July 10, 1956 E. D. BARKER 2,753,573

INFLATABLE MATTRESS

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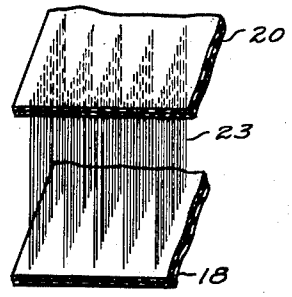


FIG. 4

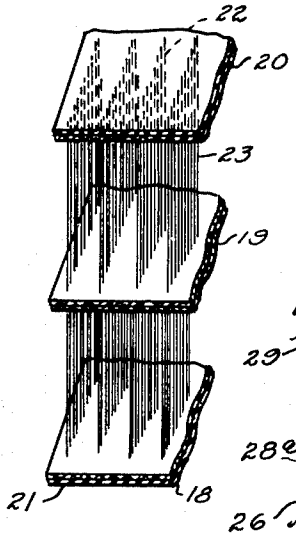


FIG. 2

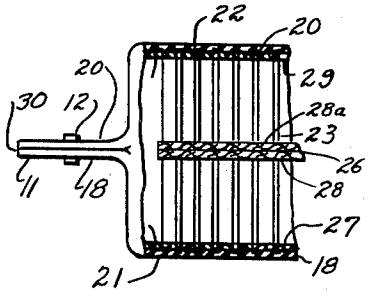


FIG. 5

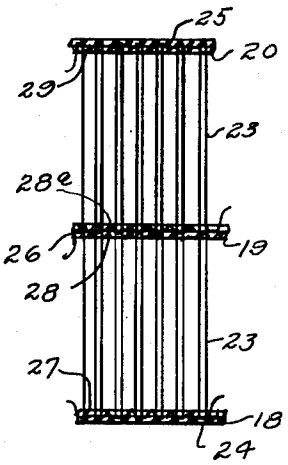


FIG. 3

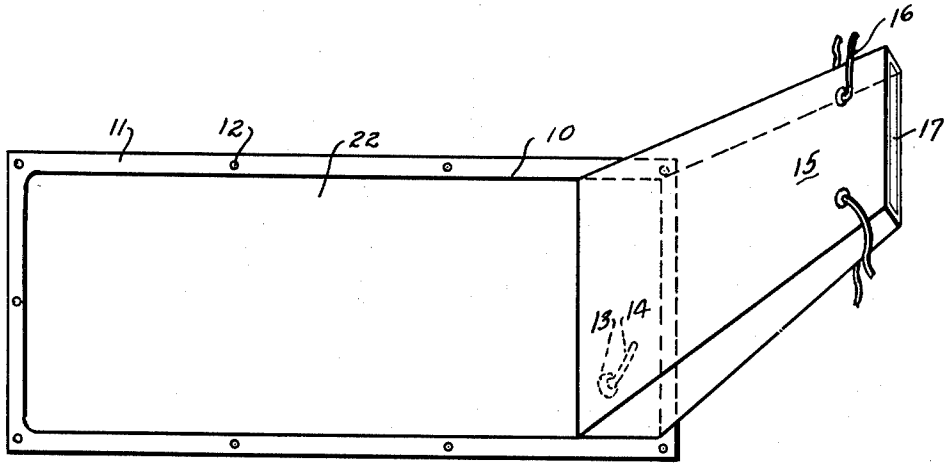


FIG. 1

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INFLATABLE MATTRESS

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The invention described herein may be manufactured and used by or for the Government for governmental purposes without the payment of any royalty thereon.

This invention relates to an inflatable mattress especially adapted to military use, although capable of general employment.

Among the objects of the invention is to provide a comfortable, adjustable, strong, tough mattress which is comparatively light in weight and which can be rolled up when deflated, to a small light package. Another object is to provide a mattress of the above character which is inflatable to a considerable degree of internal pressure without a metal pump. Another object is to provide a mattress having an integral combined inflation bag and pillow. Another object is to provide a mattress which may be combined with others of light construction for use as a float, bridge or raft.

Referring to the accompanying drawings, Figure 1 is a plan view of the mattress showing the inflation bag extended. Figure 2 is a fragmentary view in perspective, showing the preferred material of which the bag is made and its construction. Figure 3 is a side elevation of substantially the same fragment shown in Figure 2. Figure 4 corresponds to Figure 2, except that a two deck material instead of a three deck material as shown in Figure 2 is employed. Figure 5 is a fragmentary cross-sectional view of the form of inflatable mattress shown in Fig. 2 showing how the flange of the mattress is formed.

Referring again to Figure 1, **10** indicates the body of the mattress, which is preferably made of the fabric shown in Figures 2 and 3. Body **10** is substantially surrounded by a margin of flange **11** in which there are spaced at regular intervals a plurality of grommets **12**. At one end of the body **10** there is an air inlet and exit valve **13** which may be of the kind manufactured by A. Schrader & Sons, Type #2127 or Type #2180–S or equivalent. These valves are of the manually adjustable type to regulate the inlet and the exit rate of air passing through and they are also capable of total closure. These valves may have attached to them a rubber hose **14** by which the body **10** may be inflated directly by mouth. Surrounding the valve **13** and hose **14**, as shown in Figure 1, there is a rubberized cloth or thin plastic inflation bag **15** which is preferably of trapezoidal shape. It may optionally be provided with a puckering or draw string **16** at its narrower or outer end **17**, through which it can be inflated by merely opening it to fill it with air, then closing the outer end and rolling it up.

Referring now to Figures 2 and 4, **18** is a lower sheet, **19** an intermediate sheet, and **20** a top sheet of strong fabric, preferably nylon, which has been rubberized on its outer surfaces **21** and **22**, the inner sheet **19** being internally rubberized. It is desired that the bottom surface **21** and the top surface **22** have a smooth waterproof coating, such as may be achieved by coating a thin, loosely woven fabric with rubber or "neoprene." Connecting the inner surfaces of sheets **18** and **19** and the outer surface of **19** with the inner surface of sheet **20** there are

numerous parallelism-preserving or stabilizing threads **23** which are arranged in rows, such rows being optionally lengthwise or crosswise on the body **10**. The threads **23** are preferably quite numerous and may range in number from 16 to the square inch to 60 to the square inch, the larger in number of the joining or distance limiting threads **23**, the finer should be each thread. As shown in Figure 3, each sheet **18**, **19** or **20** is made of two layers, two outer layers of the sheets **18** and **20** being **24** and **25** respectively and consisting largely of pure rubber or "neoprene." The threads **23** are imbedded in the layers **24** and **25** only to such extent as will obtain secure adhesion under stress. The threads **23** are adhesively attached to the sheet **19** on both sides thereof, the inner "neoprene" layer of sheet **19** being **26**. The inner or intermediate sheet has two functions, the first being that of stabilization and the second being that of a convection-current block. The air between the sheets **18** and **19** is not able to penetrate through the sheets **19** and **20** and consequently air which has been near the ground and has consequently been chilled, cannot mix to any extent with the air which has been in more or less close contact with the sleeper's body and which consequently has become warmed.

The flange **11** is produced by cementing the two sheets **18** and **20** together at the edges and piercing the so combined sheets to provide a substantial number of holes which are encircled by the grommets **12**. Sheet **19** is left free so that inflation air may circulate around it through these free edges. Lashings may be employed to bind one mattress to another mattress and so build up another structure which will float on water and which is capable of supporting personnel.

While a three sheet construction is preferred, my invention is not limited to three sheets, but may dispense with the sheet **19** and utilize only sheets **18** and **20**, these being connected as before with a multiplicity of threads **23**. In the three sheet embodiment of the invention the threads **23** are substantially integral with textile fabrics **27** and **28** and **28***a* and **29**, while in the embodiment utilizing two sheets **18** and **20**, the threads **23** integrally connect fabrics **27** and **29** as can be clearly understood with reference to Figures 4 and 5 of the drawings. While it is preferred to have the sheets **19** and **20** and **19** and **18** or **18** and **20** connected by regular rows of threads **23**, nevertheless it is within the scope of the invention to have these threads arranged in a different pattern than that shown or in an entirely random pattern.

It can be seen from the left side of Figure 5 that the flange **11** is produced by bringing sheets **18** and **20** together and cementing them in an airtight and watertight manner with an adhesive layer **30**, preferably "neoprene" latex, which should be properly heat sealed. The threads **23** are preferably removed from those portions of sheets **18** and **20** which are used to make the flange **11**. The flange may also be made of three sheets, **18**, **19** and **20**, in which case there is adhesive between each pair of sheets.

In operation, the mattress is unrolled and laid on the ground, the operator's arm is inserted through the mouth or open end **17** of the inflation bag to grasp the valve **13** and open same. If the operator desires to inflate the bag to a low pressure hurriedly he may do so either by blowing directly through the valve **13** or blowing into a rubber hose **14** which he has attached to the valve **13**. Use of the hose for mouth inflation is imperative at temperatures below freezing to avoid freezing of the user's lips to the metal parts of the valve **13**. After mouth inflation, or in place of mouth inflation, inflation with the bag **15** may be practiced. To perform this function, the valve **13** is first opened, the outer end **17** of the bag **15** is puckered either by the use of the draw string **16** or by gathering the bag mouth **17** between the hands. The user then blows

through the puckered bag mouth **17** until he has inflated the bag **15**, whereupon he rolls the puckered bag mouth **17** toward the valve **13**, thus forcing the air which is contained in the bag **15** through the valve **13** and into the body **10**. The bag **15** is in fluid communication with both the spaces between the sheets **18** and **19** and spaces between the sheets **19** and **20**. The inflation cycle is continued, using the inflation bag until the desired pressure has been reached. For use as a float, the internal pressure may be desired to be fairly high; in fact higher than may be obtained by mouth inflation alone.

For use as a pillow, the inflation bag **15** may be inflated by mouth, the draw string **16** being tightened and bag **15** rolled up partially by rolling the bag from the mouth end in order to balloon that end of the bag **15** which is near the body **10**. The ballooned portion forms a pillow and is now placed over the end of the body portion **10** and the appropriate bedding or sleeping bag is placed on the top surface **22** of the mattress. Or, inflation of the inflation bag may be dispensed with and the user's outer clothing may be stored within the inflation bag for use as a head rest.

While for convenience, the surface **22** has been spoken of as the top and the surface **21** as the bottom, in practice these are interchangeable and the mattress may be placed on either one of them.

In all of the above described constructions, it is to be understood that a two sheet body such as shown in Figure 4 may be substituted for the three sheet body shown in Figures 2 and 3.

I claim as my invention:

1. An inflatable mattress comprising at least an upper and a lower sheet of air-impervious material, said sheets being joined at their edges to form an airtight enclosure, and rows of closely spaced parallel threads formed integrally with the respective sheets adhesively secured thereto and imbedded therein, extending therebetween providing a stabilizing means, the threads ranging in number from 16 to 60 per square inch.

2. An inflatable mattress comprising, an upper and a lower sheet of air impermeable material, said sheets being joined at their edges to form an airtight enclosure, a third sheet of internally rubberized air impermeable material arranged intermediate said upper and lower sheets to define an upper and a lower space thereby, aligned stabilizing thread elements substantially vertically arranged relative said sheets, integrally connecting thereto and respectively connecting said upper and said intermediate sheet and said lower and said intermediate sheet, their extremities respectively embedding in the rubberized portions thereof only to an extent to sufficiently secure adhesion under stress, a perimeter portion of said intermediate sheet being spaced laterally relative the sides of the said mattress formed by the joined portion of said upper and lower sheets, and inflation means connected into said airtight enclosure whereby, on inflation thereof, said vertically and integrally connecting threads and said intermediate sheet effect a stabilizing of the structure obtained thereby and said intermediate sheet forms a convection-current block permitting inflation of the enclosure but preventing free intermixture of the air resulting in said upper and lower spaces.

3. An inflatable mattress comprising, an upper and a lower sheet of externally rubberized fabric material, said sheets being joined at their edges to form an airtight enclosure, a third sheet of internally rubberized fabric material arranged intermediate said upper and lower sheets to define an upper and lower space thereby, thread elements substantially vertically arranged relative said sheets, integrally connecting thereto and respectively connecting said upper and said intermediate sheet and said lower and said intermediate sheet, the vertical extremities of each thread being embedded in the rubberized portions of the sheets connected thereby for secure adhesion under stress, said intermediate sheet having at least a portion thereof in laterally spaced relation to said enclosure to provide an inflating passage between said upper and lower spaces, and inflation means in said airtight enclosure whereby on inflation thereof said connecting threads and said intermediate sheet provide a stabilizing of the structure obtained thereby and said intermediate sheet forms a convection-current block permitting pressure inflation but preventing consequent intermixture of air between said upper and lower spaces.

4. An inflatable mattress comprising, an upper and a lower sheet of air impermeable material, said sheets being joined at their edges to form an airtight enclosure, a third sheet of internally rubberized air impermeable material arranged intermediate said upper and lower sheets to define an upper and a lower space thereby, aligned stabilizing thread elements substantially vertically arranged relative said sheets, integrally connecting thereto and respectively connecting said upper and said intermediate sheet and said lower and said intermediate sheet, the extremities of the respective thread elements respectively embedding in said sheets only to an extent sufficient to secure adhesion thereto under stress, said stabilizing thread elements being arranged in closely spaced parallel rows which are coextensive with said intermediate sheet, a perimeter portion of said intermediate sheet being spaced laterally relative the sides of said mattress formed by the joined portions of said upper and lower sheets, and inflation means connected into said airtight enclosure whereby, on inflation thereof, said vertically and integrally connecting threads and said intermediate sheet effect a stabilizing of the structure obtained thereby, the lateral spacing of said intermediate sheet being such that it forms a convection current block permitting inflation of the enclosure but preventing free intermixture of the air resulting in said upper and lower spaces.

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