally designed to lock said shoe into said limiting position.

Now referring to FIG. **6,** the cap **27** that is shown in FIGS. **1** and **2** as rigidly attached to the upper end of main support **15,** is shown herein in exploded detail to better explain its operational and interfacing functions. Cap **27** consists of two parts, a bottom portion **50** and a top portion **51** that are screwed together. The bottom portion is fabricated with ribs **52***a* and **52***b* adapted to receive therebetween torsion assembly rod **53** extending from and then bent at a 90° angle from roller **14.** The roller **14** is retained against the face of cap **27** by said rod **53.** The face of cap **27** has adjacent recesses **49***a* and **49***b* in said top and bottom of said cap **27** adapted to receive therein said rod **53.** Said rod **53** resting in said recesses and keyed therein by said ribs to prevent turning, yet has sufficient clearance to allow substantial swivel-like motion of said rod **53** in cap **27.**

The swivel-like connection of rod **53** to cap **27** is important to several operations of the awning unit. When the operator first released the closed awning unit **13** from its collapsed position as shown in FIG. **4,** one side of the awning unit is released at a time. Nevertheless the support structure on each side has a freedom of motion independent of the support structure attached to the other end of the roller **14** since both are joined to said roller **14** by said swivel-like connection between cap **27** and rod **53.** This swivel-like connection is important also when one side of the awning unit is raised or lowered different than that of the other side; this might be desirable in many other situations such as to permit rain water to run off.

The function of the roller depends on a conventional torque spring therein. The torque spring inside roller **14** winds up as the roller falls away from the side of travel trailer **12** as it starts to open up from its collapsed position shown in FIG. **4** and opens itself to an extended position as shown in FIGS. **1** and **2.** The embodiment herein taught includes two torque springs in roller **14** — one at each end thereof — reinforcing and independent of each other.

The awning structure **13** will be described completely when flexible cover **19** shown in FIG. **1** together with its interface with other elements of the awning structure **13** and its operating functions have been described. Attention is directed to flexible cover **19,** which may be made from dacron vinyl material that is rectangular in shape and, depending on the length of the travel trailer **12,** has a length alongside the travel trailer of approximately 8 to 21 feet and a width that can be extended from the travel trailer approximately 8 feet.

The inner end of flexible cover **19** adjacent to the side or wall of the travel trailer **12** is fixedly attached thereto by conventional means. The outer end of the flexible cover **19** farthest removed from the side or wall of the travel trailer **12** is adapted to be fixedly attached to roller **14** and adapted to wind therearound.

Referring now to FIG. **4,** the awning structure **13** is shown collapsed in a closed position with holding catch **21** having been wrapped around the nested elements

thereof in order to retain it in the collapsed position. The above described simple twofold operating procedure involving releasing and positioning functions is performed by the operator to collapse the awning structure **13** by reversing the steps used to open it. The integrated nesting of all the elements of awning structure **13** when it is collapsed into a closed position is shown by FIGS. **4** and **5.** The vertical slide **20** nests inside the auxiliary support **16.** The auxiliary support **16** nests inside the slide shoe **44.** Slide shoe **44** as well as the telescopic first portion **17** nest inside the main support **15.** The flexible cover **19** when collapsed into a closed position is wound up around roller **14.**

In light of the above teachings of the preferred embodiments disclosed, various modifications and variations of the present invention are contemplated and will be apparent to those skilled in the art without departing from the spirit and scope of the invention.

What is claimed is:

1. A support structure for an awning for a recreational vehicle comprising:

a pair of vertical slides adapted to be fixed to a recreational vehicle;

a pair of elongated main supports secured in sliding relation at a first end thereof to said slides and having an opposite end adapted to support the outer end of an awning cover secured to the recreational vehicle; and

a pair of elongated auxiliary supports adapted to be secured at one end thereof to said main supports intermediate the opposite ends of the main supports and pivotably mounted at the opposite end thereof to the vertical slides above the first end of the main supports;

the vertical slides being substantially completely disposed within a hollow interior of the main supports along the entire length of the vertical slides and the vertical slides being substantially completely disposed within hollow interiors of the auxiliary supports when the support structure is in a collapsed position.

2. The invention defined in claim **1,** wherein each of the main supports is adjustable in length and comprises a first elongated member, a second elongated member slidingly disposed within the first member, and means for securing the second member to the first member.

3. A support structure for an awning for a recreational vehicle comprising:

a pair of vertical slides adapted to be fixed to a recreational vehicle at selected locations along the length of the slides so that the slides are disposed in spaced apart relation relative to a side of the recreational vehicle;

a pair of elongated main supports secured in sliding relation to a first end thereof to said slides and having an opposite end adapted to support the outer end of an awning cover secured to the recreational vehicle; and

a pair of elongated auxiliary supports adapted to be secured at one end thereof to said main supports intermediate the opposite ends of the main supports and pivotably mounted at the opposite end thereof to the vertical slides above the first end of the main supports;

said main supports extending around the vertical slides when the support structure is in a collapsed position, the main supports and the auxiliary supports being generally C-shaped in cross-section, and the vertical slides being generally O-shaped in cross section and being substantially completely disposed within both the main supports and the auxiliary supports when the support structure is in a collapsed position.

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