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Case Number: T 1096/16 - 3.2.08

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Title of invention:
Shift mechanism, transmission and vehicle equipped therewith

Applicant:
Yamaha Hatsudoki Kabushiki Kaisha

Headword:

Relevant legal provisions:
EPC Art. 76(1), 123(2)

Keyword:
Divisional application - added subject-matter (no) - after amendment
Amendments - extension beyond the content of the application as filed (no)

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Catchword:

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Case Number: T 1096/16 - 3.2.08

D E C I S I O N
of Technical Board of Appeal 3.2.08
of 3 December 2019

Appellant: (Applicant)	Yamaha Hatsudoki Kabushiki Kaisha 2500 Shingai Iwata-shi, Shizuoka-ken 438 (JP)
Representative:	Zimmermann, Tankred Klaus Schoppe, Zimmermann, Stöckeler Zinkler, Schenk & Partner mbB Patentanwälte Radlkoferstrasse 2 81373 München (DE)
Decision under appeal:	**Decision of the Examining Division of the European Patent Office posted on 25 January 2016 refusing European patent application No. 13156361.1 pursuant to Article 97(2) EPC.**

Composition of the Board:

Chairman	M. Alvazzi Delfrate
Members:	M. Foulger
	C. Schmidt

Summary of Facts and Submissions

I. With the decision dated 25 January 2016, the examining division refused the European application No. 13156361.1. They found that the application did not meet the requirements of Articles 76(1) and 123(2) EPC, in particular that claim 1 of the then valid request contained subject-matter which went beyond that of both the earlier application and the application as originally filed.

II. The applicant filed an appeal against this decision.

III. The appellant (applicant) requests that the decision be set aside and the case be remitted to the examining division for further prosecution based on the claims filed with the letter dated 17 September 2019.

IV. Claim 1 of the current request reads:

"A shift mechanism for moving shift forks (141-144) connected to a gear of a transmission (7) and for changing a gear position of the transmission (7), the shift mechanism comprising:
a shift cam (14) that has, on an outer peripheral surface, cam grooves (14a-14d) to which the shift forks (141-144) are connected, the shift cam (14) configured to rotate at a predetermined rotation angle and to move the shift forks at a certain rotation angle, wherein a plurality of groove sections (145) are formed in one end of the outer peripheral surface of shift cam (14), and wherein a throughhole (146) is formed in the center part of one side surface of the shift cam (14);
a cam phase holding means configured to hold the shift cam (14) at the certain rotation angle;
a rotating means configured to rotate in forward and

reverse directions from a reference position, and to rotate and to move the shift cam (14) through the certain rotation angle;
a transferring means configured to rotate in response to a motor rotation, in one of the forward and reverse directions from the reference position, and to transfer the rotation to the rotating means thereby rotating the rotating means;
a regulating means configured to, while the transferring means rotates in one direction, regulate the rotation of the rotating means until a predetermined rotation angle is reached, and to allow the rotation of the rotating means at or above the certain rotation angle;
a bias accumulating means comprising a torsion spring (808) configured to increase a bias following an increase in a rotation angle of the transferring means in the one direction; and
an accumulated torque releasing means (804,805) configured to release, when the rotation angle of the transferring means reaches the predetermined rotation angle, the bias accumulated in the biasing means and to transfer torque to the transferring means,
wherein the cam phase holding means comprises:
a first rotating member (801) having a small-diameter cylindrical section (811) and a large-diameter cylindrical section (812), wherein a plurality of projecting sections (813) are formed on the outer peripheral surface of the first rotating member (801) so as to project radially outward, and wherein concave sections (814) are formed by adjacent projecting sections (813) in the circumferential direction,
wherein a throughhole (815) is formed in the center part of a side surface of cylindrical section (811),
wherein one end of a positioning shaft (802) is inserted into the throughhole (146) of the shift cam

(14) and the throughhole (815) of the first rotating member (801) so that a rotation axis of the shift cam (14) and a rotation axis of first rotating member (801) are provided on the same axis line, and wherein the cylindrical section (811) and the shift cam 14 are coupled so that the shift cam (14) and the first rotating member (801) rotate integrally;
a first spring (791) and a second spring (792);
a first moving member (793) abutting against one end of the first spring (791) and provided so as to be movable in an axial direction of the first spring (791), and a second moving member (794) abutting against one end of the second spring (792) and provided so as to be movable in an axial direction of the second spring (792); and
a first ball (795) provided between the first moving member (793) and one end of the outer peripheral surface of the shift cam (14), the first ball (795) biased toward the shift cam (16) by the first spring (791) via the first moving member (793), and a second ball (796) provided between the second moving member (794) and the outer peripheral surface of the first rotating member (801), the second ball (796) biased toward the first rotating member (801) by the second spring (792) via the second moving member (794);
wherein the rotating means comprises:
a second rotating member (803) having a rotor (831) and a shaft section (832) formed so as to extend in the axial direction of the rotor (831), wherein a cylindrical hole (833) is formed in the axial center section of rotor (831), wherein the rotor (831) includes a first ratchet (301) accommodated inside the cylindrical section (812) of the first rotating member (801), a second ratchet (302), and a cylindrical coupling section (303) that is provided so as to couple the first ratchet (301) and the second ratchet (302),

wherein first lug plates (834,835) are attached to the first ratchet 301, and second lug plates (836,837) are attached to the second ratchet (302), and wherein the other end of the positioning shaft (802) is inserted into the hole (833) so that the rotation axis of the shift cam (14), the rotation axis of the first rotating member (801), and the rotation axis of the second rotating member (803) are provided on the same axis line;
wherein the regulating means comprises:
a disk-shaped regulating member (804) having a first concave section (401) formed in a center part of a first surface of regulating member (804), a second concave section (402) formed in the center part of a second surface of the regulating member (804) opposed to the first surface, and a latch section (841) formed on the regulating member (804) so as to extend upward from the center part, wherein the coupling section (303) of the second rotating member (803) is fitted into latch section (841); and
a third rotating member (805) having a first cylindrical section (851), a second cylindrical section (852), and a third cylindrical section (853), the second rotating member (803) provided rotatably inside the third rotating member (805), the second ratchet (302) accommodated inside the first cylindrical section (851), and one end of the shaft section (832) projecting from one end of third cylindrical section (853);
wherein the transferring means comprises:
the third rotating member (805); and
a first transferring member (807) having a disk-shaped main unit (871), a coupling section (872), and a plate-shaped latch section (873) formed on the coupling section (872), wherein the main (871) is fixed to the third cylindrical section (853) in the third rotating

member (805), and the coupling section (872) is for coupling to one end of a drive mechanism (41);
wherein the accumulated torque releasing means comprises the regulating member (804) and the third rotating member (805).
wherein the rotating means further comprises a second transferring member (809) having a disk-shaped main unit (891) fixed to one end of the shaft section (832) of the second rotating member (803), and a latch section (892), wherein one end of the main unit (871) of the first transferring member (807) and one end of the main unit (891) of the second transferring member (809) are fitted inside the inner diameter of the torsion spring (808) so that the main unit (871) of the first transferring member (807) and the main unit (891) of the second transferring member (809) become the rotation axis of torsion spring (808), and wherein a latch section (873) of the first transferring member (807) and the latch section (892) of the second transferring member (809) are provided between first and second latch sections (881,882) of the torsion spring (808)."

V. The appellant argued essentially that amended claim 1 did not contain subject-matter which went beyond that of either the earlier application or the application as originally filed. In particular, the amendments overcame all the objections of unallowable intermediate generalisations raised by the examining division. The requirements of Articles 76(1) and 123(2) EPC were therefore fulfilled.

Reasons for the Decision

1. Claim 1 of the current (main-)request does not contain subject-matter which goes beyond that of either the earlier application or the application as originally filed and thus is allowable under Articles 123(2) and 76(1) EPC.

1.1 In the following references are to the published versions of the earlier application and the application as originally filed. The current application has the same description as the earlier application.

1.2 Below claim 1 is copied with the basis in the earlier application given in bold (paragraph references apply equally to the application as originally filed):

A shift mechanism for moving shift forks (141-144) connected to a gear of a transmission (7), **(paragraph [0016])** the shift mechanism comprising:
a shift cam (14) that has, on an outer peripheral surface, cam grooves (14a-14d) to which the shift forks (141-144) are connected, the shift cam (14) configured to rotate at a predetermined rotation angle and to move the shift forks at a certain rotation angle **(paragraph [0016])**, wherein a plurality of groove sections (145) are formed in one end of the outer peripheral surface of shift cam (14) **(paragraph [0321])**, and wherein a throughhole (146) is formed in the center part of one side surface of the shift cam (14) **(paragraph [0321])**;
a cam phase holding means configured to hold the shift cam (14) at the certain rotation angle **(paragraph [0016])**;
a rotating means configured to rotate in forward and reverse directions from a reference position, and to rotate and to move the shift cam (14) through the

certain rotation angle **(paragraph [0016])**;
a transferring means configured to rotate in response to a motor rotation, in one of the forward and reverse directions from the reference position, and to transfer the rotation to the rotating means thereby rotating the rotating means **(paragraph [0016])**;
a regulating means configured to, while the transferring means rotates in one direction, regulate the rotation of the rotating means until a predetermined rotation angle is reached, and to allow the rotation of the rotating means at or above the certain rotation angle **(paragraphs [0016] and [0440])**;
a bias accumulating means comprising a torsion spring (808) configured to increase a bias following an increase in a rotation angle of the transferring means in the one direction **(paragraph [0016])**; and
an accumulated torque releasing means (804,805) configured to release, when the rotation angle of the transferring means reaches the predetermined rotation angle, the bias accumulated in the biasing means and to transfer torque to the transferring means **(paragraph [0016])**,
wherein the cam phase holding means comprises:
a first rotating member (801) having a small-diameter cylindrical section (811) and a large-diameter cylindrical section (812) **(paragraph [0323], 1st sentence)**,
wherein a plurality of projecting sections (813) are formed on the outer peripheral surface of the first rotating member (801) so as to project radially outward **(paragraph [0323], 2nd sentence)**,
and wherein concave sections (814) are formed by adjacent projecting sections (813) **(paragraph [0323])** in the circumferential direction,
wherein a throughhole (815) is formed in the center part of a side surface of cylindrical section (811)

(paragraph [0324]),
wherein one end of a positioning shaft (802) is inserted into the throughhole (146) **(paragraph [0325], 1st sentence)** of the shift cam (14) and the throughhole (815) of the first rotating member (801) so that a rotation axis of the shift cam (14) and a rotation axis of first rotating member (801) are provided on the same axis line **(paragraph [0325], 2nd sentence),** and wherein the cylindrical section (811) and the shift cam 14 are coupled so that the shift cam (14) and the first rotating member (801) rotate integrally **(paragraph [0325], final sentence);**
a first spring (791) and a second spring (792) **(paragraph [0327), 6th sentence);**
a first moving member (793) abutting against one end of the first spring (791) **(paragraph [0326], 2nd sentence)** and provided so as to be movable in an axial direction of the first spring (791), and a second moving member (794) abutting against one end of the second spring (792) and provided so as to be movable in an axial direction of the second spring (792) **(paragraph [0326], 3rd sentence);** and
a first ball (795) provided between the first moving member (793) and one end of the outer peripheral surface of the shift cam (14), the first ball (795) biased toward the shift cam (14) by the first spring (791) via the first moving member (793) **(paragraph [0327]),** and a second ball (796) provided between the second moving member (794) and the outer peripheral surface of the first rotating member (801), the second ball (796) biased toward the first rotating member (801) by the second spring (792) via the second moving member (794) **(paragraph [0327], 4th sentence);**
wherein the rotating means comprises:
a second rotating member (803) having a rotor (831) and a shaft section (832) formed so as to extend in the

axial direction of the rotor (831), wherein a cylindrical hole (833) is formed in the axial center section of rotor (831) **(paragraph [0328])**, wherein the rotor (831) includes a first ratchet (301) accommodated inside the cylindrical section (812) of the first rotating (801), a second ratchet (302), and a cylindrical coupling section (303) that is provided so as to couple the first ratchet (301) and the second ratchet (302) **(paragraph [0329] & paragraph [0331], final sentence)**,
wherein first lug plates (834,835) are attached to the first ratchet 301, and second lug plates (836,837) are attached to the second ratchet (302) **(paragraph [0330])**, and wherein the other end of the positioning shaft (802) is inserted into the hole (833) so that the rotation axis of the shift cam (14), the rotation axis of the first rotating member (801), and the rotation axis of the second rotating member (803) are provided on the same axis line **(paragraph [0331])**;
wherein the regulating mans comprises:
a disk-shaped regulating member (804) having a first concave section (401) formed in a center part of a first surface of regulating member (804), a second concave section (402) formed in the center part of a second surface of the regulating member (804) opposed to the first surface **(paragraph [0332])**,
and a latch section (841) formed on the regulating member (804) so as to extend upward from the center part, wherein the coupling section (303) of the second rotating member (803) is fitted into latch section (841) **(paragraph [0333])**; and
a third rotating member (805) having a first cylindrical section (851), a second cylindrical section (852), and a third cylindrical section (853), the second rotating member (803) provided rotatably inside the third rotating member (805), the second ratchet

(302) accommodated inside the first cylindrical section (851), and one end of the shaft section (832) projecting from one end of third cylindrical section (853) **(paragraph [0334]);**
wherein the transferring means comprises:
the third rotating member (805); and
a first transferring member (807) **(paragraph [0338], 3rd sentence)** having a disk-shaped main unit (871), a coupling section (872), and a plate-shaped latch section (873) formed on the coupling section (872) **(paragraph [0337]),**
wherein the main unit (871) is fixed to the third cylindrical section (853) in the third rotating member (805), **(paragraph [0338], 1st sentence)** and the coupling section (872) is for coupling to one end of a drive mechanism (41)**(paragraph [0338], 2nd sentence);**
wherein the accumulated torque releasing means comprises the regulating member (804) and the third rotating member (805),**(paragraph [0340], 3rd sentence)**
wherein the rotating means further comprises a second transferring member (809) **(paragraph [0340])** having a disk-shaped main unit (891) fixed to one end of the shaft section (832) of the second rotating member (803), and a latch section (892) **(paragraphs {0340] and [0341]),** wherein one end of the main unit (871) of the first transferring member (807) and one end of the main unit (891) of the second transferring member (809) become the rotation axis of torsion spring (808) **(paragraph [0341]),** and wherein a latch section (873) of the first transferring member (807) and the latch section (892) of the second transferring member (809) are provided between first and second latch sections (881,882) of the torsion spring (808) **(paragraph [0342]).**

1.3 The finding that the current claim satisfies the requirements of Article 123(2) EPC is not precluded by the fact that not all features from the description paragraphs referred to above have been included in this claim:

- in paragraph [0323] it is mentioned that the projecting sections have an "approximately triangular cross-section". The Board does not consider it necessary to include this extra information in claim 1 because the essential aspect is that the parts project radially outward from the surface of the first rotating member. It is this that enables the second ball (which according to the claim is biased toward the first rotating member) to engage with the first rotating member (see fig. 31).
- paragraph [0325] specifies that latch member 822 is fitted into latch hole 816 - this has the consequence that the shift cam and the first rotating member rotate integrally, which is specified in the claim (middle of p. 2).
- paragraph [0337] describes the coupling section 872 as extending upward from the outer periphery of main unit 871. It is however clear from the claim that the coupling section implicitly extends radially away from the main unit 871 because the claim specifies (p. 4) that it is for coupling to the drive mechanism 41.
- the second transferring member comprises a disk-shaped main unit and a latch section wherein the latch section 892 is provided between the latch sections of the torsion spring 808 (final feature of claim 1) and one end of the disk-shaped main unit 891 is fitted inside the torsion spring. It is therefore implicit in the claim that the latch section has an L-shaped cross-section as mentioned in paragraph [0340].

2. Therefore, the subject-matter of claim 1 is clearly and unambiguously derivable from the earlier application (Article 76(1) EPC). As the description of the current application corresponds to that of the earlier application, the subject-matter of claim 1 is equally clearly and unambiguously derivable from the application as originally filed (Article 123(2) EPC).

3. As the decision under appeal dealt solely with Articles 76(1) and 123(2) EPC the Board remits the case to the examining division in accordance with the appellant's request.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.

2. The case is remitted to the examining division for further prosecution.

The Registrar: The Chairman:

C. Moser M. Alvazzi Delfrate

Decision electronically authenticated