GUIDE TRACK FOR GROUND EFFECT MACHINE

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ABSTRACT OF THE DISCLOSURE

A track for a ground effect machine, said machine having a wall arrangement bounding cushions of pressurized fluid formed against the track, said track comprising a flexible strip along portions of the track at which direct engagement with the wall arrangement may occur in use, said strip yielding upon such engagement to minimize wear of said wall arrangement.

The subject of the present invention is a track serving to support and/or guide a hovercraft or other ground-effect machine through the agency of cushions of pressurized fluid bounded by a skirt arrangement whose free edge moves normally at a short distance from the track surface without, consequently, physical frictional contact with the latter. Such tracks are well known today and reference may be made in this respect to the Bertin et al. 3,190,235.

Test have shown that these skirt arrangements of the fluid cushions can sometimes come into more or less violent contact with the said track, because of dynamic effects or irregularities in the track or through the action of weather conditions such as squalls or gusts of wind. Premature wear of the skirt arrangement is produced thereby.

In anticipation of such occasional contact, the present invention provides an arrangement on the track to remove this risk and to reduce it considerably.

According to the present invention the track comprises a rigid sub-structure, as is usual, but, opposite the trajectory of the free edges of the fluid cushion skirt arrangements, at least, that is, on those parts where contact with the said skirts can occur, the track presents a surface portion capable of yielding when such contact occurs. This surface portion preferably presents an external surface with a low coefficient of friction with the material of the skirt.

In one embodiment of the present invention, a flexible membrane is interposed between the rigid sub-structure and the yieldable surface portion which can be in hard steel, a diaphragm, for example of expanded polystyrene foam, forming an elastic stop, being fitted from place to place in addition.

As a variation, the yieldable surface portion is articulated on hinges substantially parallel to the track and offset laterally relative to the free edges of the confining skirts, transverse webs being provided in order to restrict leakage from the cushion across the track.

In each case, the yieldable surface portion cooperates at least partially with the skirt arrangements for the cushioning of pressurized fluid for the automatic clearance height of the cushion. In this fact, the yieldable surface portion ensures such a controlled regulation in the manner of a probe or feeler which can bend in case of accidental contact with the skirt arrangements.

In the accompanying drawings:

FIG. 1 is a cross sectional view of one embodiment of the track according to the invention;

FIG. 2 is a perspective view of a detail from FIG. 1;

FIG. 3 is a cross sectional view of an alternative embodiment;

FIG. 4 is a sectional view on line IV—IV of FIG. 5, showing a detail from FIG. 3 on a larger scale;

FIG. 5 is a view in section on the line V—V of FIG. 4;

FIG. 6 is a cross sectional view of another alternative embodiment; and

FIG. 7 is a perspective view of a detail from FIG. 6.

In the embodiment shown in FIGS. 1 and 2, a track 1 comprises a bed in the general form of an inverted T, with a deck 1a forming two lateral, substantially horizontal wings, and a central, substantially vertical upright 1b. The ground-effect machine, represented schematically at A, straddles this upright; it is supported by the wings 1a of the track and guided by the upright 1b through the intermediary of fluid cushions B bounded by confining skirts C.

According to the present invention, the track 1 presents, facing the said skirts, yieldable strips 2 extending in the longitudinal direction of movement. These strips 2 are of a hard sheet steel which has a low coefficient of friction with the material of the skirts of the ground-effect machine, and are supported on distance-pieces 3, for example, of expanded material, which limit their spacing and their deflection and which are set between angle-sections 4 which constitute stops.

The strips 2 are mounted resiliently by means of a resilient and leak-proof joint 5 on the track 1. This joint 5 can also act as a hinge at the same time as it prevents leakage. The angle-sections 4 and the joint 5 are secured to the strips 2 and to the track 1, with the aid of rivets 6, for example.

Hollows 15 are made in the deck 1a so that the strips 2 and the corresponding upper faces of the track wings 1a shall be at the same level. An assembly such as is shown on the central upright 1b can also be presented, consisting of two strips 2 arranged on either side of this upright upon a base plate 20 and adjoining a rigid projection 21.

The inverted T-section track is only one typical example from among a number of other known tracks; channel-section track (FIG. 3), inverted U-section track (FIG. 6), the flexible strips according to the present invention being obviously applicable whatever the type of track.

According to the second embodiment shown in FIGS. 3, 4 and 5, the strips 2a are articulated about a hinge 7, itself firmly fixed to the track 1 through the agency of supports 8. These supports 8 consist of a base plate 8a fixed onto the track, two flanges 8b whose edge 8d, facing the strip 2a, tapers off towards the inside of the track, and a projection 8c which receives the hinge 7. The flanges 8b are in staggered relation with transverse webs 9 projecting toward the track from the inside of strip 2a and having a slanting edge 9a facing the track. Fluidtightness is obtained by means of a flexible joint 10 fixed to the strip 2a and to the track 1.

It will be noted that the articulating hinge 7 of the strip 2a is offset laterally relative to the skirt arrangements C of the cushion B, so that the strip will yield when contact with that skirt occurs.

In the variation of FIGS. 6 and 7, the same device is mounted on the edges of the track 1; the strips 26 are joined to the latter by distance-pieces 19 and rest upon a series of flexible stops 11 which contribute to the sealing of the track, joined together at 12 and fixed onto the track 1 and onto the strips 2b by rivets 6, for example.

In this embodiment, the articulation described previously is replaced by the natural flexibility of the strip 2b.

Stop-members 13, flexible or rigid, can be provided under the strips 2b; opposite the distance-pieces 19, although the flexible strips have only been shown opposite the skirt C of the sustaining cushion, in the variations of
FIGS. 3 to 5 and 6 and 7, it is clear that the track could be arranged similarly with respect to the guiding cushions, as on FIG. 1.

Equally it is clear, that in order to increase the flexibility of the strips 2 to a level greater than the natural flexibility of the same, they can, with advantage, be formed of a succession of separate sections of appropriate length, arranged end to end.

The arrangements described above function in the following manner:

The ground-effect machine A, through the agency of its fluid cushions B, induces a flow of fluid behind the strips 2 which lift and thus restrict leakage from under the skirt C.

The strips are constructed from a suitable material whose coefficient of friction with the material of the cushion skirts is low and consequently wear of the skirt C due to contact with the strips is greatly decreased. In addition, as the suspension is constituted by the track, parasitic vibrations due to the suspension are eliminated from the vehicle A.

We claim:

1. A ground effect transportation system comprising a vehicle having a longitudinally-extending wall arrangement at a longitudinal side of a fluid pressure cushion, and a track for supporting and guiding and said vehicle and against which said cushion is formed, said track having a main cushion-bearing section of rigid structure, and a longitudinally-extending yieldable strip adjacent to said rigid track section and along the path to be followed by said wall arrangement, said strip being adapted to yield upon contact engagement with said wall arrangement.

2. A ground-effect transportation system according to claim 1, wherein said strip comprises a plate adapted to pivot effectively about an axis parallel to the track and laterally offset relative to said wall arrangement.

3. A ground-effect transportation system according to claim 2, wherein said plate is provided with a hinge for defining said axis.

4. A ground-effect transportation system according to claim 2, wherein said plate is made of a material sufficiently elastic to provide for said effective pivoting.

5. A ground-effect transportation system according to claim 1, wherein said strip has an outer surface of low coefficient of friction with respect to the material of which said wall arrangement is made.

6. A ground-effect transportation system according to claim 5, wherein said surface is of hard sheet steel.

7. A ground-effect transportation system according to claim 1, further comprising webs disposed transversely of the track and adapted to restrict leakage of pressurised fluid from said cushion.

8. A ground-effect transportation system according to claim 1, further comprising means to seal said fluid cushion from the space to the rear of said strip, in the direction of vehicle movement.

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