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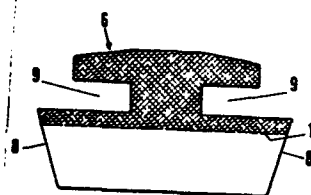
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(54) Metal driving belt.

(57) A driving belt having a trapezoidal cross-sectional configuration and suitable to transmit a torque between expanding pulleys formed of pairs of conical discs defining a V-shaped space between them for receiving the driving belt, which driving belt comprises a carrier in the form of one or a number of endless metal belts having a continuous series of transverse members (6) freely slidable with respect to the carrier thereon. In such a driving belt there may be a lateral vibration of the transverse members under certain conditions. This vibration, during which the transverse members (6) strike the carrier, results in wear, which can be considerably reduced by providing the parallel surfaces with which the transverse members contact each other with friction-increasing means, such as a grooved surface.

FIG. 2



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Metal driving belt

This invention relates to a driving belt having a trapezoidal cross-sectional configuration and suitable to transmit a torque between expanding pulleys formed of pairs of conical discs defining a V-shaped space between them for receiving the driving belt, which driving belt
5 comprises a carrier in the form of one or more endless, metal belts having a continuous series of transverse members freely slidable with respect to the carrier thereon, which transverse members define the cross-sectional configuration of the driving belt.

Such a driving belt is known from Dutch patent 142,767, in which
10 the operation of the driving belt, which transmits the torque by means of pushing force, is explained. Such a driving belt is particularly suitable for use in an infinitely variable transmission.

A drawback of such a driving belt is that under certain working conditions the transverse members may shift in transverse direction to
15 cause heavy wear. During this lateral shifting the transverse members strike the flanks of the belt or belts forming the carrier.

To solve this problem, it is proposed in Dutch patent application 73,12089 to provide the transverse members with fixing means which fully prevent shifting in transverse direction. To this end it is proposed to
20 provide the transverse members with interengaging means.

Practice has shown, however, that such a solution is not satisfactory, because the slightest freedom of relative lateral movement between two successive transverse members will result in an impermissibly great slidability in transverse direction over a number of
5 transverse members.

It is an object of the present invention to provide a driving belt of the type described above, while preventing wear due to shifting of the transverse members in transverse direction.

To this end, at least a number of the substantially parallel
10 surfaces with which the transverse members are in contact with each other in a straight part of the belt are provided with friction-increasing means.

Experiments have shown that the detrimental shifting of the transverse members in transverse direction occurs in the pushing run of
15 the driving belt, if the torque being transmitted is relatively small, i.e. only in the situation where a relatively slight mutual pushing force between the transverse members is present. In the slack run, where there is no pushing force at all, and, in the other run, if the transverse members are pushed onto one another with great force, no
20 detrimental shifting occurs.

From these findings it has been concluded that the cause of shifting of the transverse members in transverse direction should be found in the shifting of the transverse members along one another in such a manner that a force in transverse direction is transmitted
25 between the successive members. This may create a situation in which the series of transverse members perform, as it were, a vibration.

It has been found that, by increasing the coefficient of friction between the transverse members it is possible to avoid the above-mentioned detrimental shifting in a technically easily feasible way. The relative shifting of the transverse members in the slack run, 5 which is not prevented in this way, appears to have no adverse effect in practice.

In accordance with a preferred embodiment of the present invention, the friction-increasing means comprise a knurling of small depth, for instance some hundredths of a millimeter. According to the 10 invention, this knurling can be formed by grinding the surface in two directions, called cross-grinding.

It is important that the knurling on the surface is such that it is maintained during use of the driving belt, and consequently does not easily wear out, or disappear during running in of the driving 15 belt.

One embodiment of the driving belt according to the invention will now be described, by way of example, with reference to the accompanying drawings. In said drawings,

Fig. 1 shows schematically a sectional view of two pulleys with 20 a driving belt running thereon;

Fig. 2 shows a transverse member in front elevational view.

Fig. 1 shows schematically two V-shaped pulleys 1, 2. The running diameter of the driving belt 3 on a pulley 1, 2 can be varied by adjusting the mutual distance of the conical pulley parts of the V-shaped 25 pulley 1, 2. The ratio of the rotary speeds between the schematically shown shafts 4 and 5 can be varied infinitely in this way. The driving belt 3 comprises a number of metal transverse members 6 slidably mounted

on an endless carrier 7. This carrier 7 may comprise, for example, a number of metal belts combined into one or more belt packs. Each of the preferably two belt packs comprises a number, for example ten, of superposed metal belts which are slidable about and with respect to each other. (In Fig. 1 a pack of only 4 belts is shown).

The transverse members 6 are slightly tapered radially inwardly of the driving belt, which enables the driving belt 6 to run about the pulley with curvature, as shown in Fig. 1.

During operation of the driving belt there is such a tension in carrier 7 that transverse members 6 are passed between pulleys 1 and 2 in a substantially linear path. A torque is thereby transmitted between pulleys 1 and 2 due to the pushing force with which the transverse members push against each other in the loaded run of the driving belt.

Fig. 2 shows a transverse member 6 (shown in Fig. 1 in side elevational view) in front elevational view. Transverse member 6 comprises two side surfaces 8 adapted to cooperate with the conical pulley parts of the V-shaped pulley 1, 2 and two recesses 9, each adapted to receive a belt pack 7, as shown. The broken line 10 in Fig. 2 indicates the tilting line or the tilting zone, i.e. the place where the transverse member 6 starts tapering. In the substantially straight, pushing run of the driving belt, the transverse members are in contact with each other with the surface shown in cross-hatched lines in Fig. 2 above the broken line 10. This hatching indicates the two grinding directions in which the surface has been ground so as to produce such grooves in the surface—that with relatively small pressure forces between the transverse members the mutual friction in transverse direction is great.

-1-

C L A I M S

1. A driving belt having a trapezoidal cross-sectional configuration and suitable to transmit a torque between expanding pulleys formed of pairs of conical discs which define a V-shaped space between them for receiving the driving belt, which driving belt comprises a carrier in
5 the form of one or a number of endless, metal belts having a continuous series of transverse members freely slidable with respect to the carrier thereon, which transverse members define the cross-sectional configuration of the driving belt, characterized in that at least a number of the substantially parallel surfaces with which the transverse members are in
10 contact with each other on a straight part of the belt are provided with friction-increasing means.
2. A driving belt according to claim 1, characterized in that the friction-increasing means comprise a knurling of small depth.
3. A driving belt according to claim 2, characterized in that the
15 knurling is formed by grinding the surface in two directions.

FIG. 1

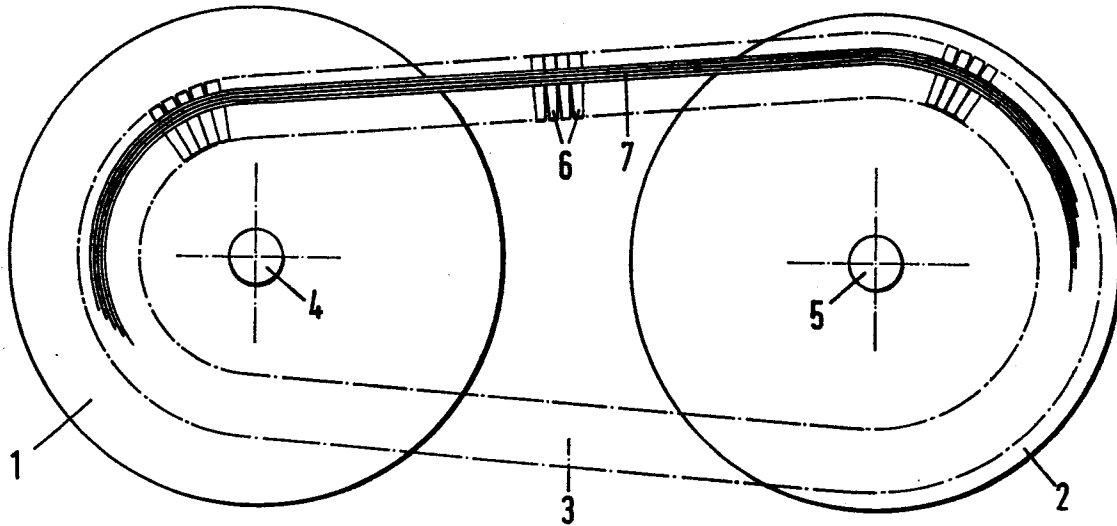
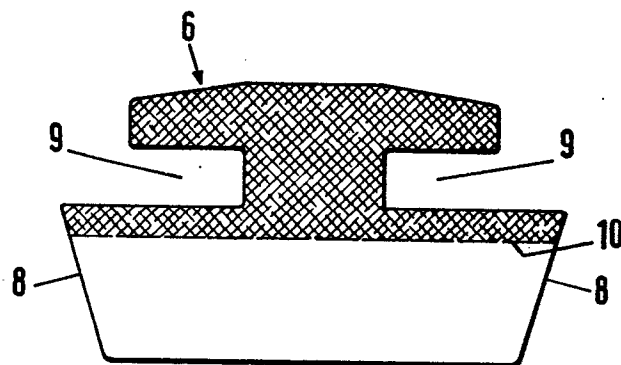


FIG. 2



[illegible]

34 78 24 310

DOCUMENTS CONSIDERED TO BE RELEVANT			CLASSIFICATION OF THE APPLICATION (Int. Cl.)
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	
	<u>DE - A - 2 557 724 (HEYNAU)</u> * Page 3, lines 1-8; page 8, line 13 to page 9, line 7; figures 10, 11 * --- <u>FR - E - 81 703 (A.B.G.)</u> * Page 2, right-hand column, line 49 to page 3, left-hand column, line 15; figures 5-8 * --- <u>FR - A - 2 031 782 (PEUGEOT-RENAULT)</u> * Claims 1, 2; figures 1, 2 * -----	1 2, 3 2	P 16 G 5/15 TECHNICAL FIELDS SEARCHED (Int. Cl.) P 15 G 5/00 P 16 G 5/16 P 16 G 5/18 F 16 G 5/20 F 16 G 1/22 F 16 G 1/24 F 15 G 1/00 P 16 H 9/24 CATEGORY OF CITED DOCUMENTS X: particularly relevant A: technological background O: non-written disclosure P: intermediate document T: theory or principle underlying the invention E: conflicting application D: document cited in the application L: citation for other reasons &: member of the same patent family; corresponding document
The present search report has been drawn up for all claims			
Place of search	Date of completion of the search	Examiner	
The Hague	11-10-1978	SIGWALT	

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