May 31, 1960 G. O. BENSON 2,938,524

TENT

Filed Aug. 23, 1956

Fig. 1.

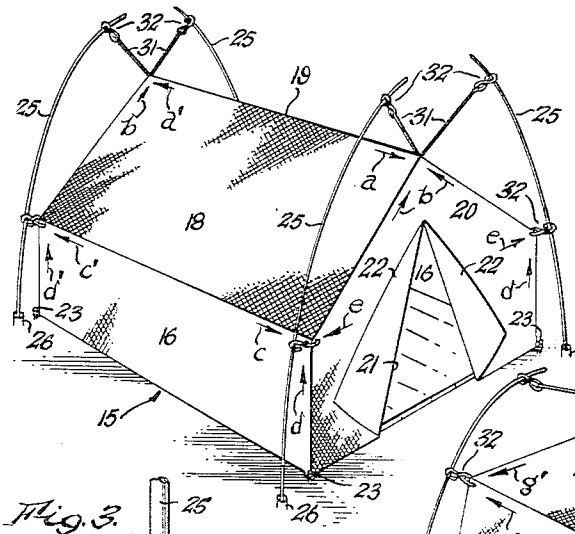


Fig. 2.

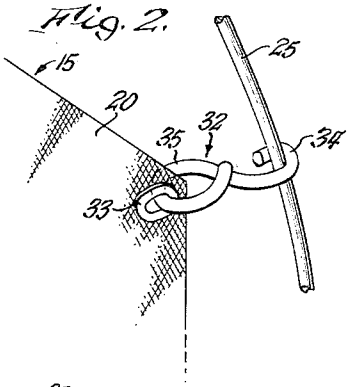


Fig. 3.

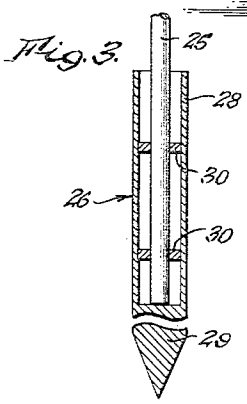
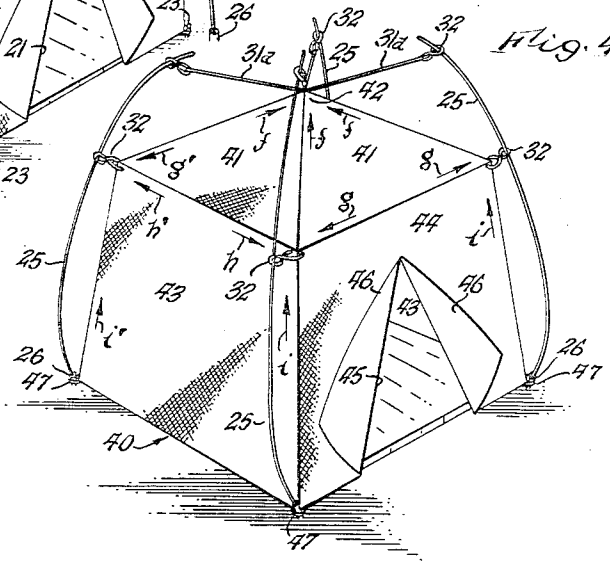


Fig. 4.



INVENTOR.

BY George O Benson

Popp and Sommer

ATTORNEYS.

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TENT

George O. Benson, Rte. 1, Creek Road, Youngstown, N.Y.

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4 Claims. (Cl. 135—1)

This invention relates to tents made of flexible sheet material stretched and sustained by rods and more particularly shown as embodied in different designs of tents adapted to be erected upon the ground.

One of the principal objects of the present invention is to provide such tents which are simple to erect properly by one having little skill so that the tents can be easily erected by children or by householders having little or no mechanical bent.

Another object of the invention is to provide such tents, the components of which are very light in weight so as to be easy to handle both in erecting and tearing down the structure and so as to be easy to install and inexpensive to ship.

Another object of the invention is to provide such tents which are entirely noiseless, the parts yielding under wind stresses and the like and being free from rattle, clatter, bumps or other disturbing noises.

Another object is to provide such a tent which is self-adjusting after being erected, so that as the canvas or other fabric shrinks or expands, the supporting frame automatically adapts itself to the changed condition.

Another object of the invention is to provide such a tent which is extremely strong in spite of its light weight and will stand up under conditions of severe and constant use under the heat of the sun and under the beating of wind storms without giving way.

Another object is to provide such a tent, the components of which will withstand weathering under adverse circumstances, temperature, humidity, wind stresses, salt air and air contaminated with corrosive industrial by-products.

Another object is to provide such a tent which can be completely free from internal poles or struts.

Another object is to provide such tents which are of pleasing and ornamental appearance and which can be produced in structures of distinct and widely different appearance and design as compared with conventional tent structures now on the market.

Another object is to provide such a tent in which one size or set of the flexible, spring-like rods used fits varying sizes of tents, as compared with conventional tent supports currently used which must be made in exact sizes and form to fit each individual tent or awning. The use of one size or set of rods for various sizes of tents in the practice of the present invention reduces required inventory and simplifies manufacturing, selling and servicing.

Another object is to provide such a tent which can be erected from the outside as compared with conventional tents which require assembly and erection of the supporting frame from inside the fabric tent body while the collapsed fabric tent body rests on the head and body of the operator.

Another object of the invention is to provide tents which permit elimination of guy ropes particularly in front or at the sides of the tent.

Other objects and advantages of the invention will

be apparent from the following description and drawings in which:

Fig. 1 is a perspective view of a wall tent embodying the present invention.

Fig. 2 is an enlarged perspective view of one of the corners between the roof and wall of the wall tent and showing the manner in which this corner is attached to a flexible spring-like rod which holds the corner under stress in distended form.

Fig. 3 is a vertical section through one of the ground sockets in which each of the flexible spring-like rods is mounted.

Fig. 4 is a view similar to Fig. 1 illustrating a modification of the invention, the tent illustrated being a so-called pyramid tent.

In Figs. 1–3 is illustrated a wall tent embodying the present invention. As shown, the body **15** of the tent is made of flexible sheet material such as canvas or light-weight fabric, although the body could also be made of paper, especially high wet strength paper. The body **15** of flexible sheet material is shown as having two side walls **16** connected to roof panels **18** which incline and converge upwardly from the side walls to a crest in the form of a common ridge **19**.

The tent body is shown as having a front wall **20** which conforms and is secured to the front ends of the side walls **16** and roof panels **18** and is shown as having a central entrance opening **21** capable of being closed by tent flaps **22** which form part of the front wall **20** when they are closed. The tent also has a rear wall (not shown) which is identical to the front wall **20** except that it is unprovided with the entrance opening **21** and flaps **22**. The walls of the tent can be staked down at intervals as shown by the stakes **23**.

The present invention revolves around the use of a plurality of flexible spring-like rods **25** to support the tent body **15** in the erect condition shown. These rods **25** are preferably made of strands of glass fiber imbedded in plastic and of the nature now in general use for fishing poles. These rods **25** can be solid or tubular; they can be of uniform diameter throughout their length or tapered; and they can be one-piece rods or composed of several jointed sections detachably connected together. The essential characteristics are that they be flexible and return to their straight form when released and have the required resilient resistance to bending so as to maintain the tent body **15** under the required stress to hold it erect under all weather conditions.

These flexible spring-like rods **25** are arranged externally of the tent and are shown as anchored in the ground although it will be understood that they could be anchored in any base, such as the platforms used for semi-permanent tents. For this purpose, they are desirably held in pointed sockets **26** which are driven into the ground. As best illustrated in Fig. 3, each of these pointed sockets can be made of metal and its upper part **28** is preferably of tubular form with its lower part **29** of solid pointed form to be readily driven into the ground. The socket member can be of any suitable length and its upper end is open so that one of the flexible spring-like rods **25** can be inserted into it from its upper end. At spaced intervals, the socket **26** preferably has horizontal transverse walls **30**, these walls having central alining openings of approximately the same diameter as the base of the flexible spring-like rods **25** so that the bases of these rods can be snugly fitted therein.

In the form of the invention illustrated in Figs. 1–3, four of such sockets **26** are used in conjunction with four flexible spring-like rods **25** and an important feature of the invention is the location of these sockets and rods. As illustrated in Fig. 1, these sockets **26** are driven vertically into the ground adjacent the lower vertical external cor-

ners of the tent body 15, but spaced a short distance outwardly beyond the ends of the side walls and the front and rear end walls. The front pair of sockets 26 so driven vertically into the ground are spaced forwardly of the vertical plane of the front wall 20 of the tent and similarly the rear pair of vertically driven sockets 26 are spaced rearwardly from the vertical plane of the rear wall (not shown) of the tent, this also being the plane of the rear edges of the side walls 16 and the rear edges of the top panels 18. It is also important that when driven vertically each side pair of these sockets 26 be spaced outwardly from the plane of the corresponding side walls 16 of the tent. However, as explained in greater detail in connection with Fig. 4, the desired stress in the rods 25 can be achieved by driving the sockets 26 immediately adjacent an angle to the vertical at the lower external corners of the tent body.

The forward peak of the ridge 19 of the tent body has attached thereto a pair of ropes, thongs and similar ties 31, each terminating in a metal connector 32. Similarly, the peak at the rear end of the ridge 19 has an identical pair of ropes or thongs 31 having metal connectors 32. Additionally, grommets 33 are provided in the front, rear and side walls of the tent at each corner of the tent body immediately below the corner of the corresponding roof panel 18 and through these grommets at each corner of the tent is threaded a metal connector 32 identical with the metal connectors 32 at the ends of the ropes or thongs 31.

As best shown in Fig. 2, each of these metal connectors comprises a piece of stiff wire of figure-8 form bent to provide a closed loop and an open loop. While either loop can be open, the connector is shown as having an open loop 34 at one end which is of relatively small size and a closed loop 35 at its opposite end which is of larger size. Where the connectors 32 are used to thread through the grommet 33 as illustrated in Fig. 2, the large loop 35 threads through these grommets. The other or smaller loop 34, shown as the open loop, embraces the corresponding flexible spring-like rod 25. In the case of the metal connectors 32 which support the front and rear peaks of the tent, the large closed loops 35 fasten to the ropes or thongs 31 and the small open loops 34 embrace the tips of the flexible, spring-like rods 25.

In assembling the tent as shown in Figs. 1–3, the body of the tent is first laid on the ground in collapsed condition and the corners of the walls secured by stakes 23, as is customary. Four anchoring sockets 26 are driven into the ground, it being important as previously indicated, that the front and rear pair of these sockets be located fore-and-aft, respectively, of the front and rear walls of the tent and that the side pair of these anchoring sockets be located outside of the planes of the side walls 16 of the tent.

Thereafter, a flexible spring-like rod is set in each socket 26 and projects upwardly with its upper end being unattached and arranged in spaced relation to the upper ends of the other rods, above the roof. These rods are successively flexed or bent over by hand to permit of engaging the open loops 34 of the connectors 32 to be attached to the rods. These connectors 32, which are shown as attached to the tent body 15 by the closed loops 35, but which could also be open, can readily be lifted the required distance. Preferably the top connections, from the ropes 31, are made first followed by the remaining lower attachments. Accordingly, the upper portion of each of these rods is slideably embraced by the open loop 34 of a connector 32 of a companion rope or thong 31 and the intermediate portion of each rod is slideably embraced by the open loop 34 of the companion connector which is hooked through the grommet 33 in the corresponding corner of the tent body adjacent the junctures of the front, rear and side walls of the tent.

After the rods 25 are so attached to the tent body 15, the connectors 32 can be adjusted along the rods 25 so as to bring the wall tent to the regular form shown in Fig. 1, the connectors 32 being adjusted vertically up or down the flexible spring-like rods 25 for this purpose. When properly adjusted, the thongs 31 of the front rods 25, which rods are flexed downwardly and inwardly toward the adjacent front peak, exert a horizontal forward force on the peak of the tent indicated by the arrow *a* and this is opposed, as indicated by the arrow *a'*, by the rearward force exerted through the rear ropes or thongs 31 by the rear pair of rods 25, which rods are flexed downwardly and inwardly toward the adjacent rear peak. This force is, of course, a function of locating the base sockets 26 for these front and rear rods forwardly and rearwardly, respectively, of the front and rear walls of the tent. Similarly, each thong 31 is under tension provided by the stressed rods 25 and this creates forces extending upwardly or parallel with the roof panels 18 indicated by the arrow *b* at the front of the tent and by the arrow *b'* at the rear of the tent. The combined forces *a*, *b*, and *a*,' *b*,' provide, of course, an upward force which holds the front and rear peaks of the tent in the elevated condition shown.

Each lower connector 32 at the front of the tent and passing through the corresponding grommet 33 exerts a forward pull on the upper end of the corresponding side panel 16 designated by the arrow *c* and similar opposing rearward pull, designated by the arrow *c'*, is provided at each rear upper corner of each side panel 16. Also, these lower corner connectors 32 are arranged so as to exert an upward pull on the corresponding corner of the side wall of the tent, these being designated by the arrows *d* and *d'*, at the front and rear of the tent, respectively. The lower corners of the tent must, of course, be staked down, as at 23, to resist these upward forces.

Also, these lower connectors 32 exert a horizontal lateral pull designated at the front of the tent by the arrows *e*, similar forces being applied at the rear wall of the tent.

Viewing the forces indicated by these arrows, it will be seen that the simple arrangement of four flexible spring-like rods in the manner illustrated and connecting with the tent through the simple connectors shown hold the tent erect and provide a structure which will withstand very severe wind storms, the more particularly in that the flexible spring-like rods, which are preferably made of glass fibers bonded in plastic, are under an initial stress of substantial proportions and merely yield or release to a greater degree when the tent body 15 is subjected to additional wind storm stresses. Further, there is no rattle, no clatter or thumping of any of the parts even in severe wind storms since the entire structure is under flexible stress and merely sways in response to external forces. Also, the structure is self-adjusting, particularly as the tent body dries and becomes wet under normal climatic conditions. As the cloth becomes wet and shrinks, the flexible spring-like rods 25 are stressed or drawn together and as the cloth dries and stretches or regains its size, the rods 25 are merely released to take up the larger surface. Further, it will be seen that the parts of the tent are very lightweight; that the interior is entirely unobstructed by poles or other supports; and that the tent is easily erected and is composed of low-cost lightweight members which are easily installed and shipped or transported in an automobile.

The features of the invention can also be applied to other styles of tents such as the so-called pyramid tent as illustrated in Fig. 4. With this form of tent, the tent body 40 includes a roof of pyramidal shape composed of four panels 41 of triangular form joined along their edges of equal length and converge upwardly to provide a crest in the form of a central peak or apex 42. The horizontal edge of each side panel 41 is joined to a side wall panel 43 which is shown as having converging vertical side edges. The horizontal edge of the front panel 41 is similarly joined to the upper end of the

front panel 44 which is also shown as having converging vertical side edges joined to the front edges of the side panels 43. This front panel is provided with an entrance opening 45 which can be closed by flaps 46. The tent is also provided with a rear wall (not shown) which is similar to the front wall 44 except that it is unprovided with an entrance opening. The walls of the tent thereby slope to converge in an upward direction and the base of the tent is larger than the top. At each base corner, the tent body is shown as having attached thereto a hook or loop 47 by which the base of the tent is staked down as hereinafter described.

The peak of the tent has secured thereto four ropes or thongs 31*a*, the outer ends of which are secured to figure-8 metal connectors 32 having one or both loops 34, 35 open, the loop 34 being shown open as with the form of the invention shown in Figs. 1–3. Likewise, figure-8 metal connectors 32 with one hook open are provided at the four upper corners of the side, front and rear walls of the tent. Also, as with the form of the invention shown in Figs. 1–3, flexible spring-like rods 25 are provided, such rods having their lower ends anchored in ground sockets 36 immediately adjacent the lower external corners of the tent body and projecting upwardly with their upper ends being unattached and arranged in spaced relation.

However, an important distinction of the form of the invention shown in Fig. 4 resides in the location, use and inclination of the ground sockets 26. Thus, while these sockets 26 are driven into the ground adjacent the base corners of the tent body and are elongated outwardly beyond the ends of the side walls and the front and rear end walls, they are located close enough to the corners of the tent body to be embraced by the loops or hooks 47. With these loops or hooks 47 caught around these sockets 26 it will be seen that they serve as the base stakes for the tent body. Also these sockets are driven into the ground at an angle so as to slope radially upwardly and outwardly with reference to the center of the tent body. Accordingly, unflexed, the flexible spring-like rods inserted in these sockets would also slope radially upwardly and outwardly from the center of the tent so that their upper ends are required to be flexed to a greater degree to attach them to the tent body than if these rods were mounted to extend vertically when unflexed. So angling the sockets not only permits of using smaller and less costly rods than would be necessary if the same rod were, when unstressed, vertical, but also permits the sockets 26 to be mounted at the tent base and to be used as the base stakes as shown.

When the open hooks of the metal connectors 32 at the ends of the ropes or thongs 31*a* are connected with and slideably embrace the upper portions of the flexible spring-like rods 25, these rods are flexed downwardly and inwardly toward the peak of the roof, and when the open hooks of the other four connectors 32 are connected with the bodies of these rods 25, as shown, these rods are maintained under stress, the stresses of the several rods opposing each other to exert upward forces, as indicated by the arrows *f* at the peak 42 of the tent. Similarly, horizontal forces *g* and *g'* are exerted by the lower four connectors 32 along the lower edges of the front and rear roof panels, respectively. Also, these lower connectors 32 exert fore-and-aft forces, represented by the arrows *h* and *h'*, along the lower edges of the side roof panels 41. These lower connectors 32 also exert upward forces on the walls at the corners of the tent, these being represented by the arrows *i* and *i'* at the front and rear of the tent, respectively. These forces are exerted against the sockets 26 to which the base of the tent is secured. It will be seen, as with the form of the invention shown in Figs. 1–3, that these forces are essentially a function of the placement of the ground sockets 26 for the flexible spring-like rods 25 so that these rods are maintained under the stress shown to provide these forces. It will therefore be seen that the principles of the invention are as applicable to wall tents, pyramid tents, and other forms of tents and that in all cases the tents can be free from any internal poles or structural obstructions.

From the foregoing, it will be seen that the present invention provides a tent including a body of flexible sheet material which can be produced in a wide variety of forms for different purposes and that in each form the tent is simple to erect and remove; is lightweight so as to be easily handled and stored and inexpensive to ship; is noiseless and free from rattles and clatter even under severe wind conditions since the parts are always under stress; and is self-adjusting so that as the flexible sheet material expands or shrinks under moisture conditions the structure easily adapts itself to the changing conditions.

I claim:

1. A tent comprising a body of flexible sheet material having side walls, end walls and a roof composed of panels converging upwardly from said side walls and forming a crest, a plurality of elongated and flexible, spring-like rods having their lower ends anchored adjacent the lower external corners of said body, but outwardly beyond the ends of said side and end walls, and projecting upwardly with their upper ends being unattached and arranged in spaced relation above said roof, a plurality of elongated members connecting the upper portions of said rods with the crest of said roof and flexing said rods downwardly and inwardly toward said crest, and means connecting the intermediate portions of said rods with the corresponding corners of said body adjacent the junctures of said side walls and roof panels.

2. A tent comprising a body of flexible sheet material having side walls, end walls and a roof composed of panels converging upwardly from said side walls and forming a crest, a plurality of elongated and flexible, spring-like rods having their lower ends anchored adjacent the lower external corners of said body, but outwardly beyond the ends of said side and end walls, and projecting upwardly with their upper ends being unattached and arranged in spaced relation above said roof, a plurality of elongated and flexible, connecting members having their inner ends attached to the crest of said roof and means at their outer ends slideably embracing the upper portions of said rods, said connecting members flexing said rods downwardly and inwardly toward said crest, and means slideably embracing and connecting the intermediate portions of said rods with the corresponding corners of said body adjacent the junctures of said side walls and roof panels.

3. A wall tent comprising a body of flexible sheet material having rectangular side walls, end walls and a roof composed of rectangular panels converging upwardly from said side walls and forming a ridge, a plurality of elongated and flexible, spring-like rods having their lower ends anchored adjacent the lower external corners of said body, but outwardly beyond the ends of said side and end walls, and projecting upwardly with their upper ends being unattached and arranged in spaced relation above said roof, a plurality of elongated and flexible, connecting members having their inner ends attached to the adjacent ends of said ridge and means at their outer ends slideably embracing the upper portions of the adjacent rods, said connecting members flexing said rods downwardly and inwardly toward the adjacent ends of said ridge, and means slideably embracing and connecting the intermediate portions of said rods with the corresponding corners of said body adjacent the junctures of said side walls and roof panels.

4. A pyramid tent comprising a body of flexible sheet material having side walls, end walls and a pyramidal roof composed of triangular panels converging upwardly

from said side and end walls and forming a peak, a plurality of elongated and flexible, spring-like rods having their lower ends anchored adjacent the lower external corners of said body, but outwardly beyond the ends of said side and end walls, and projecting upwardly with their upper ends being unattached and arranged in spaced relation above said roof, a plurality of elongated and flexible, connecting members having their inner ends attached to the peak of said roof and means at their outer ends slideably embracing the upper portions of said rods, said connecting members flexing said rods downwardly and inwardly toward said peak, and means slideably embracing and connecting the intermediate portions of said rods with the corresponding corners of said body adjacent the junctures of said walls and roof panels.

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