

IN THE CANADIAN PATENT OFFICE
DECISION OF THE COMMISSIONER OF PATENTS

Patent application 487,869 having been rejected under Rule 47(2) of the Patent Regulations, the Applicant asked that the Final Action of the Examiner be reviewed. The rejection has consequently been considered by the Patent Appeal Board and by the Commissioner of Patents. The findings of the Board and the ruling of the Commissioner are as follows:

Agent for Applicant

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This decision deals with the Applicant's request for review by the Commissioner of Patents of a Final Action on application serial number 487,869 (Class 310-22), assigned to Matsushita Electric Industrial Co. Ltd. The inventors of the application, entitled "Small Electric Motors," are S. Uda, H. Takao and S. Kondo. The examiner issued a Final Action on December 21, 1989, refusing claims 1 to 16 for lack of inventive ingenuity. A hearing was held on January 15, 1992 at which Mr. Edwin J. Gale, patent agent, represented the Applicant.

The application is directed to electric motors, specifically small electric motors of the type used in tape recorders, video tape recorders and the like, wherein specific organic compounds are used to reduce abnormal operation.

Claim 1 of the application, as refused by the Examiner in the Final Action, reads as follows:

A small electric motor having brushes and a commutator slidably engaged with the brushes, wherein the interior or (sic) the motor is filled with an atmosphere containing the vapour of at least one organic compound having a boiling or sublimation point of 40 to 350°C and being selected from the group consisting of paraffins, mono- or poly-hydric alcohols, ethers, cyclic ethers, esters, ketones, ether alcohols, ester alcohols, aminoalcohols, carboxylic acids, amides, primary, secondary and tertiary amines, imidazoles, imidazolines and monocyclic oxyterpenes.

In the Final Action, the examiner rejected claims 1 to 16 on the grounds of obviousness in view of the following United States patent:

2,703,372 issued March 1, 1955 Savage

The above United States patent relates to means for minimizing brush wear in dynamoelectric machines operating under low humidity conditions. Claim 1 of the United States patent reads as follows:

In an air-cooled electrical machine comprising a current collector device and relatively slidable current collector contact member in engagement with said device, the method of minimizing wear at the area of engagement of said device and member comprising the steps of shielding said area from the cooling air and providing to said shielded area a gaseous medium comprising a vapour.

In the Final Action the examiner stated, in part:

Savage discloses an electric generator having brushes and a commutator. The atmosphere inside the generator contains vapours of organic compounds to reduce brush wear and improve slidability between the brushes and the commutator. These organic compounds are "alcohols, ethers, esthers (sic), ketones, alcohol-ethers, amides and amines (column 4, lines 49-51) provided on a felt (column 9, line 57) or porous metals (column 9, line 58)."

Claims 1 to 16 are rejected because the subject matter thereof lacks inventive ingenuity in view of the patent to Savage, as the difference thereover is held to be obvious to one of ordinary skill in the art to which the alleged invention pertains.

Some of the compounds listed in claims 1 and 16 are disclosed by Savage and the remaining organic compounds in the claims are considered obvious alternatives in view of Savage.

In his last amendment, dated June 13, 1989, the applicant has amended claims 1 and 16 by specifying that the organic compound has a boiling point or sublimation point of 40 to 350°C. This feature is considered obvious because most of today's electric motors operate within these temperature limits and it is clear that if the interior of the motor has to be filled with the vapour of an organic compound, the organic compound selected must have a boiling or sublimation point such that the compound will be vaporized by heat during operation of the motor.

The applicant also argues in his letter dated June 13, 1989 that "the motor disclosed in United States Patent No. 2,703,372 is intended to be used at altitudes of the order of 35,000 feet and more. Therefore the air or gas to be supplied between the brush and the commutator contains oxygen in a low concentration (page 2, lines 5-9)."

Applicant's attention is directed to column 2 lines 10-14 of United States Patent 2,703,372 where it is clearly disclosed that "the invention is applicable to polar regions of the earth, desert regions and test chambers". From this statement, it is clear that this motor is not intended to be used only at altitudes of the order of 35,000 feet and more. The arguments presented by the applicant to explain the effect of a low-oxygen concentration at page 2, lines 25-28 of his last letter ("the organic material is incompletely burnt in the '372 patent, as the concentration of oxygen in the air is small since the motor is to be used at the high altitudes") are in contradiction with the other arguments

presented by the applicant at page 2, lines 10-13 of the same letter ("in the '372 patent, a large energy is supplied to the motor, an organic compound having a large molecular weight of 9,000 can be used and the black material formed is completely burnt").

The applicant also argues that "in the present invention, the generation of such black materials is prevented so as to maintain the electric contact between the brush and the commutator" (applicant's letter dated June 13, 1989 bottom of page 2).

At page 2, lines 4-5, of the disclosure the formation of the black material is defined with the following terms: "a mixture of carbon and metal powder formed between the brushes and the commutator segments" and at page 5, lines 18-20 "probably a mixture with powder abraded from the brush and the commutator".

Savage discloses, at lines 18-21 of column 2, that this invention is particularly applicable to minimize wear of carbonaceous brushes employed as current collector contact members in electrical machines. From this statement it is clear that the invention disclosed by Savage will also reduce the formation of powder abraded from the brushes.

In response to the Final Action, dated June 21, 1990, the applicant states, in part, as follows:

In a prior response to an Examiner's Action, applicant argued that Savage related only to electrical equipment operated at high altitude. As the Examiner correctly pointed out, the Savage disclosure makes it clear that other operating environments were contemplated. In trying to identify the difference of the present invention from Savage, the essential point was unfortunately not expressed. The true difference of the present invention from Savage is that Savage addresses quite a different problem from that of the present invention and there is no reason for a person skilled in the art to believe that the solution to the problem addressed by Savage would be useful as a solution to the problem addressed by the present invention.

The problem addressed by Savage is that of rapid brush wear in electrical equipment of large current capacity when operated in conditions of very low humidity because of the lack of the lubricating effect normally caused by water vapour in the air (see Column 1, lines 56 to 65). The main operating environment of low humidity which Savage contemplated was one of high altitude, and this was the reason this was mentioned in the prior response, but he suggested others (Column 2, lines 6 to 14). In all cases,

however, the message to be derived from Savage on a normal reading of this document is that if you want to operate electrical equipment of large current capacity in an atmosphere of low humidity, you must use water vapour or the vapours of organic materials to provide the necessary lubrication or otherwise brush life will be severely reduced.

The present invention, in contrast, is not necessarily concerned with the problem of what happens in unusual operating conditions of this type and is instead concerned with the formation of "black material" during the operation of electrical machines of small current capacity (such a (sic) motors used for tape recorders and the like) under normal operating conditions. The production of "black material" does not necessarily lead to premature brush wear (although this is often observed), but instead leads to abnormal operating performance which reduces the effectiveness of the equipment even if the brushes are still within acceptable wear tolerances.

The harmful effects of "black material" are believed to be limited to the operation of electrical equipment of small current capacity rather than the equipment of large current capacity of the type disclosed in Savage. Equipment of large current capacity is apparently capable of overcoming any problems caused by "black material."

Following the Hearing, the applicant submitted, on February 16, 1992, clarification with respect to the use of a mixture containing 50% styrene in example 21 of the disclosure, and on February 18, 1992 amendments to the disclosure and claims of the application.

The issue before the Board is whether or not the claimed invention is patentable in view of the above referenced United States patent. Upon reading the Savage reference, the Board extracts the following main points:

- i) the United States patent is concerned with minimizing brush wear or wear between the current collector and the engaging contact member that occurs in larger types of electrical motors and generators, particularly those used in aircraft;
- ii) the problem addressed by the patent is premature brush wear in large electrical motors operating under low humidity environments such as at high altitudes or in a desert; and
- iii) the solution to the problem is to provide a supply of water vapour or vapours of organic compounds to the brush-commutator environment.

The invention disclosed in the instant patent application is concerned with the following:

- i) improving the operational characteristics of small electric motors, particularly wow and flutter problems associated with these motors when used in tape recorders or video tape recorders; and
- ii) preventing the formation of hard, abrasive material occurring under normal operating conditions, which causes the above wow and flutter problems.

The applicants's solution to the above problem is to supply vapours of organic compounds to the brush-commutator environment.

In determining the question of obviousness, the Board turns to the following quotation from Beecham Canada Ltd. v. Procter & Gamble Co. (1982), 61 C.P.R. (2d) 1, wherein it is stated at page 27:

The question to be answered is whether ... an unimaginative skilled technician, in the light of his general knowledge and the literature and information available on the subject available to him ..., would have been led directly and without difficulty to the invention.

The test the Board must apply to the present case is whether a technician skilled in the art of small electric motors and their operation in tape recorders and video tape recorders would, if confronted with wow and flutter problems in the recorders, and given the Savage disclosure, be led directly and without difficulty to apply gaseous organic vapours to such small motors in order to reduce the operational problems associated therewith.

We note that the inventions described in the instant patent application and in the United States patent generally relate to extending the operating life of electrical motors. The basic problems sought to be resolved are, however, quite different. The patent is concerned with brush wear in large motors or generators, whereas the application under consideration is concerned with wow and flutter difficulties found in small motors.

Moreover, the invention in the patent is designed to overcome problems arising from the operation of motors or generators at high altitudes or desert-type of environments having a low humidity, while the invention under consideration is not particularly concerned with that problem since the motor is intended to operate under normal atmospheric conditions. Finally, the lack of lubrication due to low humidity is addressed


in the patent, whereas the invention in the application is concerned with preventing the formation of a hard, abrasive, black material in the contact area between the brush and the commutator of a small motor.

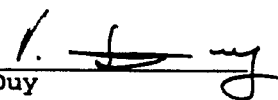
We also note that both the patent and the application under consideration use organic compounds, selected from groups which overlap in the two disclosures, to supply the desired vapour to the brush-commutator area. All of said compounds are old and known in chemistry, and the fact that the same or similar materials are used to solve two distinctly different problems in the operation of electric motors does not by itself lead us to the conclusion that the instant invention is obvious.


Turning to the amended claims submitted on February 18, 1992, we note that the claims have been amended and that the applicant has added statements concerning the use, and operating voltage and current of the motor. Amended claim 1 reads as follows:

A small-size motor of a type comprising brushes and a commutator slidably engaged with the brushes and operated at a voltage of 1 to 30V and with a current not larger than 1A, as used in tape recorders, video tape recorders and the like, a vaporized organic compound being provided in the motor interior, characterized in that the motor interior is filled with an atmosphere containing a vapour of at least one organic compound selected from the groups consisting of mono- or polyhydric alcohols, ethers, cyclic ethers, ketones, ether alcohols, ester alcohols, aminoalcohols, carboxylic acids, amides, primary, secondary and tertiary amines, imidazoles, imidazolines and monocyclic oxyterpenes, the organic compound having a boiling or sublimation point between about 40 and 350°C.

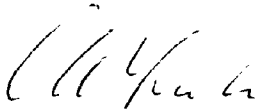
The Board is of the view that the amended claims define the invention over the prior art cited by the examiner in the Final Action. The Board therefore recommends that the amended claims submitted on February 18, 1992 be accepted as overcoming the Examiners's Final Action on the basis of lack of inventive ingenuity.


F.H. Adams
Chairman
Patent Appeal Board


V. Duy
Member
Patent Appeal Board


A. Legris
Member
Patent Appeal Board

I concur with the findings and recommendation of the Patent Appeal Board. I remand the application to the Examiner for prosecution consistent with the findings of the Board.

A handwritten signature in cursive script, appearing to read 'M. Leesti'.

M. Leesti
Commissioner of Patents

Dated at Hull, Quebec
this 13th day of May 1993