Filed: October 24, 2016

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

COSTCO WHOLESALE CORPORATION,
Petitioner,

v.

ROBERT BOSCH LLC,
Patent Owner.

Case IPR2016-00041
Patent 8,099,823

DECLARATION OF DAVID PECK

I. INTRODUCTION

I, David Peck, hereby declare the following:

1. I have been asked by Petitioner Costco Wholesale Corporation to review: (i) Patent Owner Robert Bosch LLC's ("Bosch's") Responses to the Petitions for *Inter Partes* Review, submitted in IPR2016-0034 (Paper No. 26); IPR2016-0036 (Paper No. 28); IPR2016-0038 (Paper No. 28); IPR2016-0039 (Paper No. 31); IPR2016-00040 (Paper No. 28); IPR2016-00041 (Paper No. 32) (collectively, the "Responses"); (ii) the patents at issue in each of the six proceedings, respectively: U.S. Patent Nos. 6,973,698 (the "'698 Patent"), 6,944,905 (the "'905 Patent"), 6,292,974 (the "'974 Patent"), 7,228,588 (the "'588 Patent"), 7,484,264 (the "'264 Patent"), and 8,099,823 (the "'823 Patent") (collectively, the "Bosch Patents"); and, (iii) the Declaration of Mr. Martin Kashnowski, which I understand was submitted by Patent Owner as Exhibit 2007 to the Responses.

2. I am currently employed as an Advanced Technology Subject Matter Expert by Mahindra North American Technical Center, Inc. in Troy, Michigan.

3. From April 1997 through July 2013, I was employed as a Manager of Advanced Products and Processes Research and Development by Trico Products, Inc. ("Trico"). As part of my responsibilities at Trico, I worked on advanced wiper projects, including an advanced direct drive wiper motor and the Innovision

windshield wiper product. During part of my tenure at Trico, I also managed the test and materials laboratories.

4. In my present position, I continue to provide engineering consultation services relating to wiper systems. A copy of my *curriculum vitae* is attached hereto as Appendix A.

II. DESIGN AND MANUFACTURE OF FLAT-SPRING WIPERS

5. While at Trico, in the course of my employment, I became familiar with the windshield wiper product design and development process.

6. It is my opinion that there are numerous technical aspects that are accounted for in design and manufacture, all of which contribute to an ultimate commercial product. None of the Bosch Patents describe or disclose the engineering or manufacturing methods that would be required to develop a commercially successful windshield wiper.

7. By no later than 1997, development of flat-spring wipers would begin with a generalized design. Preliminary choices such as material and sizing would be made first. If a flat-spring wiper was to have a spoiler to, for example, counteract wind-lift, its geometry would have to be determined before calculating the flat-spring's required curvature.

8. By no later than 1997, it was the practice at Trico to design a spoiler in three stages. First, we would model a spoiler cross-section using commercially

available Computational Fluid Dynamics ("CFD") software such as FLUENT or EXA. These computer programs were capable of predicting forces imparted to a structure by impinging airflow and eddy currents produced in its wake. We would choose as a spoiler cross-section in the first instance an arbitrarily sloped triangle that was approximately as tall as the entirety of the structure below it (i.e. the wiper and wiping element). A CFD simulation would yield the pressures (or suctions) applied to the various faces of the wiper structure caused by the airflow, the maximum of which would occur at a wipe angle position of approximately 45-degrees. We would then vary the curvature, slope, and height of the spoiler until we were satisfied with the wiper's performance. The goal was to maximize the velocity at which the wiper would lift from the glass—in many cases around 120 miles per hour. Second, we would build a prototype and road test it to confirm the CFD predictions generally. Third, because laboratory testing is very expensive, we would take actual wind-lift force measurements in a wind-tunnel at various speeds and angles of wipe to ensure the general design met functionality requirements.[1]

[1] Trico's internal requirements were a composite of those of various vehicle manufacturers. These covered everything from minimum duty cycles, to wipe quality across temperatures, to maximum vehicle speed without lift, etc.

9. Once the general design of a flat-spring wiper was complete, the next step would be to determine the appropriate curvature of the flat blade. This step would begin with the windshield. For aftermarket wipers, a composite, or generalized windshield approximating several similar vehicle models, would be used. After scanning the windshields, a singular, representative curvature profile would be created.

10. A designer would then seek to conform the wiper blade to this composite profile for a desired force-intensity distribution. The ’698 Patent, for example, illustrates some possible variations. *See* ’698 Patent, figs. 5–7. Using elementary beam equations, it would be possible to calculate the curvature required to yield the chosen force distribution. Commercially available, iterative-analysis computer programs, such as finite-element-analysis (“FEA”) programs, which applied those equations efficiently, were available from at least as early as 1997. Since 1997, Trico utilized VariFlex—a custom computer program created by Adriaan Swanepoel and used by him for some time prior to 1997—which enabled such calculations to be made very quickly and to account for a greater complexity of geometries, such as the taper-taper design (discussed below).

11. Any method that can determine which geometry will yield a particular force profile when pressed against a surface is equally capable of accounting for non-metal components, such as a rubber wiping strip or superstructure. In fact, by

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