V. Patent War Yesterday: Wright v Herring-Curtiss

A. Background

In December 1903, more than 100 years prior to the iPhone, the Wright brothers demonstrated their working Wright Flyer heavier-than-air prototype aircraft. Attempts at human piloted aircraft had been ongoing for several decades in the form of primitive balloons and gliders. These prior aircraft lacked control and thus served limited utility. Wilbur and Orville Wright then developed a breakthrough tri-axis control system by incorporating a "wing-warping" mechanism into aircraft design. By twisting and shaping the wing, a pilot can maintain balance and directional control during flight much like a bird adjusting the contour of its wings. Achieving such equilibrium had proved elusive until this point. This breakthrough ushered in the age of modern aviation which today utilizes the associated "aileron" to achieve directional control on fixed wing aircraft.[101]

The move from wing warping to use of ailerons as well as a host of other substantial improvements to the Wright Flyer concept were achieved early on by Glenn Curtiss, inventor and engine designer. Curtiss recognized an opportunity to apply his technical capabilities and know-how from motorcycle engine design to aircraft. He entered the aircraft business and started producing superior prototypes in hopes of securing government and private interest. After hearing of his methods of simplifying wing shape control, the Wright brothers quickly confronted him with a lawsuit. They felt strongly that their patents covered any variations to wing surface alteration lending to aircraft control and thus Curtiss' design for ailerons and other components became their intellectual property. Curtiss did not agree with the Wrights' claims and continued to innovate new aircraft designs while evading enforcement of their issued patents.[102] A contentious period followed where the Wrights suffered substantial interruption to their business while Curtiss also struggled to continue improvements on aircraft design in the midst of legal confrontations. As with *Ap-*

101 Lawrence Goldstone, Birdmen: The Wright Brothers', Glenn Curtiss, and the Battle to Control the Skies 41 (2014)

102 *Id.* at 124

ple vs Samsung, these events have become the topic of historical debate with a central question being whether the *Wright vs Herring-Curtiss* patent war disrupted what otherwise would have been a more rapid and efficient evolution of American aircraft design.[103]

B. Analysis

Some analysts feel that the Wrights had become too focused on securing profitability after their initial success with their Wright Flyer prototype aircraft As attorney and columnist Matt Levine describes:[104]

> "Rather than take advantage of their legal monopoly by developing, promoting and selling the airplane, they kept it under wraps, refusing for many years even to show it to prospective purchasers. However, while refusing to devote any effort to selling their own airplane, they did invest an enormous amount of effort in legal actions to prevent others, such as Glenn Curtis, from selling airplanes."[105]

Opponents of the patent system point to *Wright vs. Herring-Curtiss* as yet another example of how innovation is inhibited rather than encouraged under such a system.

It is helpful to describe certain aspects concerning the patent system as it existed in the early 1900s to obtain added perspective on the role of patent quality in large scale litigation. Firstly, the patent office at the turn of the century appears, at least for aviation claims, to have set forth a more rigorous examination than what exists today. Initial attempts by the Wrights to patent their aircraft structure were met with refusals from the U.S. patent office. Their first application submitted in March 1903 was rejected for a host of reasons including drawings that were "inadequate," claims perceived to be "vague and indefinite," as well as suggestions that their work was already covered by at least six pre-existing patents.[106] To top it all off, the examiner suggested the Wrights' concept was "a device

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103 Matt Levy, *Yes, The Aviation Industry Was Nearly Derailed by the Wright Brothers' Patent*, Patent Progress 67 (Jan 2015) https://www.patentprogress.org/2015/01/12/yes-aviation-industry-nearly-derailed-wright-brothers-patent/ (accessed Aug 25, 2017)

104 *See* U.S. patent 821,393

105 Michele Boldrin & David K. Levine, Against Intellectual Monopoly, 21 (dklevine.com 2004)

106 Worrel, *supra*

that is inoperative or incapable of performing its intended function;" in other words, he did not believe it would really work. Apparently it did not help that the patent office had been flooded with applications from "cranks" claiming aviation patents that were not plausible or substantiated.[107] In any case, it is notable that despite having less formal procedures than today, the patent office reacted to these conditions by qualitatively raising the standard on demonstrated utility for incoming applications concerning aviation.

A second point, obscured by limited historical account, is the question of how much the Wrights actually contributed to the centuries old efforts at achieving powered, manned flight. The Wright brothers had been fascinated with flight from a young age and made efforts to track the efforts of other famous aviation pioneers. A primary example is German engineer Otto Lilienthal who in 1889 "produced the most advanced study ever written on the mechanics of flight, *Der Vogelflug als Grundlage der Fliegekunst* – 'Bird-flight as the Basis of Aviation.'" [108] Wilbur Wright followed Lilienthal's work and was inspired by him to pursue aircraft development.

Wright tracked and communicated with other notable pioneers in aviation such as Octave Chanute, a French American engineer who completed extensive research into high-lift airfoil designs.[109] Chanute had published a compilation of his technical articles in 1894 under the title *Progress in Flying Machines.* In his assessment for fixed-wing "aeroplanes," he concluded that the "problem of the maintenance of the equilibrium is now, in my judgment, the most important and difficult of those remaining to be solved .." [110] There is record of the Wrights referencing these prior works and the Wright 821,393 patent operates upon the principle of resolving the equilibrium challenge described by Chanute.[111]

Not only is there the question regarding contributions occurring before an invention, but also how to "parcel out" inventions that arise post-grant. The primary claims by the Wrights in their '393 patent state broad terms:

> 1. In a flying-machine, a normally flat aeroplane having lateral marginal portions capable of movement to different positions above or below the normal

107 Goldstone, supra at 30
108 *Id. at 3*
109 *Id. at 12*
110 *Id. at 14*
111 *Id.*

> plane of the body of the aeroplane, such movement being about an axis transverse to the line of flight, where-by said lateral marginal portions may be moved to different angles relatively to the normal plane of the body of the aeroplane, so as to present to the atmosphere different angles of incidence, and means for so moving said lateral marginal portions, substantially..”

The essential segments of language, repeated in many of the subsequent claims, centers upon the aeroplane’s (or “wing’s”) ability to “be moved to different angles .. so as to present to the atmosphere different angles of incidence.” In the Wright Flyer aircraft prototype used to demonstrate this method, a mechanism of pulleys was used to flex the wings of the aircraft in order to deflect oncoming airflow and steer the entire aircraft.

Glenn Curtiss was a talented and proficient mechanical engineer experienced with developing powerful and light-weight motorcycle engines. He was initially drawn to aviation when realizing the benefit his light-weight engines could provide to aircraft.[112] As he started building entire aircraft on his own, he came up with an alternative to the wing warping approach used by the Wright Flyer. Instead of warping the entire wing of the aircraft, Curtiss instead placed controllable hinged tabs near each wing-tip (compare Figures 2 and 3). This modification not only dramatically simplified aircraft design and improved mechanical reliability, but also offered better steering control compared to the full wing warping employed by the Wrights. This wing tab, now known as an “aileron,” remains an essential component of aircraft design today.

112 Goldstone, *supra,* at ixxx

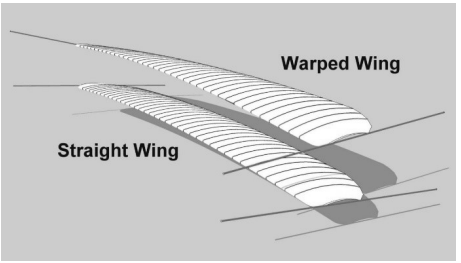

Figure 2: Illustration of Wright concept of "wing warping"[113]

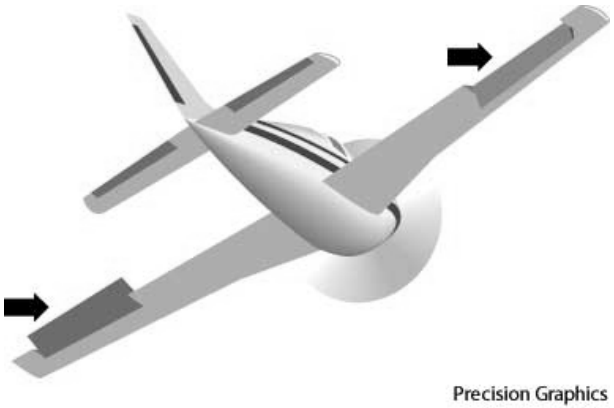

Figure 3: Ailerons (moveable) with fixed straight wing of modern aircraft[114]

The Wrights pressed on to have their patent granted in 1908 and later followed up with impressive public displays of their working Wright Flyers. However, as Curtiss and other interested parties joined in on aircraft development, the Wright brothers became so consumed by the litigation that they started to fall behind on further research and development.[115] Still, courts had recognized their achievement and ultimately held their patents

113 Wright-Brothers.org, http://www.wrightbrothers.org/History_Wing/Wright_Story/Inventing_the_Airplane/Wagging_Its_Tail/Wagging_Its_Tail_images/1902-Glider-wings-compared.jpg (accessed Sep 5, 2017)

114 Precision Graphics, http://cf.ydcdn.net/1.0.1.80/images/main/A5aileron.jpg (accessed Sep 5,2017)

115 Goldstone, *supra*, at 203

valid and infringed. Furthermore, the courts considered their progress "to be of a pioneer nature entitled to having their claims given the broadest interpretation" therefore would cover Curtiss' ailerons as well as wing warping.[116] Curtiss and other parties viewed their improvements to aircraft design as distinctive so remained defiant. The conflict was settled only after Assistant Navy Secretary Franklin Roosevelt in 1917 "pressured the rivals to allow unrestricted production of airplanes for the war effort," bringing the Wright patent war to a close.[117]

116 Worrel, *supra*

117 Sean Trainor, *The Wright Brothers: Pioneers of Patent Trolling*, Time (Dec. 2015), http://time.com/4143574/wright-brothers-patent-trolling/ (accessed Sep. 3, 2017)