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COMBINED SHELTER AND PNEUMATIC JACK

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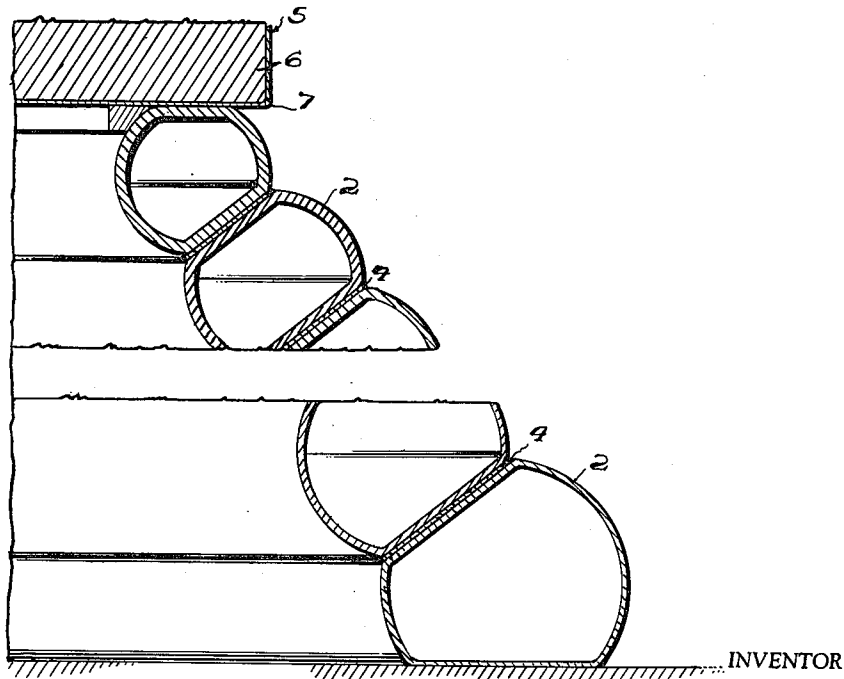
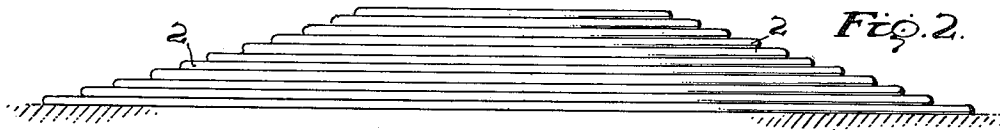
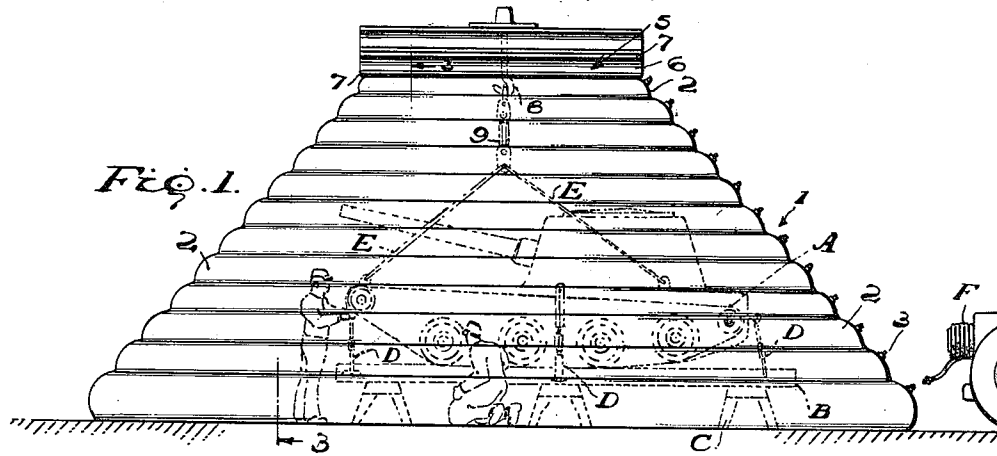


Fig. 3.

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COMBINED SHELTER AND PNEUMATIC JACK

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Granted under Title 35, U.S. Code (1952), sec. 266)

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

This invention relates to a lifting jack which may be used as a shelter from time to time as desired, and has for its primary object to provide such a device of relatively inexpensive and lightweight construction which is capable of lifting extremely heavy objects and yet which may be collapsed so as to occupy a minimum of space when not in use.

Another object of the invention resides in the provision of a lifting jack which, in addition to its lifting characteristics, is also capable of serving as a shelter for the items being operated upon, as well as the operators.

A further object of the invention consists in the provision of a pneumatic jack for use in lifting heavy items, such as pieces of ordnance, so that they may be placed on and fixed to a lightweight platform preliminarily to being parachuted from a plane or the like.

Other objects and advantages of the invention will be apparent from the following description when taken in connection with the accompanying drawings, in which:

FIG. 1 is a front elevational view of the combined shelter and pneumatic jack showing in dotted outline one of the purposes for which it may be used;

FIG. 2 is a side elevational view showing the jack in partly collapsed condition; and

FIG. 3 is an enlarged sectional detail view, partly broken away, taken on the line 3-3 of FIG. 1.

Referring to the drawings in greater detail and by reference numerals, the combined shelter and jack, which is frusto conical in shape, is indicated generally by the numeral 1. This jack is composed of a plurality of annular inflatable members 2, each of which is provided with a valve 3, such as a tire valve, for the purpose of inflating or deflating it.

In the present illustration, the pneumatic inflatable tubes are shown as of graduated cross-sectional diameter, although they could be made of uniform cross-sectional diameter if desired.

These several elements are adhesively secured together, as indicated by the numeral 4. Supported on the upper annular tube 2 is a detachable ceiling or roof, shown as a whole at 5, of lightweight construction such as honeycomb 6 faced with aluminum skin, or the like 7. Fixed centrally on the roof 5 is a hook 8 from which depends a block and tackle 9 or other type of lifting and supporting means.

One of the primary purposes of the present invention is the formation of a jack for lifting heavy objects such as a self-propelled howitzer A, shown in dotted outline in FIG. 1. In the operation of the device, the howitzer, or other article to be lifted, is drawn or driven upon a lightweight platform B, also shown in dotted lines in FIG. 1. Thereafter, the combined shelter and jack, in more or less deflated form, is placed over the vehicle and the operators attach the vehicle to the board B and place it upon saw horses, or the like C, after the vehicle is lifted. The vehicle is first attached to the board by straps, shackles, or the like D and slings E may be secured to it in the manner indicated. Subsequently, the block and tackle is secured to the slings E and the tubes 2 are individually inflated, starting at the top and proceeding

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downwardly. This inflation of the tubes elevates the board B and its cargo so that the operators may place the saw horses under it, as indicated. During these operations, the frusto conical member 1 serves as a shelter for the operators, as well as the jack for lifting the item into spaced relation with the ground. The tubes 2 may be inflated by any desired means but in the present illustration an air pump F is used for such purpose, or the exhaust of an internal combustion engine may be used if desired.

The tubes 2 may be made of any air-impermeable material, such as coated fabrics or polyester film. The pressure required to raise and support the load varies in accordance with the amount of surface in contact with the ground or with the next adjacent tube. Consequently as the diameter of annuli decreases in the frusto conical construction, the amount of pressure in the tubes must increase in proportion. Likewise, the graduation of the diameters of the tubes themselves will require a graduated increase in pressure from the bottom to the top of the series. It will be noted, therefore, that the material of which the tubes are formed gradually increases in thickness from the bottom to the top of the jack.

The total weight of the jack and shelter is rather light due to the structure of the tubes themselves as well as the light weight of the honeycomb construction of which the support for the block and tackle is composed. It will be understood, therefore, that this frusto-conical jack may be partly inflated and then readily placed over the supporting board B and the cargo mounted thereon. In this connection, it should be mentioned that after the vehicle is positioned, as indicated in FIG. 1, the jack is detached therefrom and removed from the position shown, after which the combined board and vehicle may be associated with one or more parachutes and placed upon an aircraft for transportation to its destination, whereupon it may be ejected and parachuted to the ground in the usual manner.

In accordance with the patent statutes, I have described what I now consider to be the preferred form of the invention, but since various minor changes may be made in structural details without departing from the spirit of the invention, it is intended that all such changes be included within the scope of the appended claims.

I claim:

1. A frusto-conical pneumatic jack adapted to be placed over an article to be lifted, comprising a series of annular inflatable tubes superposed one upon the other, the annuli of the tubes gradually decreasing in diameter from the bottom to the top, means for individually inflating said tubes, means overlying the topmost of said annular tubes, and a block-and-tackle assembly depending from said last-named means.

2. A frusto-conical pneumatic jack adapted to be placed over an article to be lifted, comprising a series of annular inflatable tubes superposed one upon the other, means for individually inflating said tubes, removable means in overlying contact with the topmost of said annular inflatable tubes, and means for engagement with and for raising and/or lowering an article located beneath the removable means upon the inflation or deflation of said annular tubes, said engagement means depending from said removable overlying means.

3. A frusto-conical pneumatic jack adapted to be placed over an article to be lifted, comprising a series of annular inflatable tubes superposed one upon the other, the annuli of the tubes gradually decreasing in diameter from the bottom to the top, means for serially inflating said tubes, removably mounted roof means in overlying engagement with the topmost of said inflatable annular tubes, and means depending from the roof means for engagement with and for raising and/or lowering an article disposed

beneath said roof means upon the inflation or deflation of said annular tubes.

4. A frusto-conical pneumatic jack adapted to be placed over an article to be lifted, comprising a series of annular inflatable tubes superposed one upon the other, means for inflating the tubes, inflexible means overlying and contacting the topmost of said annular tubes and disposed above said article, and means depending from the inflexible overlying means above the article for engaging and lifting the same upon the inflation of said tubes.

References Cited in the file of this patent

UNITED STATES PATENTS

468,455 Giessmann ----- Feb. 9, 1892

5

10

511,472
1,493,729
1,986,273
2,609,177
2,718,014
2,804,118
2,990,837
3,057,054

1,141,274

Sumovski ----- Dec. 26, 1893
Brown ----- May 13, 1924
Leffingwell ----- Jan. 1, 1935
Hughes ----- Sept. 2, 1952
Mizrach et al. ----- Sept. 20, 1955
Bayerkohler ----- Aug. 27, 1957
Cushman ----- July 4, 1961
Barnes ----- Oct. 9, 1962

FOREIGN PATENTS

France ----- Mar. 11, 1957