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Datasheet for the decision of 26 June 2019

Case Number: T 2329/16 - 3.2.01

Application Number: 10807652.2

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Language of the proceedings: EN

Title of invention:
SNOW GROOMER AND RELATIVE CONTROL METHOD

Patent Proprietor:
PRINOTH S.p.A.

Opponent:
Kässbohrer Geländefahrzeug AG

Headword:

Relevant legal provisions:
EPC Art. 54(1), 56, 123(3), 111(1)

Keyword:
Novelty - main request (no) - first auxiliary request (yes)
Amendments - broadening of claim (no)
Inventive step - first auxiliary request (yes)
Remittal - adaption of the description (yes)

Decisions cited:

Catchword:

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Beschwerdekammern

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Case Number: T 2329/16 - 3.2.01

D E C I S I O N
of Technical Board of Appeal 3.2.01
of 26 June 2019

Appellant: (Opponent)	Kässbohrer Geländefahrzeug AG Kässbohrerstrasse 11 88471 LAUPHEIM (DE)
Representative:	Patentanwälte Ruff, Wilhelm, Beier, Dauster & Partner mbB Postfach 10 40 36 70035 Stuttgart (DE)
Respondent: (Patent Proprietor)	PRINOTH S.p.A. Via Brennero, 34 Vipiteno (BZ) (IT)
Representative:	Eccetto, Mauro Studio Torta S.p.A. Via Viotti, 9 10121 Torino (IT)
Decision under appeal:	**Interlocutory decision of the Opposition Division of the European Patent Office posted on 11 August 2016 concerning maintenance of the European Patent No. 2507118 in amended form.**

Composition of the Board:

Chairman	G. Pricolo
Members:	W. Marx
	O. Loizou

Summary of Facts and Submissions

I. The appeal of the opponent is directed against the decision of the opposition division to maintain European patent No. 2 507 118 in amended form on the basis of the first auxiliary request filed during the oral proceedings.

II. In its decision the opposition division held that the subject-matter of claim 1 as granted was new and inventive.
The subject-matter of granted claim 6 was considered not new with respect to D1 (DE 10 2004 059 823 A1).
The subject-matter of independent claims 1 and 6 of the first auxiliary request (claim 1 remained the same as granted claim 1) filed during the oral proceedings was considered new and inventive over D1.

III. Oral proceedings before the board took place on 26 June 2019.

The appellant (opponent) requested that the decision under appeal be set aside and that the patent be revoked.

The respondent (patent proprietor) requested that the appeal be dismissed (main request), or in the alternative, that the patent be maintained in amended form on the basis of the set of claims of one of the first to third auxiliary requests filed with its reply dated 2 May 2017.

IV. Claim 1 according to the main request (broken into a feature analysis adopted by the parties) reads as follows:
M1 A ski slope snow groomer (1) comprising :

M2 - a frame (2);
M3 - two wheel assemblies (3) on opposite sides of the frame (2);
M4 - two tracks (4) wound respectively about the two wheel assemblies (3);
M5 - a variable-configuration and variable rigidity shock absorber assembly (16) connected to the wheel assemblies (3) and the frame (2) and designed to adjust the wheel assemblies (3); and
M6 - a control assembly (5) comprising a plurality of sensors including
M7 a speed sensor (46) for acquiring a signal indicating the travelling speed of the snow groomer (1);
M8 a sensor (47) for acquiring a signal indicating the steering angle of the snow groomer (1); and
M9 at least one sensor selected from
M10 pressure sensors (44, 45) for acquiring signals correlated to the rigidity of shock absorber assembly (16),
M11 an inclinometer (48) for acquiring a signal indicating lateral tilt of the snow groomer (1),
M12 and an inclinometer (49) for acquiring a signal indicating longitudinal tilt of the snow groomer (1);
M13 the control unit (13) being configured to calculate an operating state signal as a function of a plurality of signals including
M14 the speed signal;
M15 the angle signal; and
M16 at least one signal selected from the signals of the pressure sensors (44, 45), the lateral tilt signal, and the longitudinal tilt signal, and
M17 to adjust the shock absorber assembly (16) as a function of the operating state signal.

Claims 6 of the main request and of the first auxiliary request are identical in wording and correspond to claim 6 as upheld in opposition proceedings. They read (broken into a feature analysis adopted by the parties) as follows:

M18 A method of controlling a ski slope snow groomer,
M19 the snow groomer (1) comprising :
M20 - a frame (2);
M21 - two variable-configuration wheel assemblies (3) on opposite sides of the frame (2); and
M22 - two tracks (4) wound respectively about the two wheel assemblies (3);
M23 the method comprising the steps of:
- adjusting the wheel assemblies (3) by means of a variable-configuration shock absorber assembly (16) connected to the wheel assemblies (3) and the frame (2);
M24 - acquiring a plurality of signals including
M25 a signal indicating the travelling speed of the snow groomer (1);
M26 a signal indicating the steering angle of the snow groomer (1);
M27 signals indicating
M28 the operating pressures of the shock absorber devices (17);
M31 - calculating an operating state signal of the snow groomer (1) as a function of a plurality of signals including
M32 the speed signal,
M32 the angle signal, and
M33 signals indicating the operating pressure; and
M36 - adjusting the rigidity of the shock absorber assembly (16) as a function of the operating state signal.

The amendments made to claim 1 of the first auxiliary request relate to features M9, M11, M12, M16 and M17 of claim 1 as granted, which have been modified as follows (features added are underlined; features deleted struck through):

M9 ~~at least one sensor selected from~~
M11 ~~an inclinometer (48) for acquiring a signal indicating lateral tilt of the snow groomer (1),~~
M12 ~~and an inclinometer (49) for acquiring a signal indicating longitudinal tilt of the snow groomer (1);~~
M16 ~~at least one signal selected from the~~ signals of the pressure sensors (44, 45), the lateral tilt signal, and the longitudinal tilt signal, and
M17 to adjust the rigidity of the shock absorber assembly (16) as a function of the operating state signal.

Reasons for the Decision

Main request

1. Claim 1 - novelty (Article 54((1) EPC)

1.1 The subject-matter of claim 1 of the main request is not new in view of the disclosure of document D1 (Article 54(1) EPC).

1.2 D1 discloses (Figures 1 to 3; claim 1) a ski slope snow groomer according to features M1 to M4 comprising a frame (10), two wheel assemblies on opposite sides of the frame (paragraph [0047]) and two tracks (41) wound respectively about the two wheel assemblies. Moreover, D1 shows (Figure 3) a control assembly according to

features M6 to M16 comprising a plurality of sensors, i.e. a speed sensor (claim 17, paragraph [0050]), a steering angle sensor (claim 19) and at least an inclinometer (claim 18, paragraph [0048]), and a control unit (34) configured to calculate an operating state signal as a function of these sensor signals (claims 17 to 19), as found by the opposition division (see contested decision, in particular point 2.3.1.3). The shock absorber assembly (comprising torsion bars 16a, 16b) is adjusted (by actuating hydraulic cylinders 26, 27) as a function of the operating signal (height adjustment, see claims 17 to 19), as required by feature M17. This was not contested by the parties.

1.3 The only feature in dispute was feature M5 that specifies the shock absorber assembly, which is connected to the wheel assemblies and the frame, as being of variable configuration and of variable rigidity. The shock absorber assembly of D1 (Figure 2), connected to the wheel assemblies (via supporting arms 12a, 12b) and the frame (10), is formed by torsion bars (32a, 32b) connected on one side to the wheel assemblies and on the other side to a hydraulic cylinder (26) establishing a connection to the frame.

Within the meaning of the contested patent, the configuration of the shock absorber assembly is determined by the position of the shock absorber devices, in particular the position or length of the hydraulic cylinder which determines the position or the displacement of the wheels relative to the frame (see Figure 4 and paragraphs [0038] and [0043] of the patent specification). Such kind of height adjustment of the vehicle's frame as specified in feature M5 is also known from D1 (see Figure 3). However, it was contested by the respondent that D1 disclosed also a variable-

rigidity shock absorber assembly connected to the wheel assemblies and the frame and designed to adjust the wheel assemblies.

1.4 As understood by the board and also confirmed by the respondent, the term "rigidity" describes a characteristic of a physical body or physical structure, namely its property to resist a deformation when applying a force and thus its stiffness. The rigidity or stiffness of a body is defined in mechanics by the ratio of applied force to resulting deformation, i.e. describes the extent to which an object resists deformation in response to an applied force. A variable-rigidity shock absorber assembly according to feature M5 thus specifies the stiffness of the assembly of shock absorbers forming the suspension of the claimed snow groomer, i.e. its reaction to disturbances or forces applied to the snow groomer e.g. from road irregularities such as bumps or pot-holes.

1.5 According to the respondent, the skilled person would understand from the whole description of the contested patent that configuration and rigidity were characteristics of the same shock absorber assembly and could be adjusted separately from each other.

The board finds that such independent adjustment of configuration and rigidity is also possible for the shock absorber assembly of D1. According to Figure 3 in D1, the position of the middle wheels with respect to the frame can be adjusted to vary the contact surface of each track, so that a variable-configuration shock absorber assembly within the meaning of the patent is realised. Moreover, D1 describes "in addition" (see paragraph [0052]: "Darüber hinaus ...") a control which realises an active suspension by applying a counter

force via a hydraulic cylinder to one end of a torsion bar situated opposite to the end which supports the wheel assembly when detecting a large acceleration of a wheel supporting arm mounted to the torsion bar. As explicitly said in paragraph [0052] of D1 (reading: "*Beispielsweise wird bei starkem Einfedern und/oder starker Beschleunigung der Tragarme 12a, 12b ... mittels der Kolben-Zylinder-Einheit 26 eine Gegenkraft aufgebracht, um ein zu starkes Einfedern der Tragarme 12a, 12b und damit verbundene starke Aufbauschwankungen zu verhindern.*"), the wheel displacement in vertical direction relative to the frame ("*Einfedern*") is reduced ("*starkes Einfedern verhindern*") in reaction to an applied force applied to the wheel resulting in an acceleration of the supporting arms ("*Beschleunigung der Tragarme*") by applying a counter force to the torsion bar. This paragraph clearly describes a dynamic condition, in which for a given force applied to the wheel the deformation of the shock absorber (torsion bar pre-loaded by counter force of hydraulic cylinder) is reduced, i.e. its rigidity is increased. Or to put it differently, the shock absorber assembly respectively the suspension is made stiffer and more rigid in reaction to the external disturbance.

1.6 The respondent also argued that the rigidity of the assembly in D1 was determined by the elastic property of each torsional bar of the assembly (having its own torsional rigidity). According to D1 (see paragraphs [0007] and [0043]), the characteristic curve of the torsional bars did not change when rotating the torsional bars to vary the configuration of the assembly, i.e. the rigidity of each torsional bar was fixed and not adjustable. As regards paragraph [0052] of D1, the respondent argued that an active suspension (making use of actuators to raise and lower the chassis

at the wheel in response of the dynamic behavior of the suspension) did not encompass varying the rigidity of the shock absorber, which was only achieved by an adaptive suspension, so that claim 1 was novel over D1.

The board agrees with the respondent that there is no teaching in D1 that the rigidity of the torsional bars might be variable. However, feature M5 does not require a spring or torsional bar having a variable rigidity, but a "*variable-rigidity shock absorber assembly connected to the wheel assemblies and the frame*", i.e. a variable rigidity of the suspension connecting the wheels to the frame. The connection between wheel assemblies and frame and thus the suspension in D1 is established by torsional bars connected via hydraulic cylinders to the frame, so the rigidity of this system of torsion bars and hydraulic cylinders is crucial when judging on novelty over D1. As argued already further above, D1 explicitly describes that at least under dynamic conditions the rigidity of the shock absorber is increased. Moreover, D1 explicitly states (see paragraph [0052]: "*Dadurch lässt sich im Effekt eine progressive und dabei dynamisch veränderbare Federkennlinie der mit den Tragarmen verbundenen Drehstabfedern erreichen.*") that the spring characteristic is dynamically varied. It is clear for the skilled reader that this passage does not teach a progressive or variable spring characteristic of the torsional bar, but a dynamically variable rigidity of the system constituted by the torsion bar and the hydraulic cylinder applying a counter force. Since the wording of feature M5 leaves open whether rigidity variations under static or dynamic conditions are meant, feature M5 is known from D1.

1.7 The respondent further stressed the difference between an active suspension and an adaptive suspension, which according to the appellant allegedly provided the same effect. In particular, an active suspension provided a delayed reaction to an action and stabilised the attitude of the vehicle in some operation conditions, but it was not possible to preselect a given degree of stiffness. As argued by the respondent, the rigidity of the suspension assembly was an absolute value and preselected by the driver (and modified e.g. for improving comfort) irrespective of any modification of the configuration of the shock absorber. The snow groomer claimed allegedly could vary the configuration and the rigidity of the shock absorber assembly in independent manner and even simultaneously, which was not possible in D1.

Admittedly, the embodiments disclosed in the patent specification show a different structure of the shock absorber assembly than what is known from D1. However, novelty of the subject-matter of claim 1 has to be assessed on the basis of the claimed features. The board finds that the wording of claim 1 as granted neither requires a rigidity to be preselected by the driver under static conditions, nor independent means for varying independently configuration and rigidity of the shock absorber assembly. Moreover, the wording of granted claim 1 does not exclude a dynamic variation of rigidity, possibly with some time lapse, in reaction to sensing vertical acceleration of the wheel assembly, as known from D1 and argued further above.

1.8 Further arguments provided by the respondent in this respect, referring to a delayed and allegedly slow reaction of the hydraulic piston cylinder in D1 after having detected a displacement of the support arms or

an external force (or shock), could not convince the board either.

A progressive or variable spring characteristic which is an intrinsic characteristic of a spring element might be different from what is shown in D1, as argued by the respondent. Moreover, the dynamic of the shock (displacement) transmission from the wheel to the frame in D1 might be faster than the counter reaction of the hydraulic system of the piston. However, the board does not follow the respondent's argument that the effect of the system of D1 was not a progressive and dynamically variable spring characteristic curve of the torsion bar or of torsion bar springs. As already argued above, feature M5 does not require a variable-rigidity torsion bar or spring per se, but a variable rigidity of the shock absorber assembly which is not further defined in claim 1 and does not exclude a delayed reaction under dynamic conditions as known from D1. The behaviour of D1's system of piston-cylinder units and torsion bars (together constituting the shock absorber assembly) in reaction to external forces results in a displacement as if a progressive spring characteristic would be provided. The term "*to adjust the wheel assemblies*" in feature M5 does not change anything in this respect.

1.9 As regards the respondent's doubts raised during the oral proceedings on how to implement the teaching given in paragraph [0052] of D1, leaving open when and for how long to apply the counter force, the board cannot see that the skilled reader reading this paragraph does not understand how the active suspension works. As shown above, it is explicitly described in D1 that by applying a counter force to the torsion bar the wheel displacement in vertical direction relative to the

frame is reduced ("*starkes Einfedern verhindern*") in reaction to a force applied to the wheel.

1.10 In view of the above, the board concludes that D1 also shows a "variable-rigidity shock absorber assembly" within the meaning of feature M5 so that novelty of claim 1 as granted has to be denied.

First auxiliary request

2. Amendments

2.1 The amendments made to claim 1 in the first auxiliary request correspond to the limitation provided in claim 6 of the main or first auxiliary request, which was found allowable by the opposition division. The subject-matter of claim 1 is limited to a plurality of sensors including (apart from a speed sensor and a steering angle sensor) pressure sensors for acquiring signals correlated to the rigidity of the shock absorber assembly, and a control unit configured to calculate an operating state signal as a function of these plurality of signals and to adjust the rigidity of the shock absorber assembly as a function of the operating state signal.

2.2 The amendments satisfy the requirements of Articles 84 and 123 EPC.

2.2.1 The appellant did not raise objections under Article 84 or 123(2) EPC, but raised an objection against claim 1 under Article 123(3) EPC. According to the appellant claim 1 was directed to a ski slope snow groomer. In order to enable a control of its driving and working functions, such a ski slope snow groomer comprised a plurality of sensors fixed to the vehicle, including

inclinometers indicating lateral and longitudinal tilt of the vehicle. These inclinometers were mounted to the vehicle, irrespective of whether they were needed for calculating an operating state signal, but were deleted in claim 1 of the first auxiliary request, resulting in an extension of the scope of protection.

2.2.2 The board cannot follow the appellant's argument. The subject-matter claimed is defined by the features of claim 1, and the wording of claim 1 does not specify any mounting of sensors to the ski slope snow groomer. In claim 1 as granted, the pressure sensors and the lateral and longitudinal inclinometer (features M10 to M12) are specified merely as optional features in view of feature M9 reciting "*at least one sensor selected from*". As a consequence, claim 1 as granted corresponds to a set of independent claims specifying either one or two or three of these sensors. Each independent claim affords a respective scope of protection, and deletion of features M11 and M12 results in a scope of protection as defined by only one of the independent claims among the set of independent claims covered by claim 1 as granted, i.e. results in a limitation of the scope of protection as granted.

Therefore, the board cannot see any violation of Article 123(3) EPC.

3. Novelty (Article 54(1) EPC)

3.1 The subject-matter of independent claims 1 and 6 according to the first auxiliary request is new over document D1 (Article 54(1) EPC).

3.2 Independent claim 1 - novelty:

3.2.1 The appellant argued that pressure sensors according to feature M10 of claim 1 were implicitly disclosed in D1 (see paragraphs [0016] and [0017]: "*Sensoren zum Erfassen ... aus der Tragarmauslenkung abgeleitbaren Größen*"; "*die Steuereinheit die Verstellmittel in Abhängigkeit ... von der Tragarmauslenkung ableitbarer Größen ansteuert*"; also paragraph [0052]). The piston-cylinder units in D1 were connected to the support arms, so the skilled person would read pressure sensor from deflection sensor in D1 (and pressure changes from deflection) because a pressure sensor was a sensor which detected values derivable from the deflection of the support arm. The hydraulic cylinders in the active suspension of D1 (paragraph [0052]) provided a counter force which had to be measured, and such control did not work without and thus required pressure sensors.

3.2.2 However, the board cannot see that pressure sensors (i.e. sensor devices designed to detect a pressure value) are directly and unambiguously disclosed in D1. There is no teaching in D1 supporting that pressure sensors were necessary in D1 in order to actuate or control the hydraulic cylinders. D1 only discloses sensors which detect quantities derivable from support arm deflection, such as displacement or acceleration, i.e. sensors detecting disturbances caused by the surface the snow groomer is running on. In reaction to such disturbances, the hydraulic cylinders are actuated in D1 to provide a counter force. Without further details on the control of the hydraulic cylinders in D1, e.g. whether a feed-forward control is applied or a feed-back control which might require pressure sensors, it cannot be concluded that pressure sensors are implicitly known from D1. Feature M10 further requires pressure sensors for acquiring signals correlated to the rigidity of the shock absorber assembly, i.e.

pressure sensors which detect the status of "rigidity" and thus a specific condition of the shock absorber assembly. This means that a specific characteristic of the shock absorber assembly (the rigidity is defined by the ratio of force versus displacement) must be known which allows to estimate a displacement in reaction to an applied force, which is not known from D1. It also follows that D1 does not disclose an operating state signal as a function of signals of the pressure sensors and adjusting the rigidity of the shock absorber assembly as a function of the operating state signal, as now required by features M16 and M17.

Thus novelty of the subject-matter of claim 1 according to the first auxiliary request has to be acknowledged.

3.3 Independent claim 6 - novelty:

3.3.1 As regards method claim 6, the appellant further argued that it only required "*signals indicating the operating pressures of the shock absorber devices*", i.e. not necessarily pressure signals but signals which indicated (e.g. indirectly) the functioning of the shock absorbers devices (e.g. application of a counter force), as provided by sensors detecting the deflection of the support arms. Moreover, the appellant referred again to paragraph [0052] in D1. Pressure sensors of the piston-cylinder units could detect deflection of the support arms; corresponding pressure changes were to be considered as values derivable from the deflection of the support arm. The piston-cylinder units in D1 were controlled via pressure changes to have a progressive and dynamically variable spring characteristics. Although D1 only showed acceleration or deflection sensors, the respective signals were used

for controlling the hydraulic units so that features M27, M28, M33, M36 were known from D1.

3.3.2 D1 might disclose that a large deflection of support arms leads to an actuation of hydraulic cylinders, implying - as a result - an increased pressure of hydraulic cylinders, whereby the rigidity of the shock absorber assembly is increased. The deflection detected in D1 might therefore be indicative of a counter force to be applied or a pressure of the hydraulic cylinder after actuation, but does not indicate the operating pressure of the hydraulic cylinders to be considered when controlling the pressure of the hydraulic cylinders to adjust the rigidity of the shock absorber assembly, as required by the wording of claim 6. Method claim 6 defines a sequence of steps according to which the rigidity of the shock absorber assembly is adjusted as a function of an operating state signal (feature M36) which includes signals indicating the operating pressures (feature M33) of the shock absorber devices as acquired beforehand (features M27, M28). The operating pressure as defined in claim 6 is an input value to the control of adjusting the rigidity of the shock absorber assembly, which is not known from D1.

Therefore, the subject-matter of claim 6 according to the first auxiliary request is also new over D1.

4. Inventive step (Article 56 EPC)

4.1 The subject-matter of claims 1 and 6 of the first auxiliary request involves an inventive step and complies with Article 56 EPC.

4.2 The appellant argued that hydraulic cylinders could only be controlled by changing the hydraulic pressure,

so it was obvious to monitor the hydraulic pressure in the piston-cylinder units of D1 using pressure sensors. Moreover, it was allegedly common practice to indicate operating pressures of shock absorber devices. An active suspension control (as specified in claim 6) required sensors detecting values derivable from the deflection of the support arms. D1 showed piston-cylinder units which had to be actuated by applying an operating pressure. Each piston-cylinder unit had to provide a signal detecting its operating pressure, so it was obvious to provide pressure sensors.

4.3 However, the active suspension known from D1 only operates in reaction to a deflection of the wheel support arms detected by displacement or acceleration sensors, i.e. in reaction to disturbances caused by the wheel or the road surface. The board is not convinced that the skilled person would be tempted to use pressure sensors for acquiring signals correlated to the rigidity of the shock absorber assembly, or to use signals indicating an operating pressure of the shock absorber devices, in the way as required by the wording of claims 1 and 6. The claimed invention does not merely require monitoring of the operating pressures of hydraulic actuators, or providing pressure sensors for each piston-cylinder unit, as argued by the appellant. Both in claim 1 and claim 6, the rigidity of the shock absorber assembly is adjusted as a function of an operating state signal, which takes into account the actual status of rigidity of the shock absorber assembly (as determined by the operating pressures of the shock absorber devices). Such kind of adjustment or control - which was referred to by the respondent as adaptive suspension - is not suggested by D1.

As to arguments raised by the appellant with respect to novelty further above, the board can also not see why the skilled person would consider replacing the acceleration or deflection sensors of the support arms by pressure sensors of the piston-cylinder units of D1. Moreover, pressure sensors are not indispensable for realising a control as known from D1 which provides a counter force in reaction to road disturbances.

4.4 It follows from the above that the subject-matter of claims 1 and 6 according to the first auxiliary request involves an inventive step (Article 56 EPC). Similar considerations apply also in respect of dependent claims 2-5 and 7-10.

5. Remittal to first instance (Article 111(1) EPC)

The claims according to the first auxiliary request are found to meet the criteria of patentability. However, the description still requires to be adapted, a task that the Board does not consider straightforward.

Therefore, the board considers it appropriate to exercise its discretion under Article 111(1) EPC and remit the case to the department of first instance to bring the description into line with the claims. This course of action was also agreed upon by the parties during the oral proceedings before the board.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.

2. The case is remitted to the department of first instance with the order to maintain the patent in amended form on the basis of the claims 1 to 10 of the first auxiliary request as filed with letter dated 2 May 2017 and a description and drawings to be adapted thereto.

The Registrar: The Chairman:

A. Vottner G. Pricolo

Decision electronically authenticated