Title:
3D Holographic Animation of Modern Mechanical Watch Escapements

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Introduction:
Invented some 400 years ago, mechanical watches and clocks continue to fascinate millions of people today. It is known that the "brain" of mechanical watch is the escapement. For the past 200 years, it has been the Swiss Level Escapement that dominated. In recent years, though, a number of new inventions have been developed, including the Girard-Perregaux Constant Force Escapement and the Dual Ulysse Escapement.

Since 2007, we at the Institute Precision Engineering of the Chinese University of Hong Kong have been working to develop a virtual library of mechanical watches and clocks (http://www.ipe.cuhk.edu.hk/Website%20v2/Website/index.html). For the aforementioned complex escapements, though, the plain screen animation becomes imperative. Therefore, we developed a 3D holographic animation of complex escapements.

Holography is a modern technique which enables 3D images to be displayed. Our holographic animation systems consist of a set of holographic plates, a smartphone (or a tablet computer), and a computer software. The computer software converts the computer animation file in 2D plain screen to 4-sided video. Once the stage for holographic display has been set, the 3D animation can then be shown.

Main Idea:
This paper presents the 3D holographic animation of two modern escapements. These include the Girard-Perregaux Constant Force Escapement (Figure 1), the Dual Ulysse Escapement (Figure 2). These escapements are first drawn using SolidWorks®. Next, the animations are generated, also using SolidWorks®. Then, the animations are converted to 4-sided videos. Finally, the videos are broadcasted in our pseudo 3D holographic animation system as shown in Figure 3.

Conclusion:
For the aforementioned complex escapements, though, the plain screen animation becomes imperative. Therefore, we developed a 3D holographic animation of complex escapements. Experiments with our approach, the virtual library can be demonstrated in a 3D holographic way and that it can improve the cleavage of complex escapements.

References:
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[2] The official website of Girard-Perregaux, visited in Dec. 2013, http://www.girard-perregaux.com/news/news-details-en.aspx?id=513
[3] The official website of Ulysse Nardin, visited in Dec. 2013, http://www.ulysse-nardin.com/en/swiss_watch_manufacturer/News__Events/Novelties/Freak_Phantom.html

Fig. 1: The Girard-Perregaux constant force escapement.

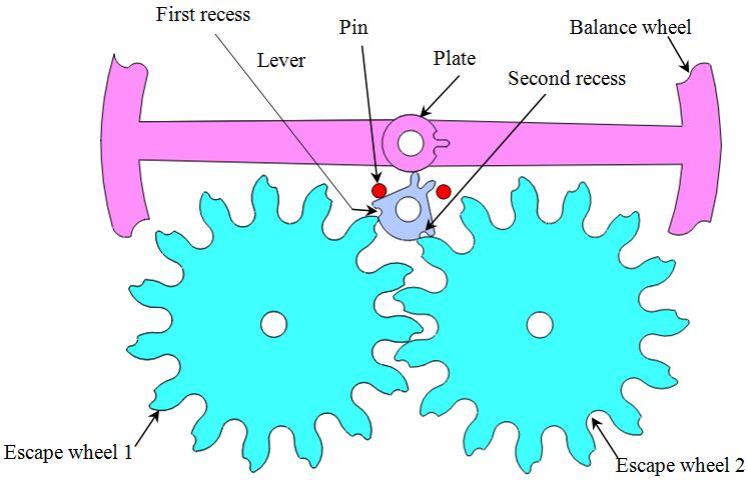

Fig. 2: The Dual Ulysse escapement.

Fig. 3: The smartphone holographic display.