

DOCKET NO: 470515US

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE  
PATENT TRIAL & APPEAL BOARD**

PATENT: 8,573,374

INVENTOR: HEIKO MAGERKURTH et al.

TITLE: HYDRODYNAMIC TORQUE CONVERTER

TRIAL NO.: IPR2017-00442

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**DECLARATION OF DR. STEVEN SHAW**

1. I, Dr. Steven Shaw, make this declaration in connection with this petition for *inter partes* review of U.S. Patent No. 8,573,374 (“the ’374 patent,” attached as Exhibit 1101 to the petition). I am over 21 years of age and otherwise competent to make this declaration.

Although I am being compensated for my time in preparing this declaration, the opinions herein are my own, and I have no stake in the outcome of the *inter partes* review proceeding.

**I. QUALIFICATIONS**

2. A detailed record of my professional qualifications, including a list of publications, awards, and professional activities, can be found

in my *curriculum vitae*, which is attached as Appendix A to this declaration. I have provided testimony by deposition within the last five years in IPR2016-00502, filed against U.S. Patent No. 8,161,740.

3. I am currently the Harris Professor of Mechanical and Aerospace Engineering at Florida Institute of Technology. I am on leave from Michigan State University (“MSU”), where I serve as a University Distinguished Professor of Mechanical Engineering and an Adjunct Professor of Physics and Astronomy. Additionally, I am involved in a small family business that makes hand and specialty tools for Snap-On, etc. as 49% owner, Vice President, and Board Member, although I am not involved in day-to-day operations.

4. Before joining the faculty at MSU in 1984, I was an Assistant Professor in the School of Engineering at Oakland University. I also served as an Associate Professor in the Department of Mechanical Engineering at the University of Michigan during 1991-93, and have held visiting professor appointments at Cornell University, the University of Minnesota, Caltech, the University of Michigan, the University of California-Santa Barbara, and McGill University.

5. During the past 32 years, I have performed research relevant to the subject matter of the '374 patent, including on dampers, rotor systems, and centrifugal pendulum vibration absorbers. I have also worked on these topics with several companies, including Ford Motor Company off and on since 1984, with Teledyne Continental Motors in 1994, with Chrysler (in its various incarnations) continually since 2006, with Honda in 2013, with Valeo starting in 2015, and with Achates Power in 2016.

6. My work on this topic has included various types of fundamental studies, design assistance, and the development of experimental methods for system characterization. This work been funded by the companies noted above and by the U.S. National Science Foundation. I have also published extensively, with over 150 technical publications. Of these, approximately 25 archival journal papers and numerous conference papers relate to this topic. I have also given professional presentations on the subject at many conferences and university seminars. I have graduated 7 Ph.D. students and 8 M.S. students working in this area, and currently have one Ph.D. student in progress on this subject. My 1997 SAE Arch T. Colwell Merit Award

and my 2013 ASME N. O. Myklestad Award, which is “presented in recognition of a major innovative contribution to vibration engineering,” were based on my technical contributions to this topic.

7. In addition, I have consultation experience with torque converters, and regularly use torque converters as an example in my classes when I teach system dynamics and vibrations.

8. I hold an A.B. degree in Physics and an M.S.E. in Applied Mechanics from the University of Michigan and a Ph.D. in Theoretical and Applied Mechanics from Cornell University.

9. I have used my education and experience working in the mechanical engineering field, and my understanding of the knowledge, creativity, and experience of a person having ordinary skill in the art in forming the opinions expressed in this report, as well as any other materials discussed herein.

## II. MATERIALS CONSIDERED

10. In forming my opinions, I read and considered the '374 patent and its prosecution history, the exhibits listed in the Exhibit List filed with the petition for *inter partes* review of the '374 patent, as well as any other material referenced herein.

### III. LEGAL PRINCIPLES

11. For the purposes of this declaration, I have been informed about certain aspects of patent law that are relevant to my analysis and opinions, as set forth in this section of my declaration.

#### A. A Person Having Ordinary Skill in the Art

12. I understand that the disclosure of patents and prior art references are to be viewed from the perspective of a person having ordinary skill in the art at the time of the alleged invention (“PHOSITA”). Unless I state otherwise, I provide my opinion herein from the viewpoint of a PHOSITA at the earliest alleged priority date for the ’374 patent, which I have been informed is July 4, 2008.

13. The ’374 patent relates to the field of hydrodynamic torque converter designs. The particular technical issue that the ’374 patent purports to address is the arrangement of components within the torque converter to decrease the assembly space while maintaining functionality. I understand from my own work experience and conversations with engineers who work in the field of hydrodynamic torque converter design that torque converter design involves three main considerations: (1) efficient transfer of torque, (2) packaging of the torque converter parts so that the torque converter fits in the space

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