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[54] **DEVICES FOR SUPPLYING THE PRESSURIZED FLUID CUSHIONS OF A GROUND-EFFECT VEHICLE**

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[52] **U.S. Cl.** .....**180/116,** 104/23 FS

[51] **Int. Cl.**.....**B61b 1/00,** B61b 1/06

[58] **Field of Search**.....180/116, 118, 125, 127; 104/134, 23 FS

[56] **References Cited**

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Assistant Examiner—D. W. Keen
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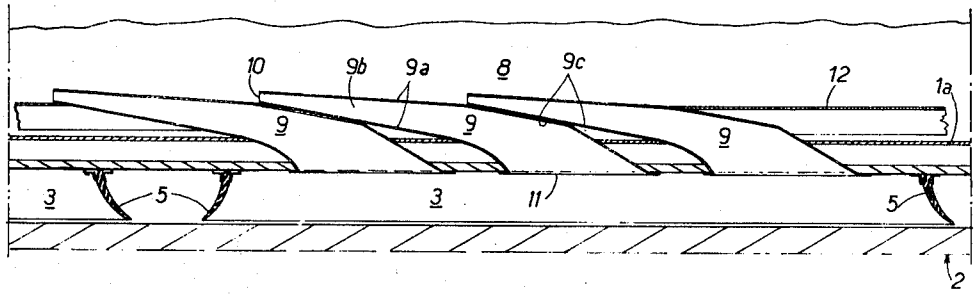
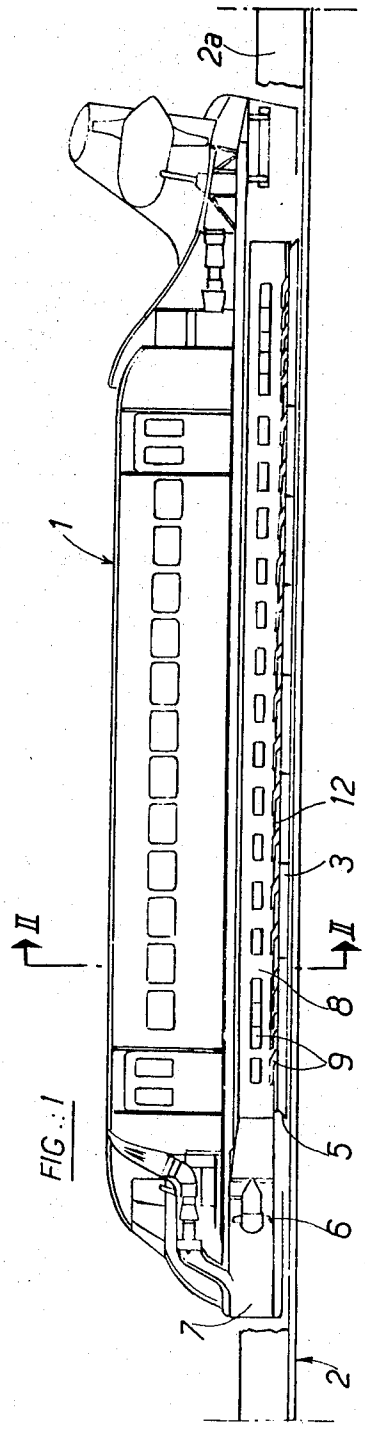
[57] **ABSTRACT**

A device in a ground-effect vehicle for supplying the pressurized cushions employed to support or to guide the said vehicle, which device comprises a collector carried by the machine structure and a plurality of pick-up ducts adapted to be fed with pressurized fluid from the collector and opening into the respective cushions, wherein the pick-up ducts are divergent towards their exits, over at least a part of their lengths, in order to improve transfer and distribution of pressurized fluid between the collector and the cushions.

8 Claims, 5 Drawing Figures




2a
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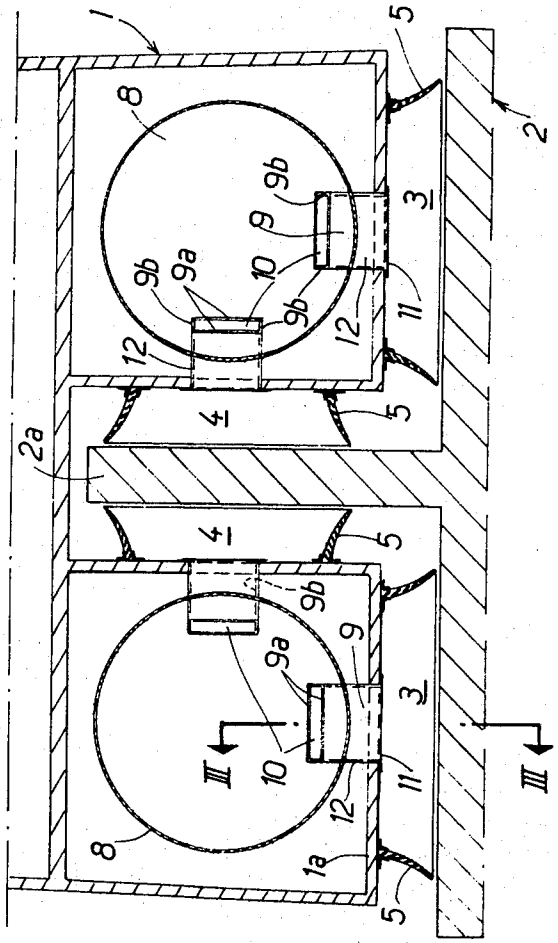
II
II
12
3
8
9
5
6
7
2

FIG.: 1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12
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9b
9
9a
3
III
10
12
11
III
8
1a
5

FIG.: 2

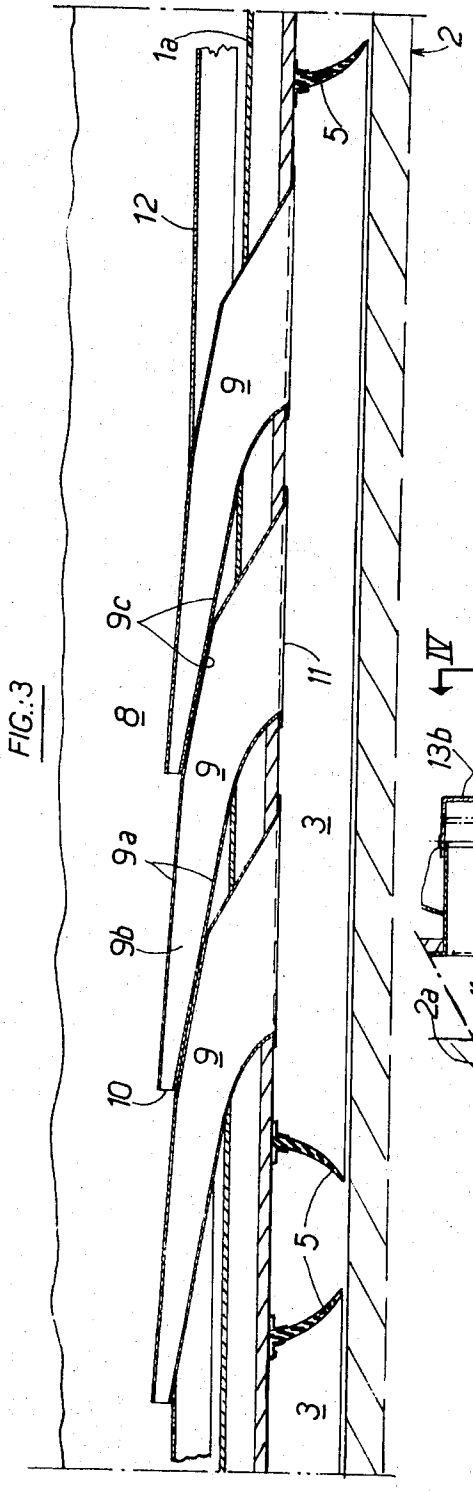
1a
2
5
12
9
9c
8
11
3
9a
9b
10

FIG. 3

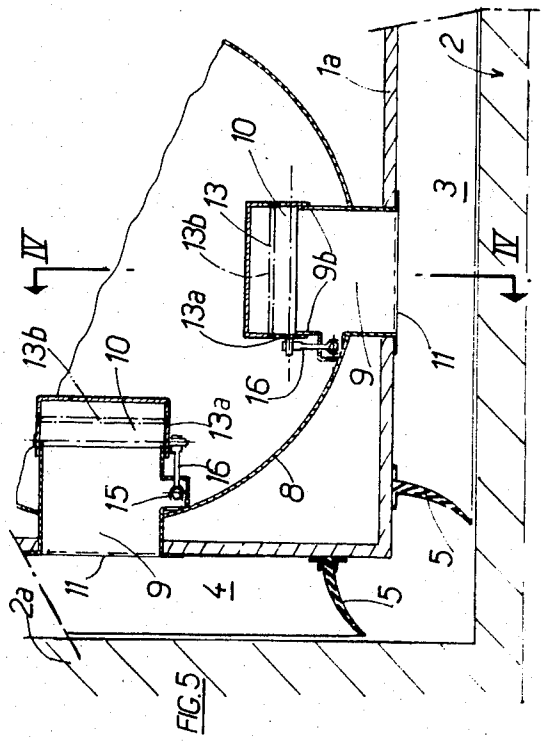
IV
IV
1a
2
10
13
13b
9b
3
13a
16
9
11
8
15
5
2a
4

FIG. 5

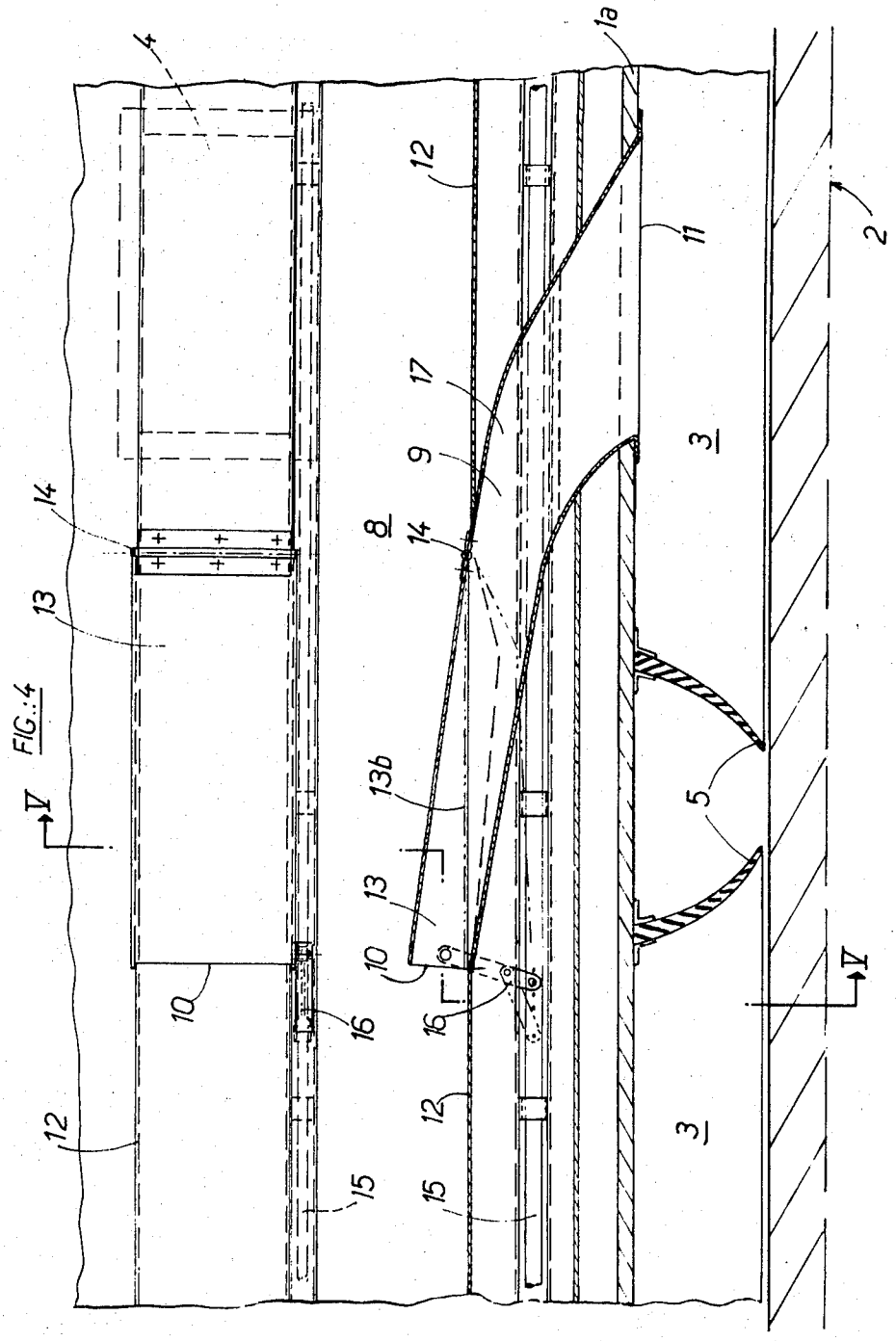

FIG. 4

DEVICES FOR SUPPLYING THE PRESSURIZED FLUID CUSHIONS OF A GROUND-EFFECT VEHICLE

This invention relates to a device for supplying the pressurized fluid cushions which support and/or guide a ground-effect vehicle.

This device is the kind in which a collector carried by the machine structure supplies pressurized fluid to a plurality of pick-up ducts, each of which extends first of all into the interior of said collector in a direction substantially parallel to the axis thereof, then in a direction which intersects said axis so that said duct passes through the wall of said collector as well as the machine structure and opens into the cushion or plenum chamber.

In accordance with the invention, the pick-up ducts are divergent over at least part of their length and advantageously comprise two opposite divergent walls connected by substantially parallel third and fourth walls.

Such a device enables the fluid cushions to be supplied with pressurized fluid in quasi-independent fashion from a common collector. The velocity of the fluid flowing through the collector may be substantial, the device in accordance with the invention transferring the kinetic energy of the fluid into pressure energy with a high degree of efficiency. This is a significant factor since it is the total pressure of the fluid flowing through the collector which is employed, whilst its static pressure may be lower than the pressure required for the cushions.

The supply device furthermore enables quasi-uniform distribution, amongst all the cushions, of the supplied fluid flow to be effected, this by its association of a variable number of pick-up ducts with each cushion and/or by giving such ducts different entry cross-sections depending upon whether they are close to or far away from the source which generates the fluid pressure.

The invention can be employed simultaneously for supplying the cushions which support a machine, and the cushions which guide it. In this case, it is equally possible to provide different numbers of pick-up ducts and/or ducts with differing entry sections, depending upon whether they are to be used to supply, the lift cushions or the guide cushions.

In one embodiment of the invention, the entry section of the pick-up ducts is variable and the control of the various ducts can be effected independently in a chosen manner for example as a function of the speed of the machine, depending upon whether they are close to or far away from the fluid pressure generator, or again depending upon whether they are associated with lift cushions or guide cushions.

In accordance with one further feature of the invention, the formation of undesirable addies at the input to the pick-up ducts is avoided by arranging a fairing between them.

The invention furthermore makes it possible to supply fluid under pressure to the cushions in the form of a uniform stream, because of the divergence in the pickup duct. This may make it possible to dispense with devices for distributing the supply flow.

The following description given in relation to the accompznying drawings will indicate by way of a non-limitative example how the invention may be carried into practice.

IN THE DRAWINGS

FIG. 1 is a schematic longitudinal section of a machine moving along a track on pressurized fluid cushions supplied in accordance with the invention;

FIG. 2 is a partial transverse section on a larger scale, taken on the line II—II of FIG. 1;

FIG. 3 is a partial longitudinal section on a larger scale taken on the line III—III of FIG. 2;

FIG. 4 is a view similar to that of FIG. 3, taken on the line IV—IV of FIG. 5 and showing the variable entry section pick-up ducts;

FIG. 5 is a partial transverse section on a smaller scale, taken on the line V—V of FIG. 4.

The machine shown in FIGS. 1, 2 and 3 is a guided hovercraft designed to move along a track 2 of inverted T-section, the leg of the T 2*a* being vertically disposed, through the medium of lift cushions 3 and guide cushions 4 which are laterally defined by skirts 5.

The supply of pressurized fluid, for example compressed air, to the cushions 3 and 4 located at either side of the central ridge 2*a*, is effected by a fan 6 whose intake fairing 7 opens forward in order to make use of the ram effect produced by the velocity of the machine 1, this fan delivering into a longitudinal collector 8 located in the lower part of the structure 1*a* of the machine. Each cushion is supplied through a tap-off or pick-up duct 9 with a fluid pick-up orifice 10 located inside the collector 8 and facing upstream, said duct curving in order to pass through the collector as well as the structure 1*a* and to open into the respective cushion 3 or 4 through an exit orifice 11.

Associated with each cushion are one or more pick-up ducts 9, the number varying in accordance with the position of the cushion in relation to the fan 6, so that a quasi-uniform distribution of the flow between the various cushions is achieved. This kind of result can equally well be obtained by appropriate choice of the section of each fluid pick-up orifice 10.

In accordance with the invention, the pick-up ducts 9 are divergent and of rectangular section, at least in their upstream sections which follow the fluid pick-up orifice 10, and are delimited by two opposite divergent walls 9*a* linked by third and fourth substantially parallel walls 9*b*.

As FIG. 3 shows, the walls 9*a* can be constituted by flat panels 9*c* located opposite one another in order that neighboring pick-up ducts serving for example one and the same cushion, such as the cushion 3, can be placed side by side and thus reduce the drag in the collector 8. For the same purpose, the aerodynamic conditions of flow prevailing there can be improved by uniting non-adjacent ducts 9, or separate groups of adjacent ducts 9, to a fairing 12 which provides continuity in the collector 8 and ensures that all that emerge are the fluid intake orifices 10 which point upstream.

In the embodiment shown in FIGS 4 and 5, the fluid intake 10 of the pick-up ducts 9 is controllable and in particular can have its entry cross-section regulated as a function of the speed of the machine 1. To this end, the duct 9 has an upstream section 13 articulated at 14 at the junction between the fairing 12 and the downstream section 17 of the duct 9, which portion 13

can project to a greater or lesser extent beyond the fairing under the control of a suitable system whose transmission linkage is marked **15** and its coupling link **16**.

The position of the upstream section **13** as illustrated in FIG. **4** at **13***b*, corresponds with the minimum cross-section of the fluid intake **10**. As FIG. **5** shows, the upstream section **13** of the duct **9** is provided with lateral extensions **13***a* cooperating in sealed manner with the substantially parallel walls **9***b*, whatever the position of the moving section **13**.

It should be noted that it is possible to control the position of the moving section **13** in order to provide a pick-up duct whose section is convergent upstream of the joint **14** and divergent downstream of said joint.

It will be apparent that the embodiments above described are purely examples and are open to modification in various ways without departing from the scope of the invention as defined by the appended claims.

We claim:

1. In a surface effect machine movable along a bearing surface with the interposition of a pressure fluid cushion system, a cushion fluid delivery device comprising a source of pressure fluid, a plenum manifold generally coextensive with said cushion system and into which said source discharges a flow of pressure fluid, and a succession of closely juxtaposed scoops having each: an inlet end projecting into said plenum manifold to tap pressure fluid therefrom and facing in an upstream direction with respect to said flow to recover the dynamic pressure thereof, an outlet end opening into said cushion system, and a divergent section intermediate said inlet and outlet ends.

2. A device according to claim **1**, wherein said scoops have opposite planar wall portions which are substantially parallel to each other, with wall portions of adjacent scoops being contiguous.

3. A device according to claim **2**, wherein said scoops are of substantially rectangular cross-section and said inlet ends thereof are of substantially rectangular shape.

4. A device according to claim **11**, wherein said rectangular inlet ends extend in planes spaced longitudinally and generally normal to said flow.

5. A device according to claim **3**, wherein said rectangular inlet ends are of variable area.

6. A device according to claim **5**, wherein said variable area rectangular inlet ends comprise each a generally planar pivotal wall element hinged about an axis substantially perpendicular to said flow, and an opposite, generally planar, stationary wall.

7. A device according to claim **6**, wherein said pivotal wall is on the inward side of said stationary wall with respect to said plenum manifold.

8. A device according to claim **7**, wherein said pivotal wall is adjustable to an inlet end closure position in which it extends substantially parallel to said flow.

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