

PATENT SPECIFICATION

DRAWINGS ATTACHED



860.781

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International Classification:—B64c.

COMPLETE SPECIFICATION

Improvements in Vehicles for Travelling over Land and/or Water

I, CECIL HUGH LATIMER-NEEDHAM, of High Oaks, Deer Park, Womersley, near Guildford, Surrey, a British subject, do hereby declare the invention, for which I pray that a patent may be granted to me, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to the use of a cushion of air interposed between a vehicle and the ground or water in order to provide a lifting force and a rolling medium so as to allow horizontal motion of the vehicle with small frictional losses. The underside of the vehicle may be in the form of a platform or disc containing a series of jets or nozzles around the periphery through which air under pressure is expelled to provide the air cushion.

The air supply is provided by a suitable air compressor or pump, driven by an internal combustion or other engine, or a turbine.

In order to restrict the loss of air, the jets or nozzles are preferably positioned as near as practicable to the outer edge of the platform and are so set that the air jets are directed away from the outer edge, i.e. inwards towards the central portion of the platform or with some inward component and thus tend to neutralise airflow velocity in the outward direction. The velocity of the air jets is carefully selected to provide this restraining action without releasing excessive uncontrolled energy that may have deleterious effects.

A lip or skirt is provided around the periphery of the platform to form the upper part of the outside boundary of the air cushion. For operation over level ground or water this skirt may be shallow and of solid material, but in order that the vehicle may operate over rough ground or water, without excessive loss of air, the platform is lifted to sufficient height to clear obstructions and for this purpose a deeper skirt of any suitable flexible material e.g. rubberised fabric, is employed.

The flexible skirt is made so that it will give way to and pass over obstacles and remain

[Price 3s. 6d.]

in its extended condition. To prevent collapse upward the area of opening at the base is less than the cross-sectional area some distance above and this may be achieved by a tapering towards the base, the taper forming part or the whole of the skirt, or the skirt may be concave inwards, in cross-section, over the lower portion or over the length of the skirt. By this means there is a component of force, due to the internal pressure, acting downward to keep the skirt extended.

The skirt may be strengthened around or near the bottom lip by means of a grommet or other suitable tension member, and the lip may be further supported by means of diametral tension members spanning the base opening, or by tension members running from the lip to any convenient points under the platform. All or any of such tension members may be of elastic material to permit intermittent extension when under load.

When a deep skirt is employed it may be preferable to locate the air nozzles at or near the skirt base in order to provide a more effective barrier to the escape of air. Connection to the source of supply of pressurised air may be by flexible tubing.

In order to overcome instability due to deformation of the air cushion skirt, say by passing over rough ground, it is proposed, in one preferred form of construction, to fit the vehicle with a plurality of air cushions, as described, for example in the form of a tripod.

In operation the vehicle is lifted clear of the ground or water by supplying air, at some pressure greater than that of the ambient atmosphere, to the chamber formed below the platform, there being a small clearance between the skirt lip and the ground. The pressure bears relationship to the total weight supported and the area of the base or platform. Lateral movement may be obtained by the application of a lateral force produced by any convenient means, such as an air propel-

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ler or jet, or by permitting the cushion air to escape from the rear of the vehicle, i.e. from the side away from the desired direction of motion in the form of a propulsion jet.

5 The intake of the air pump is directed forward to take advantage of the ram air effect caused by motion of the vehicle.

To enable the invention to be more clearly understood an embodiment thereof will now be described by way of example with reference to the accompanying drawing, which illustrates the vehicle in cross-section, comprising a platform 1, forming the base and fitted with a skirt 2. An engine 3 is mounted on the platform and drives an air pump 4, having a forward facing intake 5, for supplying pressurised air via suitable piping or ducts 6 to the nozzles 7 which are set to direct the air with an inwards component, as indicated by arrows. When a relatively deep skirt is fitted the nozzles may be located near the lower extremity 8 and may be supplied with air via flexible extensions 9. Tension bracing to lend support to the skirt are shown at 10, 11.

25 WHAT I CLAIM IS:—

1. A vehicle for lifting or transporting loads supported above and clear of the ground or water by means of at least one air cushion, which also provides the rolling medium of low frictional resistance, consisting of a base platform containing a series of nozzles below the platform and around the periphery, through which pressurised air is directed, with an inward component, to form the air cushion, together with some suitable means for supplying the air, such as an engine or turbine driving an air compressor or pump.

2. A vehicle as claimed in Claim 1, in which a skirt of flexible material is suspended around the periphery of the base.

3. A vehicle as claimed in Claim 2 wherein said flexible skirt tapers towards the base.

4. A vehicle as claimed in Claim 3 containing tension members for providing additional support to the skirt lip.

5. A vehicle as claimed in Claims 2, 3 or 4, wherein the air nozzles are located at or near the bottom of the skirt and are connected with the air supply system by means of suitable flexible pipes or ducts.

6. A vehicle as claimed in Claims 1 to 5 wherein there is a plurality of air cushions, as described.

7. A vehicle as claimed in Claims 1 to 6, incorporating some means for providing lateral movement of the vehicle, such as a propeller or air jet driven by one or more engines or turbines.

8. A vehicle as claimed in Claim 1 to 6, wherein lateral movement of said vehicle is obtained by allowing air to escape in such manner as to provide an air propulsive jet.

9. A vehicle as claimed in Claim 1 to 8, wherein the air intake to the compressor or pump is faced forward, i.e. in the direction of motion, and suitably shaped to obtain the advantages of the ram effect caused by forward motion of the vehicle.

10. A vehicle supported on one or more air cushions according to any preceding Claim or Claims, substantially as herein described and as illustrated in the accompanying drawing.

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PROVISIONAL SPECIFICATION

Improvements in Vehicles for Travelling over Land and/or Water

75 I, CECIL HUGH LATIMER-NEEDHAM, a British subject of High Oaks, Deer Park, Womersley, near Guildford, do hereby declare this invention to be described in the following statement:—

80 This invention relates to the use of a cushion produced by air which is expelled at pressure beneath a disc or platform in such manner that the disc is held clear of the ground or water. The air is supplied by any normal means of pump and motive power. A skirt may be provided below the disc to restrict the loss of air around the periphery.

85 By means of this device weights may be lifted vertically and by application of a lateral force, e.g. jet or air propeller, lateral movement may be obtained with a small amount of ground or water friction.

90 The air is preferably introduced below the disc by means of slits or jets positioned substantially all round the periphery and directing the air inwards towards the centre or with a component acting towards the centre so that

the centrifugal velocity is partly or largely neutralized. Some part of the air may be introduced at the centre of the disc or at any convenient position within the disc boundary but it is a feature of the invention that some part at least of the air is given a centripetal velocity component for the reason stated above.

95 In order to allow the disc to be lifted to a considerable height without excessive loss of air a deep skirt may be employed and the skirt may be made of any suitable flexible material, e.g. rubberised fabric, and another feature of this invention is the shaping of the skirt so that the internal air forces tend to keep the skirt extended below the disc. In order to achieve this, the skirt may be made of a 'doughnut' shape when inflated, i.e. concave in section, or the skirt may be vertical over the upper part with the lower part concave inwards, or again the skirt may be inclined inwards and downwards with the lower part concave.



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Claims

Claims

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105 In order to allow the disc to be lifted to a considerable height without excessive loss of air a deep skirt may be employed and the skirt may be made of any suitable flexible material, e.g. rubberised fabric, and another feature of this invention is the shaping of the skirt so that the internal air forces tend to keep the skirt extended below the disc. In order to achieve this, the skirt may be made of a 'doughnut' shape when inflated, i.e. concave in section, or the skirt may be vertical over the upper part with the lower part concave inwards, or again the skirt may be inclined inwards and downwards with the lower part concave.



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The skirt is preferably strengthened around the bottom edge by means of a grommet or other suitable member strong in tension.

these cushions as described above, one preferred arrangement being three such units equally spaced to form a tripod.

The device may include one or more of

C. H. LATIMER-NEEDHAM.

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SPECIFICATION NO. 860,781

INVENTOR: CECIL HUGH LATIMER-NEEDHAM

By a direction given under Section 17 (1) of the Patents Act 1949 this application proceeded in the name of Westland Aircraft Limited, Yeovil, Somerset, a British Company.

THE PATENT OFFICE

DS 72924/1(1)/R.109 200 4/63 PL

PATENTS ACT, 1949

SPECIFICATION NO. 860,781

In accordance with the Decision of the Superintending Examiner, acting for the Comptroller-General, dated the 15th day of February, 1963 this Specification has been amended under Section 14 in the following manner:-

Page 1, line 14, delete "may be" insert "is"

Page 1, line 37, delete "and of solid material"

Page 2, line 37, for "pump." read "pump,"

Page 2, line 38, delete "A vehicle as claimed in Claim 1,"

Page 2, for Claims "3 to 10" read "2 to 9" respectively

Page 2, line 41, for "Claim 2" read "Claim 1"

Page 2, line 43, for "Claim 3" read "Claim 2"

Page 2, line 46, for "Claims "2, 3 or 4" read "Claims 1, 2 or 3"

Page 2, line 51, for "Claims 1 to 5" read "Claims 1 to 4"

Page 2, line 54 & 59, for "Claims 1 to 6" read "Claims 1 to 5"

Page 2, line 63, for "Claims 1 to 8" read "Claims 1 to 7"

THE PATENT OFFICE
17th May 1963

DS 73371/1(16)/R.109 200 5/63 PL