ABSTRACT

A collapsible, portable shelter consisting of two or more telescoping levels which may be raised and locked into position for use and which may be lowered and collapsed for transport and towing, and further having interchangeable wheels and skis for transport of the shelter over dry land or snow or ice.
'DROP TOP' ALL-TERRAIN, COLLAPSIBLE, PORTABLE SHELTER

[0001] This invention relates to portable shelters, specifically to such shelters that are collapsible or telescopic and transportable over multiple types of terrain.

BACKGROUND OF INVENTION

[0002] Over the centuries men and women have taken to the woods and waters of every part of the world in pursuit of fish and game either for necessity or, more recently, to experience nature’s environment. These outings into the wild have been limited in duration to mostly daytime activities by the lack of adequate shelter.

[0003] The requirements that a superior portable shelter would demonstrate over one of less versatility and of limited use are: (a) the ease of portability through adequate invention concepts; (b) the ability to use it during all seasons of the year by installing skis during the winter months and then converting to a wheel structure for use during the remainder of the year; (c) the maintenance of an adequate inside environment with the use of fully weather-stripped insulation material and heating devices; (d) the ease of maneuverability by use of light weight, durable materials for years of carefree, dependable operation with the inclusion of strong but light weight materials; (e) the ease of transport to general area, either on a trailer or in the bed of a pickup truck, by being created with telescopic rigid upper structures that slide down over the lower structure components giving the invention a low profile and less air resistance when in transit; (f) the quick and easy operation by a single individual to erect and, when ready to depart, lower upper structure components by the use of quick release, spring loaded self-locking pin assemblies; (g) the ease of moving to a desired spot of activity by the appropriate use of a tow bar system which can be attached to either a snowmobile or an ATV (All-Terrain Vehicle) and, (h) the ability to easily and quickly relocate to another area of a pond or lake, as in the case of ice fishing.

[0004] With the increasing dependability, versatility and rising popularity of ATVs (All-terrain Vehicles), as well as the ongoing use of snowmobiles, for off-road activities, a demand for the use of my proposed invention, as described in the attached document text, is evident.

[0005] The inventions that incorporate the use of telescopic type collapsibility for portable shelters are U.S. Pat. No. 3,000,664 to Martin (1959) and U.S. Pat. No. 5,028,088 to Monico (1990). These are portable structures but were invented to be utilized within the confines of the bed of a pickup truck. This limits their use when venturing into remote trout ponds to open water fish or for ice fishing purposes or for use when camping the remote, roadless back country in order to hunt or photograph. U.S. Pat. No. 4,488,752 to Broussard (1982) utilizes the invention of telescopic collapsibility but is incorporated on a trailer that is destined for use over a well maintained highway and cannot be transported over rough terrain or through heavy snow.

[0006] There have been few patents issued that cover a wheel and ski system. U.S. Pat. No. 910,206 to Karssen (1903) entails a ski that can be bolted to a wheel but no further inventive concept was reached. This type of system, with the possibility of being practical on hard packed snow, would be very impractical in deep snow due to sinking and allowing too much resistance and maneuverability when transporting the shelter to remote areas. U.S. Pat. No. 5,653,456 to Mough (1997) was issued for a simple ski system which would be connected to some type of portable shelter. This system incorporates very small wheels which in turn would have to be attached to a portable shelter or the like. This patent concept is quite impractical on any type terrain other than ice or snow, due to the small wheels and skis which make it useless on other types of terrain. This invention doesn’t allow adequate space to attach larger wheels due to the necessary space required above the skis and between the lower section of a structure. Also, it would be very difficult to maneuver a shelter with this system attached over rough terrain and through narrow spaces in remote areas due to its lack of being able to pivot easily.

[0007] There have been many attempts to invent appropriate portable shelters for protection from nature’s elements. U.S. Pat. No. 6,604,777 to Neville (1978), U.S. Pat. No. 6,439,647 to Baldwin (2001), U.S. Pat. No. 5,423,587 to Ingram (1993) are all patents for shelters that attach to the bed of pickup trucks. They are extremely heavy, non-portable shelters which protect the occupants from inclement weather and temperatures, but once in position, are troublesome to relocate to other areas because of size and design; they are doomed to that one location. These patents shouldn’t be considered totally portable because they need to be transported by a vehicle that utilizes a road system.

[0008] Other portable shelters of similar field of invention were issued. U.S. Pat. No. 6,017,080 to Gill (1996), U.S. Pat. No. 5,375,902 to Church (1993) are types of portable shelters with attached wheels but are large, heavy and have to be pulled by a pickup truck, or other vehicle of similar size. Again, these type inventions are limited to over-the-road use and aren’t designed to maneuver off-road or over different types of terrain, such as snow covered ground.

[0009] Many other patents have been issued for portable shelters with a wide variety of sheathing materials and collapsible inventions. U.S. Pat. No. 5,335,960 to Benigna (1994), U.S. Pat. No. 6,397,870 to Makedonsky (2002), and U.S. Pat. No. 5,749,387 to Thompson (1997) et. al., have a slide type base for use over snow covered surfaces. These inventions are designed with folding metal frames which are covered with a thin flexible sheathing. Some have to be assembled when arriving at desired location. Though they do protect the occupants from the wind, there is little heat retaining value and the material of which it is constructed has a short life span due to its thin, flexible nature. The above mentioned patents, as well as many others, utilize a slide type base to allow transportation over snow or ice covered surfaces. These type inventions are limited to the winter season and have no means of being transported over dry, rough terrain during spring, summer or fall, thus restricting their use.

[0010] Other patents have been issued for many other inventions that are classified and indexed as portable or collapsible shelters. U.S. Pat. No. 3,464,735 to Smith (1968), U.S. Pat. No. 3,570,507 to Kasuba (1971), and U.S. Pat. No. 3,854,746 to Flynn (1973) et. al., have been issued invention rights that encompass a portable shelter with ski type systems. These serve a purpose and are similar to the
above mentioned patents by way of being able to be transported over ice or snow cover terrain only. Their inventive usefulness is, also, limited to the winter months and have inadequate means to retain an acceptable inside temperature due to a thin, flexible, non-insulating outer sheathing.

[0011] The beginning of this document mentioned the criteria needed for the ultimate all-terrain, all-season, portable shelter, which can be used during all four seasons of the year and over all types of terrain. All of the prior art invention patents which I have described earlier in this text, and all patents not mentioned but researched, lack many of the necessary criteria needed to equal my proposed invention.

[0012] Over the years inventors have created many shelters, some having one or two of the desirable requirements of a complete shelter, but none possessing all positive traits. Some are portable during the winter months with the use of skis but have no means to be transported during open water seasons over dry ground to remote fishing ponds or on camping trips during spring, summer or fall. Others are constructed of light weight, flexible materials, but none have adequate solid sheathing material that would provide for years of dependable use. Few have been invented that possess qualities of wear and durability—those inventions have very limited insulation value.

[0013] During research of prior art, all inventions that are of the similar field of inventions are invented for use solely for the purpose of use on ice or snow by being equipped with skis or a sled type mechanism which limits their use to the short winter seasons. None have been invented with the dual purpose of being able to be transported during winter conditions on ice and snow with the use of skis and then by removing the ski system and attaching a wheel system so shelter can be used on dry ground during the remaining seasons of the year for open water fishing, camping, hunting and other outdoor activities.

BACKGROUND OF INVENTIONS—OBJECTS AND ADVANTAGES

[0014] Accordingly, besides the objects and advantages of the ‘Drop Top’ portable, all-terrain shelter described in my above patent, several objects and advantages of the present invention are:

[0015] (a) To provide a portable, all-terrain shelter that collapses by telescopic means to a low profile in height to enhance the portability of being transported on a trailer or in the bed of a pickup truck to the general location of use.

[0016] (b) To provide a portable, all-terrain shelter that can be used throughout the year by use of detachable skies and wheels.

[0017] (c) To provide a portable, all-terrain shelter that, due to solid, rigid insulated panels, will maintain an adequate interior temperature for use in cold climates.

[0018] (d) To provide a portable, all-terrain shelter when constructed of solid, rigid material that will endure years of dependable use.

[0019] (e) To provide a portable, all-terrain shelter which offers a solid, secured shelf to permanently attach a propane stove that provides heat as well as a means of preparing meals.

[0020] (f) To provide portable, all-terrain shelter that offers a means of fresh air ventilation and barrier from insects by the use of permanently attached screened, sliding windows.

[0021] (g) To provide a portable, all-terrain shelter that is easily manufactured at an affordable price because no intricate components embody the invention.

[0022] (h) To provide a portable, all-terrain shelter that is easily maneuverable while being towed by a snowmobile or ATV (all-terrain vehicle) due to the light weight of the solid and durable material of manufacture.

[0023] (i) To provide a portable, all-terrain shelter where the structure units are easily raised or lowered in a telescopic fashion, by the use of light weight material of manufacture with molded in, or inserted onto said structure, a set of corresponding grooves that align the opposing sections.

[0024] (j) To provide a portable, all-terrain shelter that allows for quick and easy lowering and raising of said structural units where said structural units are automatically locked into place to allow the multiple structure units to remain in a raised position by the use of spring loaded locking pin assembly. Then, when the shelter is ready to be transported, the multiple structural units may be easily and quickly lowered by reversing the spring loaded locking pin assembly mechanisms.

[0025] (k) To provide a portable, all-terrain shelter that allows for compact storage due to the invention’s structural units telescoping down over the corresponding structural unit. The upper structural unit is slightly larger in width and length, as is all corresponding structural units, as compared to the middle structural unit which allows the upper unit to telescope down around the lower adjacent structural unit.

[0026] (l) To provide a portable, all-terrain shelter that allows ease of manufacture, shipping and assembly. All components of the invention are easily mass produced due to the invention concept and are easily stacked for shipping whereby purchaser may assemble said invention with limited manipulative skills, simple hand tools and limited prior construction knowledge.

[0027] (m) To provide a portable, all-terrain shelter that allows ample interior space for occupancy of one or more individuals in order to perform their desired outdoor sporting activity.

[0028] (n) To provide a portable, all-terrain shelter that allows for the attachment of a shelf on which a portable heating source can be permanently secured for use as a mode of cooking and as a source of heat.

[0029] Further objects and advantages are to provide a portable, all-terrain shelter with multiple structural units that can be easily and quickly raised for use or easily and quickly
lowered for transporting, that can be utilized during all seasons of the year and for many outdoor activities due to the interchangeability of skies and wheels depending on the type of surface of which the invention is to be transported, that can, with use of a heating device, maintain an adequate interior temperature for cold season activities. Still further objects and advantages will become apparent from a consideration of the ensuing descriptions and drawings.

SUMMARY

[0030] In accordance with the present invention the portable shelter comprises the ability of multiple structural units to be dropped down in a telescopic motion to create a low, air resistant, profile for transport. When the ‘Drop Top’ shelter is transported to the desired location of outdoor activity, the structural units can be easily raised and automatically locked into position for use. Also, the invention offers the use of either skies, so as to be transported over ice or snow for winter use such as ice fishing, or the removal of the ski system to be replaced with wheels and leveling posts which allow the ‘Drop Top’ portable shelter to be used during the warm weather months for activities such as remote camping, back country fishing and many hunting applications that necessitate day or over night accommodations.

DRAWINGS—FIGURES

[0031] In the indicated drawings, each component of the invention is documented with a separate number. Certain multiple part components are distinguished by the component number with a component part alphabetic suffixes.

[0032] FIG. 1 shows an isometric view of the invention in the raised position with skies attached. Each visible component is labeled.

[0033] FIG. 2 shows a view of the right side of the invention in the raised position with skies attached. The front of the invention is to the right of the drawing.

[0034] FIG. 3 shows the rear, or back end, view of the invention in the raised position with skies attached.

[0035] FIG. 4 shows the right side view of the invention in the lowered position with skies attached.

[0036] FIG. 5 shows the rear, or back end, view of the invention in the lowered position with skies attached.

[0037] FIG. 6 shows an isometric view of the rear, right side and top of the invention in the raised position with skies removed and wheels and leveling posts attached.

[0038] FIG. 7 shows the left side view of the invention in the raised position with skies removed and wheels and leveling posts attached.

[0039] FIG. 8 shows the rear, or back end, view of the invention in the lowered position with skies removed and wheels and leveling post attached.

[0040] FIG. 9 shows the left view of the invention in the lowered position with wheels and leveling post attached.

[0041] FIG. 10 shows a cross section view, including inside and outside alignment grooves, of the lower, middle and upper structural unit panels which have the option of interior insulation material.

[0042] FIG. 11 shows an isometric view of the ski/wheel support bracket, ski yoke attached to ski, wheel hub spacer, wheel and ski/wheel hub bolt, washer and nut.

[0043] FIG. 12 shows view of ski/wheel support bracket attached to floor support which is attached to floor by carriage bolt. Also, wheel is attached by ski/wheel hub bolt to ski/wheel support bracket with wheel hub spacer installed.

[0044] FIG. 13 shows the ski/wheel support bracket attached to the floor support and floor by carriage bolt. Also, the ski, with ski yoke, is attached to the lower end of the ski/wheel support bracket with the ski/wheel hub bolt.

[0045] FIG. 14 shows a cross-section of the upper, middle and lower structural unit panels with the latch pin assembly in the locked position securing the upper and middle panels; and a lock pin assembly, sliding against the stationary lower structural unit panel, in the unlocked position.

[0046] FIG. 15 shows a latch pin assembly in the unlocked position.

[0047] FIG. 16 shows a latch pin assembly secured to a panel in the locked position.

[0048] FIG. 17 shows the face plate, latch pin assembly and the latch pin assembly split ring.

[0049] FIG. 18 shows a ski/wheel support bracket with a leveling post, in the ‘down’ position, attached with the ski/wheel support bracket bolt.

[0050] FIG. 19 shows a ski/wheel support bracket with a leveling post, in the ‘up’ position, attached to the ski/wheel support bracket with a support bracket bolt and held in the ‘up’ position with the leveling post locking pin.

[0051] FIG. 20 shows an isometric view of the ski/wheel support bracket with the leveling post secured in the ‘down’ position.

[0052] FIG. 21 shows a ski, with ski yoke secured, attached to the ski/wheel support bracket.

[0053] FIG. 22 shows a side view of a ski, with ski yoke secured, attached to ski/wheel support bracket.

[0054] FIG. 23 shows an end view of wheel, with wheel hub spacer, attached to ski/wheel support bracket by ski/wheel support bracket bolt.

[0055] FIG. 24 shows side and end views of wheel with wheel hub spacer attached.

[0056] FIG. 25 shows tow bar, which can be used to pull said portable shelter by either snowmobile or ATV (all-terrain vehicle), which attaches to front end of ‘Drop Top’ portable shelter.

[0057] FIG. 26 shows exploded view of parts of ‘Drop Top’ portable shelter in the raised position.

DRAWINGS—Reference Numerals

[0058] 1. Lower Structure Unit

[0059] 1a. Lower right wall panel

[0060] 1b. Lower left wall panel

[0061] 1c. Lower front panel
1d. Lower rear wall panel
2. Middle Structure Unit
2a. Middle right wall panel
2b. Middle left wall panel
2c. Middle front panel
2d. Middle rear wall panel
3. Upper Structure Unit
3a. Upper right wall panel
3b. Upper left wall panel
3c. Upper front panel
3d. Upper rear wall panel
4. Roof Panel sheathing
5. Side Fascia
6. Roof rafter panels
7. Side Sliding Window
8. Upper door Unit
9. Middle Door Unit
10. Lower Door Unit
11. Door Hinge
12. Ski
13. Ski Yoke
14. Ski/Wheel Support Bracket
14a. Ski/Wheel Support Bracket Bolt
14b. Ski/Wheel Support Bracket Washer
14c. Ski/Wheel Support Bracket Nut
15. Floor Support
16. Tow Bar Unit
16a. Tow Bar Hinge
16b. Tow Bar Arms
16c. Tow Bar Plate
17. Wheel
17a. Ski/Wheel Hub Bolt
17b. Ski/Wheel Hub Washer
17c. Ski/Wheel Hub Nut
18. Wheel Hub Spacer
19. Floor Frame Unit
20. Floor
20a. Floor hole covers
20b. Floor openings
21. Leveling Post
22a. Locking Pin
22b. Split Ring
22c. Washer
22d. Cotter Pin
23. Latch Pin Assembly Unit
23a. Latch Pin Assembly Pin
23b. Latch Pin Assembly Split Ring
23c. Latch Pin Assembly Spring
23d. Latch Pin Assembly Retainer Washer
23e. Latch Pin Assembly Flat Washer
23f. Latch Pin Assembly Face Plate
23g. Latch Pin Assembly Screws
24. Structure Unit Wall Panel Screws
25. Structure Unit Wall Panel Outside Alignment Groove
26. Structure Unit Wall Panel Inside Alignment Groove
27. Shelf

DETAILED DESCRIPTION OF THE INVENTION

A preferred embodiment of the telescopic, portable, all-terrain, portable shelter of the present invention is illustrated in FIG. 1, raised position, FIG. 4, lowered position, isometric view (with skis attached). FIG. 6, raised position, and FIG. 8, lowered position, (isometric view with wheels attached).

The shelter consists of the floor 20, FIG. 26, formed or manufactured of solid, rigid, re-enforced material or singular parts combined for same purpose. The shelter floor 20 has two floor openings 20a, FIG. 26, formed or manufactured as to allow two floor hole covers 20a to be inserted, allowing the floor hole covers 20a to be flush with floor 20 surface, when floor hole openings 20b are not in use for the purpose of ice fishing.

The floor 20 provides a base for attaching the lower structure 1, FIG. 1 and FIG. 6, which encompasses a left wall panel 1a, right wall panel 1b, front wall panel 1c, and rear wall panels 1d (both rear wall panels 1d are of similar dimensions). Right wall panel 1a, left wall panel 1b, front wall panel 1c, and (2) rear wall panels 1d are formed or manufactured with the capacity to include an insulating material imbedded between two thin, rigid outer sheathing surfaces. All said wall panels are formed or manufactured with a solid material, or similar material used to form or manufacture the wall panels, at the top and bottom of the all panels with sufficient dimensions to facilitate the attachment of latch pin assembly units 23, FIG. 14, FIG. 15 and FIG. 16. Right wall panel 1a, left wall panel 1b, front wall panel 1c and rear wall panels 1d are formed or manufactured with two structure unit wall panel inside alignment grooves 26, FIG. 10, imbedded or formed in the panels to facilitate the alignment of the middle structure unit 2, FIG. 1 and FIG. 6, while moving up and down in a vertical motion along the outside dimensions of the lower structure unit 1. Wall panels 1a, 1b, 1c, and 1d are attached to floor 20 and to each adjacent wall unit by structural wall panel screws 24.

The middle structure unit 2 is formed or manufactured and assembled in similar fashion as lower structure
The middle structure unit 2, as an embodiment of the invention, is formed or manufactured to sufficient dimensions as to allow middle structure unit 2 to move vertically up and down along the outside dimensions of lower structure unit 1. The right wall panel 2a, the left wall panel 2b, the front wall panel 2c, and the two rear wall panels 2d (both rear wall panels 2d are of similar dimensions) of middle structure unit 2 are formed or manufactured with two vertically positioned structure unit wall panel inside alignment grooves 26, FIG. 10, and two, vertically positioned, structure unit wall panel outside alignment grooves 25, FIG. 10, imbedded or formed in the said panels to facilitate the alignment of the middle structure unit 2 while moving up and down in a vertical motion along the outside dimensions of the lower structure unit 1 and to facilitate the alignment of the upper structure unit 3, FIG. 1 and FIG. 6, while moving up and down in a vertical motion along the outside dimensions of the middle structure unit 2.

The upper structure unit 3 is formed or manufactured and assembled in similar fashion as middle structure unit 2. The upper structure unit 3 is formed or manufactured to sufficient dimensions as to allow middle structure unit 2 to move vertically up and down along the outside dimensions of middle structure unit 2. The right wall panel 3a, the left wall panel 3b, the front wall panel 3c, and the two rear wall panels 3d (both rear wall panels 3d are of similar dimensions) of upper structure unit 3 are formed or manufactured with two, vertically positioned, structure unit wall panel inside alignment grooves 26 imbedded or formed in the said panels to facilitate the alignment of the upper structure unit 3 while moving up and down in a vertical motion along the outside dimensions of the middle structure unit 2 and to facilitate the alignment of the upper structure unit 3 while moving up and down in a vertical motion along the outside dimensions of the middle structure unit 2. The upper structure unit 3 is capped with a roof system formed or manufactured with the capacity to include an insulating material imbedded between two thin, rigid outer sheathing surfaces and formed or manufactured in a curved or an inverted ‘V’ shape, consisting of: a multiple number of roof rafter panels 6 secured to the top portion of the upper structure unit 3 by structure wall panel screws 24, FIG. 10. A thin, flexible, solid roof panel sheathing 4, to prevent the entrance of precipitation into the shelter, is attached to the upper surfaces of the roof rafter panels 6 with fastening devices.

Side sliding windows 7, FIG. 1 and FIG. 6, with incorporated screens, are attached with fastening devices to the upper structure unit 3 right wall panel 3a and left wall panel 3b on the outside of a formed or manufacturing opening created in the upper structure unit 3 right wall panel 3a and the upper structure unit 3 left wall panel 3b.

A lower unit door 10, FIG. 1, formed or manufactured with the capacity to include an insulating material imbedded between two thin, rigid outer sheathing surfaces and of sufficient width to fit opening created by lower structure rear wall panels 1d and of sufficient height to match height of lower structure unit 1, is attached to door opening of lower structure unit 1 by means of door hinges 11, FIG. 1. A middle unit door 9, FIG. 1, formed or manufactured with the capacity to include an insulating material imbedded between two thin, rigid outer sheathing surfaces and of sufficient width to fit opening created by middle structure rear wall panels 2d and of sufficient height to be approximately one inch longer than opening created by middle rear wall panels 2d of middle structure unit 2, is attached to door opening of middle structure unit 2 by means of door hinges 11. An upper door unit 8, FIG. 1, formed or manufactured to create an opening which is to be covered by a thin, clear material to create an outside viewing window which is attached to upper door unit 8 by means of fastening devices. Upper door unit 8, is of sufficient width to fit opening created by upper structure unit 3 rear wall panels 3d and of sufficient height to be approximately one inch longer than opening created by upper rear wall panels 3d of upper structure unit 3, is attached to door opening of upper structure unit 3 by means of door hinges 11.

The middle structure unit 2 is held in a raised or elevated position by the use of four latch pin assembly units 23, which consists of latch pin assembly pin 23a, latch pin assembly split ring 23b, latch pin assembly spring 23c, latch pin assembly retainer washer 23d, latch pin assembly flat washer 23e, latch pin assembly face plate 23f, and latch pin assembly screws 23g. Two latch pin assembly units 23 are attached to the upper inside surface of the lower structure unit 1 left side wall panel 1a and two latch pin assembly units 23 are attached to the upper inside surface of the lower structure unit 1 right side wall panel 1b. The upper structure unit 3 is held in a raised or elevated position by the use of four latch pin assembly units 23. Two latch pin assembly units 23 are attached to the upper inside surface of the middle structure unit 2 left side wall panel 20 and two latch pin assembly units 23 are attached to the upper inside surface of the middle structure unit 2 right side wall panel 2a of the middle structure unit 2. When upper structure unit 3 and middle structure unit 2 are to be lowered, a simple pull of the latch pin assembly split ring 23b will release the latch pin assembly pin 23a allowing the upper structure unit 3 and middle structure unit 2 to slide down over lower adjacent structure units.

A major embodiment of the invention is the versatile use of installing two skis 12, FIG. 1, FIG. 3, and FIG. 21, for winter use on snow or ice and the interchangeability of removing skis 12 and attaching two wheels 17, FIG. 6, FIG. 8, and FIG. 12, for use during the remainder of the year. To make more rigid and give additional strength to the floor 20, whether formed of a hard, solid, molded material or if the floor system is manufactured from component parts, two floor support 15, FIG. 8, and FIG. 12, members are bolted, in a longitudinal direction, to the floor material by the use of ski/wheel support bolts 14a, ski/wheel bracket washers 14b and ski/wheel support nuts 14c, FIG. 12. The above mentioned fastening devices, 14a, 14b, 14c, as seen in FIG. 11, FIG. 12 and FIG. 13, are utilized to secure four ski/wheel support brackets 14, FIG. 11 and FIG. 12, which are permanently attached to the underside of the floor support 15 members. The ski/wheel support brackets 14, as seen in FIG. 11, FIG. 12 and FIG. 13, are used to hold in place either the skis or wheels by utilizing ski/wheel hub bolt 17a, FIG. 11 and FIG. 12, ski/wheel hub washer 17b, ski/wheel hub nut 17c, and in the case of mounting a wheel, the wheel hub spacers 18, FIG. 12, are installed. Each ski has permanently attached to it two ski yokes 13, FIG. 11 and FIG. 13, which are used to attach the skis 12 to the ski/wheel support bracket 14 by using fastening devices 14a, 14b, and 14c.
To connect the portable shelter to either a snowmobile for winter use or to an ATV (all-terrain vehicle) for warm weather use, a tow bar unit \(16\), FIG. 25, is installed. The tow bar unit \(16\) encompasses a tow bar plate \(16c\), which connects the tow bar \(16\) to the pulling machine and gives horizontal flexibility between the portable shelter and the pulling machine, two tow bar hinges \(16a\), which give vertical flexibility between the portable shelter and the pulling machine and two tow bar arms \(16b\), which connect the tow bar hinges \(16a\) and the tow bar plate \(16c\).

**FIG. 11 and FIG. 13—Additional Embodiments**

Additional embodiments, shown in FIGS. 11 and 13, demonstrate the versatile use of the ski/wheel support bracket \(14\) that allows for easy changing from the use of skis \(12\), as are needed to support the portable structure over snow and ice during the winter months, to the use of wheels \(17\), which are needed to support the portable shelter over graded or rough terrain for use during the warmer months of spring, summer and fall.

**FIG. 1 and FIG. 4—Additional Embodiments**

Additional embodiments shown in FIG. 1 and FIG. 4, demonstrate the case of configuration of the multi-structural units, \(1\), \(2\) and \(3\), of the portable shelter from a raised position, FIG. 1, when occupying the structure to, FIG. 4, shown in the lowered position for low a profile when transporting the shelter behind a motorize vehicle to or from the spot of activity and for transporting the shelter on a trailer or in the back of pickup truck.

**FIG. 14, FIG. 15 and FIG. 16—Additional Embodiments**

Additional embodiments are featured in FIGS. 14, 15 and 16 which show the latch pin assembly unit \(23\). These latch pin assemblies \(23\) are self locking due to the utilization of a latch pin assembly spring \(23c\) which allow the latch pin assembly pins \(23a\) to automatically lock into a hole drilled into the upper inside surfaces of an adjacent structural units, \(2\) and \(3\).

**FIG. 17**

**Additional Embodiments**

The use of many different materials for the manufacture of the invention can be utilized. Using an inject molding process, or similar processes, to form the floor \(20\), hole covers \(20a\), lower, middle and upper structural wall panels \(1a-1d\), \(2a-2d\), \(3a-3d\), roof rafter panels \(6\) and lower and middle doors \(9\) and \(10\) or by using a plastic, or similar substance, type material with the possible allowance for an insulating material between an inner and outer thin layer of rigid plastic could be highly utilized. The shelter frame has the possibility of being constructed from materials such as aluminum, wood, steel or any solid, rigid material and the use of plywood, sheet plastic, sheet metal, sheet aluminum or any relatively thin and flexible material attached as an inside and outside sheathing. There are many products that could be used as an insulating material, such as foam insulation, blown in insulation or sprayed on insulation, which would be sandwiched between the inside and outside sheathing surfaces of panels.

**FIG. 1, FIG. 4, FIG. 6, FIG. 8, FIG. 10, FIG. 10a, FIG. 11, FIG. 18, FIG. 25**

**FIG. 1, FIG. 4, alignment grooves FIG. 10, automatic locking together of structural units by using latch pin assembly units 23FIG. 10a and the tremendous versatility of being able to use skis 12FIG. 4 or wheels 17FIG. 8. The first step in using the ‘Drop Top’ portable shelter is determined by the type of ground condition on which one is to transport the ‘Drop Top’. If skis 12 are to be used, in the case of snow or ice covered ground, and are not already attached, one would remove the four ski/wheel bolts 14c FIG. 11 by turning ski/wheel nut 14c counterclockwise to back off nut. The two skis 12, with ski yokes 13FIG. 11 attached, should be aligned with the ski/wheel support brackets 14 and secured using the ski/wheel support bracket bolts 14a, washers 14b and nuts 14c. As the seasons change from snow covered ground to dry ground, the need to remove the two skis 12 and install the two wheels 17 becomes a necessity. This process is the same as described above which requires removing the ski/wheel supports bracket bolts 14a, remove skis 12 and then, after positioning the two wheels 17 on the rear ski/wheel support brackets 14, reinstalling ski/wheel support bracket bolts 14a, securing the wheels in position. When wheels are needed to transport the ‘Drop Top’ shelter, one will need to install the two leveling posts 21FIG. 18 on the front ski/wheel support brackets 14. This process is accomplished by positioning the leveling post 21 on the ski/wheel support brackets 14 and securing with ski/wheel support bracket bolts 14c. When the ‘Drop Top’ shelter is being transported, the leveling posts 21 can be rotated up and locked into position by inserting the locking pin 22a FIG. 18 which prevents the bottom of the leveling post 21 from dragging on the ground.

Another main embodiment of the ‘Drop Top’ shelter presents itself when the ‘Drop Top’ shelter is transported to the desired location of activity and the upper structural levels 2 and 3 are raised, allowing sufficient head room for occupants. This is a very simple process which involves the operator, while standing outside the shelter, to open the upper 8, middle 9 and lower 10FIG. 1 structural door units. Once the doors are swung open, the operator needs to climb inside the shelter. With very little manual effort, due to the lightness of the structural units, the operator needs to push the upper structure unit 3 up into position. When the upper structure unit 3 is locked into place, the operator will need to push up again, this time lifting the middle structure unit 2 along with the upper structure unit 3 which is already locked into position with the middle structure unit 2. When the locked combination of the upper 3 and middle structure units 2 reach the desired height, they will lock into position with the use of the latch pin assembly units 23FIG. 10a.

The third main embodiment of the invention includes the use of an automatic locking system which requires four latch pin assembly units 23 for each of the upper structural units. When the structural units are in the down or lowered position, the latch pin assembly pin 23a is forced inward creating pressure on the latch pin assembly spring 23c, as it rests against the inside wall of the upper adjacent structure. As the structural units are raised the latch pin assembly pin 23a rides on the inside surface of the upper adjacent structure unit. When the structure reaches the desired level, the latch pin assembly pin 23a automatically activates and is secured in an aligned, predrilled hole, locking the two adjacent structural units into place. To ready the ‘Drop Top’ shelter for transporting, all one has to do is
pull on the latch pin assembly split rings 23c, releasing the pressure on the latch pin assembly pin 23a, thus easily lowering the upper structure units. At this point all that is needed to transport the collapsed shelter is to connect the tow bar unit 16FIG. 25 to a hitch attached to a snowmobile or ATV (all-terrain vehicle) and pull the collapsed portable shelter back to an awaiting vehicle, camp or domicile.

[0140] The fourth embodiment of the ‘Drop Top’ portable shelter encompasses a set of inside 26FIG. 10 and outside grooves 25FIG. 10 on each of the wall panels. These corresponding, vertical grooves are manufactured into the wall panels and control the horizontal movement of the structures which forces the structural units to run in a near perfect vertical direction.

[0141] Advantages

[0142] From the description above a number of advantages of my telescopic, all-terrain, portable shelter become evident:

[0143] (a) The tremendous versatility of being able to either attach skis or wheels makes the ‘Drop Top’ portable shelter an all-season invention. The operator can utilize the skis over snow or ice during the winter months being towed by a snowmobile while ice fishing, camping, or as a headquarters for ice fishing derbies. With a simple operation of exchanging the skis for wheels, the shelter can be transported over graded surfaces or can be hauled over any rough terrain that an ATV (all-terrain vehicle) can traverse.

[0144] (b) The invention, the “Drop Top” portable shelter, having a plurality of telescopic structural units, allows the shelter to have a low profile when the structural units are lowered creating less wind resistance while transporting and better maneuverability while traversing narrow, off road trails. With little effort the multiple structural units can be lifted to an elevated or raised position allowing for ample headroom for occupants.

[0145] (c) Corresponding inside and outside structural unit wall panel alignment grooves, either molded into or attached to the wall panels, alleviate any horizontal movement of the wall panels and help guide the structural units in a vertical motion. These grooves help facilitate the ease of raising the structural units.

[0146] (d) With the attachment of latch pin assembly units, the securing of the elevated structural units is made simple as the structure units raise into place and the spring loaded springs automatically engage and lock the two adjacent sections into place. The lowering of the structure units is as simple as raising because all the operator has to do is pull on the latch pin assemble split ring, releasing the pressure on the pin, thus allowing the lowering of the structural units.

[0147] (e) The limited weight of the ‘Drop Top’ portable shelter, due to materials and invention concept used in the manufacturing, allows for ease of movement over any surface condition, particularly while traversing rough, off road terrain.

[0148] (f) With built in floor holes, ice fishing from the comforts of the interior is easily performed.

[0149] (g) Due to the compact size, allowing for limited wind resistance, of the ‘Drop Top’ portable shelter, it is very easily fitted onto the back of a pickup truck or secured alongside of a snowmobile on a double trailer.

[0150] (h) The option exists for inclusion of an insulating material in the wall panels which, during cold weather, will help maintain a comfortable interior temperature.

[0151] (i) Because of the materials used in the manufacturing and the invention concept, the ‘Drop Top’ portable shelter is easily maintained with very limited effort and should provide decades, if not generations, of enjoyable use.

[0152] (j) Having the invention composed of individual components, it will be easy and inexpensive to manufacture, ship and assemble with limited equipment or knowledge.

[0153] (k) The interior volume of the invention will allow ample space for occupants to perform their activities comfortably.

[0154] (l) The sliding windows of my invention will allow sufficient ventilation and light while occupying the ‘Drop Top’ portable shelter.

CONCLUSION, RAMIFICATIONS, AND SCOPE

[0155] Accordingly, the reader will see that the ‘Drop Top’ collapsible, portable shelter of this invention can be used over all types of terrain, can be conveniently used during all seasons of the year, can be easily converted from skies to wheels, can have the multiple structure units locked in place when elevated and can be quickly repositioned from a lowered structure during transportation of shelter to a raised position to provide adequate headroom for occupants. In addition, the shelter can be maneuvered and transported with ease because of its low profile and limited weight. Furthermore, the ‘Drop Top’ portable shelter has additional advantages in that:

[0156] it can be easily mass manufactured by an injection molded process or can be constructed by a single individual with limited knowledge and equipment;

[0157] it can be manufactured with readily available materials;

[0158] it should last for many years with limited maintenance;

[0159] it requires limited space for storing while not in use;

[0160] it provides comfortable shelter for numerous outdoor activities.

[0161] Although the description above contains many specifications, these should not be construed as limiting the scope of the invention but as merely providing illustrations of some of the recently preferred embodiments of this invention. For example, the shelter could have an inverted ‘V’ or a flat roof design, the shelter could have more windows, the shelter could use numerous and different materials in the manufacturing process, the structure could have more or less multiple structure units and the structure
could have different latching devices installed, etc. Thus the scope of the invention should be determined by the appended claims and their legal equivalents, rather than by the examples given.

1. A collapsible, all-terrain, portable shelter comprising a plurality of structural units with a top structural unit, a bottom structural unit, and optional intermediate structural units, with the top structural unit positioned above all other structural units and the bottom structural unit positioned below all other structural units and the intermediate structural units if any, positioned between the top structural unit and the bottom structural unit, with the top structural unit adjacent to the structural unit positioned immediately below, the bottom structural unit adjacent to the structural unit positioned immediately above, and each intermediate structural unit, if any adjacent to the structural units positioned immediately above and below;

with each said structural unit having a perimeter dimension greater than the perimeter dimension of the structural unit positioned immediately below, except for the bottom structural unit which has a perimeter dimension smaller than the perimeter dimensions of all other structural units, thereby allowing each said structural units to collapse down around the structural units positioned immediately below, except for the bottom structural unit; and

with each said structural units suitably adapted to being elevated or lowered by a positioning means.

2. The collapsible, all-terrain, portable shelter of claim 1 further comprising a floor having an area of sufficient size to accommodate multiple human occupants.

3. The collapsible, all-terrain, portable shelter of claim 1 further comprising a series of corresponding vertical ridges and grooves on said structural units providing a means of alignment between adjacent structural units, facilitating slidability between adjacent structural units.

4. The collapsible, all-terrain, portable shelter of claim 1 further comprising a locking mechanism suitably adapted to retain the said structural units in an elevated position.

5. The collapsible, all-terrain, the portable shelter of claim 1 further comprising interchangeable skis and wheels for transporting said portable shelter over differing types of terrain.

6. The collapsible, all-terrain, the portable shelter of claim 1 further comprising a plurality of holes positioned within and through the floor, each said hole having a removable cover.

7. The collapsible, all-terrain, the portable shelter of claim 1 further comprising a front end and a back end, and a tow bar positioned at the front end of the said shelter.

8. The collapsible, all-terrain, the portable shelter of claim 1 further comprising at least one stationary shelf.

9. The collapsible, all-terrain, portable shelter of claim 1 wherein the structural units are constructed of a rigid material.

10. The collapsible, all-terrain, portable shelter of claim 1 wherein the structural units are insulated.

11. The collapsible, all-terrain, portable shelter of claim 8 further comprising a heating/cooking device, with the heating/cooking device secured to one said stationary shelf.

12. The collapsible, all-terrain, portable shelter of claim 1 further comprising a roof.

13. The collapsible, all-terrain, portable shelter of claim 12 wherein said roof is insulated.

14. The collapsible, all-terrain, portable shelter of claim 1 further comprising at least one window.

15. The collapsible, all-terrain, portable shelter of claim 1 wherein each structural unit further comprises a door.

16. The collapsible, all-terrain, portable shelter of claim 1 further comprising a leveling support structure to maintain the shelter in a substantially upright orientation when it is at rest and decoupled from a towing vehicle.

17. The collapsible, all-terrain, portable shelter of claim 1 further comprising

a floor having an area of sufficient size to accommodate multiple human occupants;

a series of corresponding vertical ridges and grooves on said structural units providing a means of alignment between adjacent structural units, facilitating slidability between adjacent structural units;

a locking mechanism suitably adapted to retain the said structural units in an elevated position;

a roof; and

interchangeable skis and wheels for transporting said portable shelter over differing types of terrain.

18. The collapsible, all-terrain, portable shelter of claim 1 further comprising

a floor having an area of sufficient size to accommodate multiple human occupants;

a plurality of holes positioned within and through the floor, each said hole having a removable cover;

a roof;

a series of corresponding vertical ridges and grooves on said structural units providing a means of alignment between adjacent structural units, facilitating slidability between adjacent structural units;

a locking mechanism suitably adapted to retain the said structural units in an elevated position;

interchangeable skis and wheels for transporting said portable shelter over differing types of terrain;

a front end and a back end, and a tow bar positioned at the front end of said shelter;

at least one window;

a door integrated into each structural unit;

a leveling support structure to maintain the shelter in a substantially upright orientation when it is at rest and decoupled from a towing vehicle; and

at least one stationary shelf and a heating/cooking device, with the heating/cooking device secured to one said shelf.

19. The collapsible, all-terrain, portable shelter of claim 18 wherein the structural units are constructed of a rigid material.

20. The collapsible, all-terrain, portable shelter of claim 19 wherein the roof and structural units are insulated.

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