

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Volkswagen Group of America, Inc.,
Petitioner

v.

Michigan Motor Technologies LLC,
Patent Owner

Case IPR2020-00446
Patent No. 6,763,804

PATENT OWNER'S MOTION TO AMEND

Under 35 U.S.C. § 42.121

Mail Stop PATENT BOARD
Patent Trial and Appeal Board
U.S. Patent and Trademark Office
P.O. Box 1450
Alexandria, VA 22313-1450
Submitted Electronically via PTAB E2E

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TABLE OF EXHIBITS

Exhibit	Description
2001	Expert Declaration of Dr. Russell Leonard

I. INTRODUCTION

Michigan Motor Technologies LLC (“MMT” or “Patent Owner”) hereby moves under 35 U.S.C. § 316(d) and 37 C.F.R. § 42.121 to amend U.S. Patent No. 6,763,804 (“the ’804 patent”), contingent on the outcome of this trial.

II. STATEMENT OF RELIEF REQUESTED

To the extent the Board finds any of the challenged claims 1-20 of the ’804 patent unpatentable in this proceeding, Patent Owner respectfully requests that the Board grant this motion to amend with respect to the substitute claim presented with this Motion. Patent Owner respectfully requests that the Board not consider this Motion for each of the original challenged claims it finds patentable.

Further, Patent Owner requests that the Board issue preliminary guidance on its Motion.

III. SUBSTITUTE CLAIM

Patent Owner hereby respectfully submits and requests admittance and entry of the instant Motion to Amend and the single “Substitute Claim” 21 presented herewith under the provisions of 35 U.S.C. § 316(d) and 37 C.F.R. 42.121. Specifically, Patent Owner has (1) submitted only a single “Substitute Claim” herein and thus meets the requirement of proposing a reasonable number of substitute claims, (2) the amendment/“Substitute Claim” narrows the scope of issued claim 1 of the ’804 patent and thus, meets the requirement of not enlarging

the scope of the claims, (3) the proposed “Substitute Claim” is fully supported by the original disclosure of the patent as shown herein, and (4) the amendment responds to grounds of unpatentability set forth by both the Petitioner in its Petition as well as the same or very similar grounds of unpatentability set forth by the Board in its Decision to Institute. Patent Owner’s position is that there is no plausible combination of any of the prior art references relied upon by Petitioner or the Board that could possibly render obvious the “Substitute Claim” submitted herein.

A. Substitute Claim 21

21. (substitute for claim 1, if found unpatentable) A method for controlling a positioning device of an internal combustion engine, the method comprising the steps of:

providing an electric motor for actuating the positioning device;

detecting whether a control effort required to change a position of the positioning device has exceeded a first limit for at least a first predetermined time period;

in the event the control effort is detected to have exceeded the first limit for at least the first predetermined time period, commanding the positioning device to change to a first commanded hold open position;

detecting [a] the control effort required to change to said first commanded hold open position;

determining whether said control effort exceeds a first threshold for a second predetermined time period; and

reducing said control effort when said control effort exceeds said first threshold for said second predetermined time period;

detecting whether the control effort has exceeded a second limit for at least a third predetermined time period;

in the event the control effort is detected to have exceeded the second limit for at least the third predetermined time period, commanding the positioning device to change to a second commanded hold close position;

detecting [a] the control effort required to change to said second commanded hold close position;

determining whether said control effort exceeds a second threshold for a third predetermined time period; and

reducing said control effort when said control effort exceeds said second threshold for said third predetermined time period.

~~wherein commanding the positioning device to change to said commanded position comprises at least one of commanding the positioning device to open to a hold open mode and commanding the positioning device to open to a hold open mode and commanding the positioning device to close to a hold close mode.~~

B. Support for Substitute Claim 21

All the limitations set forth in Substitute Claim 21 can be found in the flow chart depicted in FIG. 2 of the application as originally filed (Ex. 1002, 0026), and the associated description thereof in the application as originally filed (Ex. 1002, 0012-0016 (paragraphs [0017]-[0027]) (which corresponds to the '804 patent at 3:21-4:59)), in conjunction with FIG. 1 of the application as originally filed (Ex.

1002, 0025), and the associated description thereof in the application as originally filed (Ex. 1002, (paragraphs [0011]-[0012])) of the application as originally filed (which corresponds to the '804 patent at 2:43-3:20), as well as the claims as originally filed (Ex. 1002, 0018-0021), as set forth in detail below.

Claim Limitation	Support for Substitute Claim 21 in the original disclosure of U.S. Patent App. No. 09/973,030 (Ex. 1002)
21. A method for controlling a positioning device of an internal combustion engine, the method comprising the steps of:	[0007] “In one embodiment of the invention, a method for controlling a positioning device associated with internal combustion engine control is provided.” (Ex. 1002, 0009.) “ABSTRACT [0030] A method for controlling a positioning device (34) of an internal combustion engine includes the step of providing an electric motor (30) for actuating a positioning device (34)”. (Ex. 1002, 0022.) Claim 1 (Ex. 1002, 0018). FIG. 1 (Ex. 1002, 0025).
providing an electric motor for actuating the positioning device;	[0007] “In one embodiment of the invention, a method for controlling a positioning device associated with internal combustion engine control is provided. In accordance with the method, an electric motor actuates the positioning device.” (Ex. 1002, 0009.) ASBTRACT; “A method for controlling a positioning device (34) of an internal combustion engine includes the step of providing an electric motor (30) for actuating a position device (34)”. (Ex. 1002, 0022.) Claim 1 (Ex. 1002, 0018). FIG. 1 (Ex. 1002, 0025).

Claim Limitation	Support for Substitute Claim 21 in the original disclosure of U.S. Patent App. No. 09/973,030 (Ex. 1002)
<u>detecting whether a control effort required to change a position of the positioning device has exceeded a first limit for at least a first predetermined time period;</u>	Decision box 42 of the flow chart depicted in FIG. 2 of the application as originally filed (Ex. 1002, 0026). Claim 1 (Ex. 1002, 0018). FIG. 2 (Ex. 1002, 0026). [0017] “In step 42, the controller preferably determines if the control effort has been more positive than a predetermined time limit for at least a predetermined time period.” (Ex. 1002, 0012-0013).
<u>in the event the control effort is detected to have exceeded the first limit for at least the first predetermined time period,</u> commanding the positioning device to change to a <u>first</u> commanded <u>hold open</u> position;	Action block 44 of FIG. 2 (Ex. 1002, 0026). Claim 1 (Ex. 1002, 0018). FIG. 2 (Ex. 1002, 00126). [0017] “In step 42, the controller preferably determines if the control effort has been more positive than a predetermined limit for at least a predetermined time period. ... If the predetermined threshold has been exceeded, then the sequence proceeds to step 44. [0018] A hold open mode is initiated at step 44 and the[n] immediately continued in step 46.” (Ex. 1002, 0012-0013.)
detecting [a] <u>the</u> control effort required to change to said <u>first</u> commanded <u>hold open</u> position;	Decision block 46 of FIG. 2 (Ex. 1002, 0026). Claim 1 (Ex. 1002, 0018). FIG. 2 (Ex. 1002, 0026). [0018] “In step 46, the controller preferably determines if it has called for the hold open mode for less than a hard open time period.” (Ex. 1002, 0013.)

Claim Limitation	Support for Substitute Claim 21 in the original disclosure of U.S. Patent App. No. 09/973,030 (Ex. 1002)
determining whether said control effort exceeds a <u>first</u> threshold for a <u>second</u> predetermined time period; and	Decision block 46 of FIG. 2 (Ex. 1002, 0026). Claim 1 (Ex. 1002, 0018). FIG. 2 (Ex. 1002, 0026). [0018] “In step 46, the controller preferably determines if it has called for the hold open mode for less than a hard open time period.” (‘804 patent at 3:34-36) (Ex. 1002, 0013).
reducing said control effort when said control effort exceeds said <u>first</u> threshold for said <u>second</u> predetermined time period;	Action block 50 of FIG. 2 (Ex. 1002, 0026). Claim 1 (Ex. 1002, 0018). FIG. 2 (Ex. 1002, 0026). [0020] “In step 50, the controller preferably reduces the opening control effort applied to the motor to a moderate opening control effort. The moderate opening control effort can be applied to the motor for an indefinite period of time without permitting the motor to overheat.” (Ex. 1002, 0014.)
<u>detecting whether the control effort has exceeded a second limit for at least a third predetermined time period;</u>	Decision block 52 of FIG. 2 (Ex. 1002, 0026). Claim 1 (Ex. 1002, 0018). FIG. 2 (Ex. 1002, 0026). [0022] “In step 52, the controller preferably determines if the control effort has been more negative than a predetermined time limit for at least a predetermined time period.” (Ex. 1002, 0015)

Claim Limitation	Support for Substitute Claim 21 in the original disclosure of U.S. Patent App. No. 09/973,030 (Ex. 1002)
<u>in the event the control effort is detected to have exceeded the second limit for at least the third predetermined time period,</u> commanding the positioning device to change to a <u>second</u> commanded <u>hold close</u> position;	Decision block 52 and action block 54 of FIG. 2 (Ex. 1002, 0026). Claim 1 (Ex. 1002, 0018). FIG. 2 (Ex. 1002, 0026). [0022] “If the predetermined threshold has been exceeded, then the sequence proceeds to step 54. [0023] A hold close mode is initiated in step 54 and then immediately continued in step 56.” (Ex. 1002, 0015.)
detecting [a] <u>the</u> control effort required to change to said <u>second</u> commanded <u>hold close</u> position;	Decision block 56 of FIG. 2 (Ex. 1002, 0026). Claim 1 (Ex. 1002, 0018). FIG. 2 (Ex. 1002, 0026). [0023] “In step 56, the controller preferably determines if it has called for a hold close mode for less than a hard close time period.” (Ex. 1002, 0015.)
determining whether said control effort exceeds a <u>second</u> threshold for a <u>third</u> predetermined time period; and	Decision block 56 of FIG. 2 (Ex. 1002, 0026). Claim 1 (Ex. 1002, 0018). FIG. 2 (Ex. 1002, 0026). [0023] “In step 56, the controller preferably determines if it has called for a hold close mode for less than a hard close time period.” (Ex. 1002, 0015.)

Claim Limitation	Support for Substitute Claim 21 in the original disclosure of U.S. Patent App. No. 09/973,030 (Ex. 1002)
reducing said control effort when said control effort exceeds said <u>second</u> threshold for said <u>third</u> predetermined time period.	Action block 60 of FIG. 2 (Ex. 1002, 0026). Claim 1 (Ex. 1002, 0018). FIG. 2 (Ex. 1002, 0026). [0025] “In step 60, the controller reduces the closing control effort applied to the motor to a moderate closing control effort. The moderate closing control effort can be applied to the motor for an indefinite period of time without permitting the motor to overheat.” (Ex. 1002, 0015-0016.)
wherein commanding the positioning device to change to said commanded position comprises at least one of commanding the positioning device to open to a hold open mode and commanding the positioning device to open to a hold open mode and commanding the positioning device to close to a hold close mode.	

C. Patentability of Substitute Claim 21

Substitute Claim 21 is clearly patentably distinguishable over all prior art relied upon by Petitioner and the Board thus far in this proceeding. None of the prior art references relied upon by the Petitioner or the Board, and no prior art that

Patent Owner is aware of, discloses commanding the position of the positioning device to a hold open position in the event the control effort is detected to have exceeded a first limit for at least a first predetermined time period, or commanding the position of the positioning device to a hold close position in the event the control effort is detected to have exceeded a second limit for at least a third predetermined time period, much less the other steps recited in Substitute Claim 21.

The primary references that Petitioner relies upon, *Itabashi* and *Matsumoto*, determine whether a throttle valve is jammed or frozen and reduce the current supplied to the throttle motor when such a determination is made. As the Board states:

“*Itabashi* recognizes that ***foreign objects may jam the throttle valve and water may cause the throttle valve to freeze in place***. Ex. 1007, 1:28-37. Providing a high current to the motor under those circumstances may cause harm to the circuits. *Id.* at 1:30-33. ***Therefore, if the length of time that the 100% duty cycle is applied to the motor (in either the moving or braking direction) exceeds the predetermined length, the current supplied to the motor is reduced to a level to reduce heat generation within the circuit***. *Id.* at 7:18-43, 8:25-36. If the throttle does not reach the target position within a second predetermined time length, the current supply to the motor is turned off. *Id.* at 7:60-8:3.” (Paper 9 at 14) (emphasis added).

Thus, if *Itabashi* detects that the throttle valve is frozen or jammed, it reduces the current applied to the throttle motor.

As the Board states:

“Petitioner relies upon Matsumoto’s failure detecting means 70, which Petitioner argues determines whether the throttle valve is stuck by ‘determin[ing] whether a difference between the target throttle position and the actual throttle position exceeds a threshold for a predetermined time period. Pet. 60 (citing Ex. 1003 ¶ 199; Ex. 1008, 14:45-52).” (*Id.* at 38)

As the Board further states:

“Petitioner argues that, *‘[w]hen Matsumoto’s system uses Burney’s limit detection circuit with a timing capacitor, Matsumoto’s system reduces the control effort when the control effort exceeds the threshold for the predetermined time period.’* Pet. 65-66 (citing Ex. 1003 ¶ 96, 207).” (*Id.* at 40) (emphasis added).

As the Board yet further states:

“According to Petitioner, Matsumoto’s ‘throttle valve can get stuck in its fully open position and its fully closed position, indicating, or at least suggesting, the ECU 16 commands the throttle valve to move to these positions.’” (*Id.* at 40).

Thus, even assuming *arguendo* that a POSA would attempt to combine the teachings of *Matsumoto* and *Burney* (using impermissible hindsight in Patent Owner’s view), what would result would be a system just like *Itabashi*’s discussed previously in which the system would detect when the throttle valve is stuck (*e.g.*, at its fully closed or fully open position) by determining when the control effort exceeded some threshold for some predetermined period of time, and, in response to this determination, reduce the control effort applied to the throttle motor.

As the Board states in discussing the invention of the ’804 patent:

“First, the controller determines *if the control effort has been more positive than a predetermined time limit for a predetermined time period* (step 42). *Id.* at 3:26-28. If so, *the system initiates a hold open mode (step 44) in which full voltage is applied in the throttle opening direction to clear or*

crush any small debris obstructing movement of the throttle plate. Id. at 3:31-34, 4:10-12. If the system determines that the throttle plate has been in the hold open mode for longer than a predetermined time period (step 46), then the system reduces the opening control effort to a level that can be maintained indefinitely without causing the motor to overheat (step 50) and the process begins anew. Id. at 3:65-4:7.” (Paper 9 at 5) (emphasis added).

Substitute Claim 21 presented herein more fully captures the essence of the '804 invention as described above by the Board, which is clearly patentable over *Itabashi, Matsumoto* and all other art of record or known to Patent Owner. In essence, in the prior art as represented by *Itabashi, Matsumoto* and others, it is determined whether the throttle valve is stuck (e.g., at a fully closed or fully open position) by determining whether the control effort has exceeded a prescribed threshold for a prescribed period of time, just like the '804 invention does.

However, *after making this determination that the throttle valve is stuck, Itabashi, Matsumoto, and the other prior art known to Patent Owner reduce the current (or control effort) applied to the throttle motor,* whereas, in stark contrast thereto, with the '804 invention as set forth in *Substitute Claim 21*, *after this determination of the throttle valve being stuck is made, rather than reducing the current to the throttle motor, the throttle valve is commanded to either a hold open or hold close position. After being commanded to either the hold open or hold close position in response to detection of the throttle valve being stuck,* the '804 invention as reflected in Substitute Claim 21 determines whether the control

effort exceeds a threshold for a predetermined period of time and, if it does, it reduces the control effort.

IV. CONCLUSION

For at least the above and foregoing reasons, Patent Owner respectfully requests admittance and entry of Substitute Claim 21 presented herein, as well as a finding of patentability thereof.

November 17, 2020

Respectfully submitted,

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Claim Appendix

Proposed amended claims are shown in marked-up form below.

21. A method for controlling a positioning device of an internal combustion engine, the method comprising the steps of:

providing an electric motor for actuating the positioning device;

detecting whether a control effort required to change a position of the positioning device has exceeded a first limit for at least a first predetermined time period;

in the event the control effort is detected to have exceeded the first limit for at least the first predetermined time period, commanding the positioning device to change to a first commanded hold open position;

detecting [a] the control effort required to change to said first commanded hold open position;

determining whether said control effort exceeds a first threshold for a second predetermined time period; and

reducing said control effort when said control effort exceeds said first threshold for said second predetermined time period;

detecting whether the control effort has exceeded a second limit for at least a third predetermined time period;

in the event the control effort is detected to have exceeded the second limit for at least the third predetermined time period, commanding the positioning device to change to a second commanded hold close position;

detecting [a] the control effort required to change to said second commanded hold close position;

determining whether said control effort exceeds a second threshold for a third predetermined time period; and

reducing said control effort when said control effort exceeds said second threshold for said third predetermined time period.

~~wherein commanding the positioning device to change to said commanded position comprises at least one of commanding the positioning device to open to a hold open mode and commanding the positioning device to open to a hold open mode and commanding the positioning device to close to a hold close mode.~~

CERTIFICATE OF SERVICE

I hereby certify that on November 17, 2020, I caused a true and correct copy of the foregoing materials to be served via the Patent Office electronic filing system, and electronic service via email to the following attorneys of record pursuant to Petitioner's consent.

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