Oct. 31, 1944. G. F. EYLES 2,361,832

FLUID PRESSURE LIFTING MEANS

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Fig 3

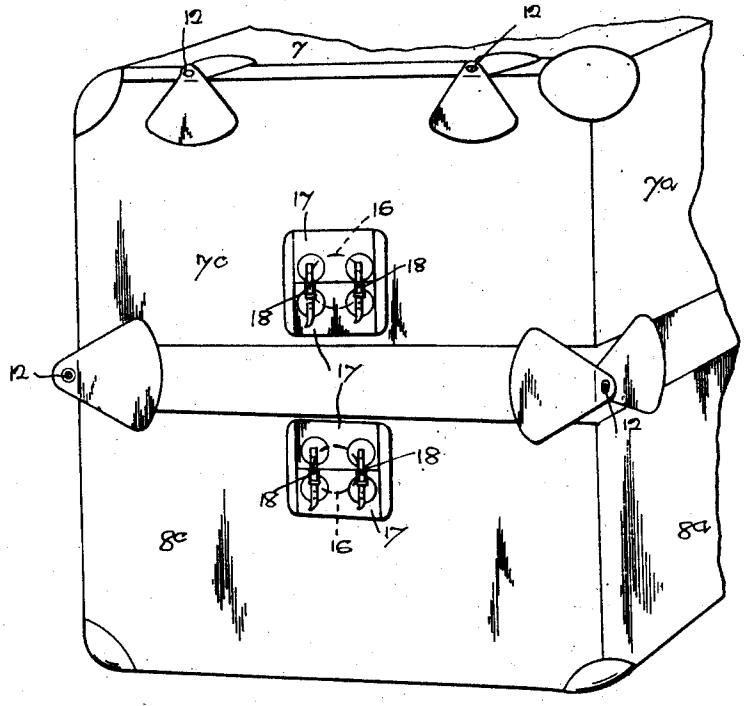


Fig 1

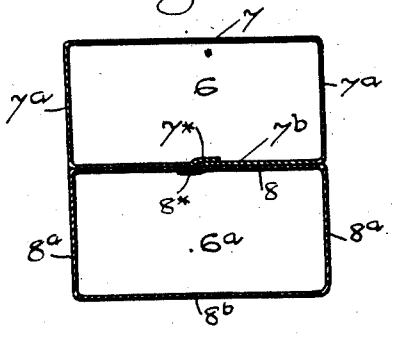
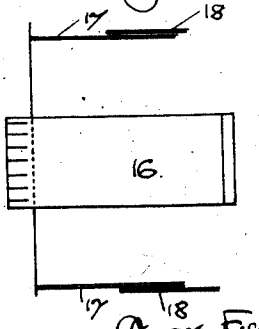


Fig 4



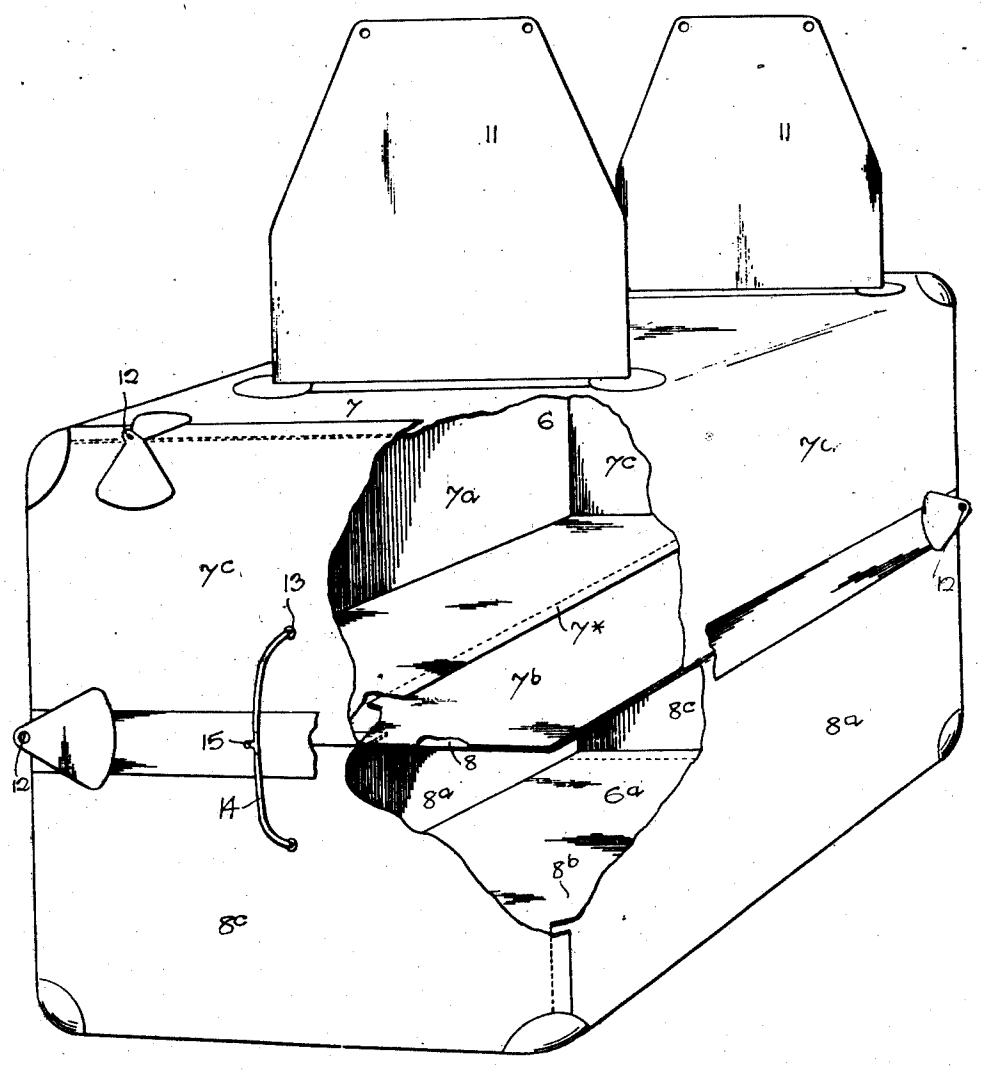
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Fig. 2



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FLUID PRESSURE LIFTING MEANS

George Frederick Eyles, Acton, England

Application July 28, 1942, Serial No. 452,668
In Great Britain October 31, 1941

4 Claims. (Cl. 254—93)

This invention has reference to lifting means particularly suitable for raising off the ground aeroplanes with damaged undercarriages to enable them to be loaded on to vehicles for removal, it may be from runways of aerodromes or from fields where they may have crashed or landed.

An object of the invention is to provide lifting means comprising an inflatable bag which will provide a relatively large area of contact with the body to be lifted.

A further object is to provide lifting means comprising an inflatable bag which will have practically no tendency to roll on the ground when inflated or for the areas of contact with the ground and the body to be lifted to become less during inflation.

Lifting means according to the invention are constituted by an inflatable bag constructed with the walls that form its top and bottom and its sides and ends square or rectangular so that when fully inflated its bottom and top are substantially flat and that it will be stable and afford a large area of contact with the body being lifted.

The invention also includes the division of the inflatable bag by transverse diaphragms or partitions into two or more compartments or chambers which are adapted to be inflated simultaneously or successively and which will tend to prevent complete collapse and spreading of the bag in the event of a burst or rent of its fabric and resulting injury to persons or damage to machines.

The bag or each of its compartments or chambers may be built up of proofed fabric, such as laminated fabric and rubber latex, a long sheet of which is folded to form the flat top, two sides and the bottom and its ends joined; the ends of the bag, compartment or chamber are formed of square or rectangular sheets of fabric joined at the margins to the margins of the sides, top and bottom.

The joined ends of the sheet of fabric constituting the top, bottom and sides of a compartment or chamber should be in the top or bottom forming the internal diaphragm or partition.

In one construction, the compartments or chambers are separately formed, mounted one upon the other so that the top of one compartment or chamber lies beneath the bottom of the next and connected together by adhesive and/or sewing and by surrounding bands overlapping the joints and stuck and/or sewn to the margins of their walls, the top and bottom of adjacent compartments or chambers constituting the dividing diaphragm or partition. In some cases, one compartment or chamber may be formed with inturned margins instead of a complete top or bottom.

The top wall of the bag may have securely attached to it flaps having eyeletted rope holes at their free edges for wrapping over say the wing of an aeroplane so as to position the bag in relation to the centre of gravity of the machine.

Eyeletted ears may be attached to the inflatable bag at convenient positions, usually at the angles between its side and end walls and the top and end walls to facilitate haulage and attachment to the body to be lifted.

The compartments or chambers are provided with separate inflation valves which may be connected to a common coupling or nipple for attachment to the delivery pipe of a pump or compressor and with separate relatively large deflation sleeves or tubes which, when closed, may be covered by flaps held together by straps and buckles or other convenient means.

It will be understood that each diaphragm or partition serves as a stay to reduce distortion or bulging of the side and end walls of the bag and, where there is little risk of the fabric bursting or rending, the diaphragms or partitions may be replaced by stays which do not completely divide the bag into separate compartments or chambers.

Advantages of the square or rectangular inflatable bags are that the area of the flat top of the bag in contact with the body to be lifted being relatively large, the air pressure required to lift the body is correspondingly small and there is practically no tendency for contact with the ground and with the body to be lifted to become less and less as maximum inflation is approached or for the bag to roll as would be the case with a cylindrical bag; moreover, the volume of air required to be pumped to attain a given lift is less and, on deflation, the top of the bag settles on to the bottom without spreading to any considerable extent and the bag is thus more easily handled.

The accompanying drawings illustrate the invention.

Fig. 1 is a diagrammatic transverse section of lifting means according to the invention, comprising an inflatable bag with an upper and a lower compartment.

Fig. 2 is a perspective view of the lifting means to a larger scale, part of the outer wall being broken away to show the diaphragm or partition between the compartments;

Fig. 3 shows an external view from the oppo-

site end of the inflatable bag to that shown in Fig. 2;

Fig. 4 is a detail view of one of the deflation sleeves or tubes.

Referring to the drawings the lifting means is constituted by an inflatable bag divided into upper and lower compartments or chambers **6**, **6a** Fig. 1. Each compartment is built up of a long sheet of folded proofed fabric, and rectangular end walls of the same material secured as by adhesive and/or sewing. The sheet forming the upper compartment **6** is folded to form the flat top **7**, the two flat sides **7a** and the flat bottom **7b**; the ends of the sheet are joined together by adhesive and/or sewing and lie at **7x** in the bottom member of the compartment **6**. The sheet forming the lower compartment **6a** is folded to form the flat top **8**, the two flat sides **8a** and the flat bottom **8b**; the ends of the sheet joined together by adhesive and/or sewing lie at **8x** Fig. 1 in the top member of the compartment **6a**. The end walls of each of the compartments **6** and **6a** are formed of rectangular sheets of fabric **7c** and **8c**, see Figs. 2 and 3 whose edges are bent to overlap the corresponding edges of the top, sides and bottom of the respective compartments and secured by adhesive and/or sewing; such overlapping edges are seen at **9**, Fig. 2.

10 is a band surrounding the joint between the top and bottom compartments which is stuck and/or sewn to the side and end walls of both compartments.

11, **11** are flaps secured to the top **7** of the upper compartment and formed with eyeletted rope holes for wrapping over and securing to the body to be lifted, and **12**, **12** are eyeletted ears attached to the inflatable bag for haulage and attachment purposes.

13, **13** are non-return inflation valves for the two compartments and **14** is a pipe connection between them which is formed with a coupling or nipple **15** for attachment to an air pump or compressor; **16**, **16** are deflating tubes or sleeves which when not in use have their ends tied or otherwise closed and are folded down and covered by flaps **17** held by straps and buckles **18**.

What I claim is:

1. Lifting means comprising an inflatable bag with substantially flat top and bottom walls and comprising compartments, each compartment being built up of a long sheet of proofed fabric folded to form its top, two sides and bottom and having its ends connected, end walls formed of rectangular sheets of proofed fabric joined to the side, top and bottom portions of the folded sheet, the compartments so formed being superposed and joined together; and the top of one compartment being joined by adhesive to the top of the adjacent superposed compartment and the adjacent marginal portions of their walls being overlapped by surrounding bands joined thereto by adhesive.

2. Lifting means comprising an inflatable bag with substantially flat top and bottom walls and comprising compartments, each compartment being built up of a long sheet of proofed fabric folded to form its top, two sides and bottom and having its ends connected, end walls formed of rectangular sheets of proofed fabric joined to the side, top and bottom portions of the folded sheet, the compartments so formed being superposed and joined together; and the connected ends of the folded sheet of the upper compartment lying in the bottom thereof and the connected ends of the folded sheet of the bottom compartment lying in the top of the lower compartment.

3. Lifting means comprising an inflatable bag with substantially flat top and bottom walls and comprising compartments, each compartment being built up of a long sheet of proofed fabric folded to form its top, two sides and bottom and having its ends connected, end walls formed of rectangular sheets of proofed fabric joined to the side, top and bottom portions of the folded sheet, the compartments so formed being superposed and joined together; and the compartments being provided with separate inflation valves.

4. Lifting means comprising an inflatable bag with substantially flat top and bottom walls and comprising compartments, each compartment being built up of a long sheet of proofed fabric folded to form its top, two sides and bottom and having its ends connected, end walls formed of rectangular sheets of proofed fabric joined to the side, top and bottom portions of the folded sheet, the compartments so formed being superposed and joined together; and the compartments being provided with separate inflation valves connected by a pipe with an air pump coupling.

GEORGE FREDERICK EYLES.