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Steven Pepe, Stepan Starchenko, and James Stevens, Ropes & Gray

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Electric Vehicles, 5G, & IP Disputes

Contributed by *Steven Pepe, Stepan Starchenko, and James Stevens, Ropes & Gray*

An 1895 patent for a gasoline-powered horseless carriage almost stopped Henry Ford's assembly lines in their tracks before he had a chance to bring the Model T to the masses. An association of American automakers led by a failed manufacturer of electric vehicles asserted the patent in a 1903 lawsuit to put Ford—the “unreliable upstart”—out of business. A long and public court battle ensued until 1911, when the Second Circuit held that Ford and other automakers were not infringing the patent. During the century that followed, large automakers have dominated the industry, mass-producing internal combustion engine vehicles while largely avoiding drawn-out legal battles. But things are about to change.

This article explores how increasing demand for electric vehicles (EVs) and the development of 5G-connected vehicles will lead to increased IP generation. It discusses how this increased IP generation, technological convergence, and the fragmentation of the automotive industry is creating a perfect storm for increased disputes and litigation in the automotive industry. The article concludes by discussing what automotive companies should be doing to best position themselves for the inevitable disputes resulting from the EV and 5G revolutions.

Increasing Demand for EVs and 5G

In 2015, 500,000 EVs were sold, representing just 0.5% of the worldwide automotive market. By 2019, more than two million EVs were sold worldwide, and global sales of EVs are projected to exceed 11 million by 2025. EVs are expected to capture one-third of the worldwide automotive market by 2030—a 60x increase in just 15 years.

The growth, however, will not affect all markets equally. China, which boasts the world's most advanced battery-only EV market, is expected to represent roughly half of the worldwide EV market by 2030. Countries such as the U.K., Germany, France, and the U.S. are expected to invest heavily in EV infrastructures and offer significant cash and tax incentives to encourage the transition to EVs. In the U.S., California is leading the charge—a sales ban of new gasoline-powered vehicles starts in 2035.

This explosive growth will cause a dramatic shift in automotive revenues. Today, the internal combustion engine (ICE) dominates automakers' revenue streams. But by 2030, EV revenues, at nearly \$1.2 trillion, will eclipse those from ICE vehicles. Automakers have taken notice of the increasing demand for EVs. Volkswagen, the world's largest automaker, predicts 40% of its global vehicle sales will be EV by 2030. Honda has pushed forward its plans to electrify all mainstream European models from 2022, and expects EVs to account for two-thirds of its global vehicle sales by 2030. And Ford, the company responsible for bringing the ICE vehicle to the masses, plans to invest \$11.5 billion in EV development by 2022.

Furthermore, as vehicles evolve from hardware-driven machines to software-driven 5G-connected devices, revenues from software and electrical and electronic components will grow at rates higher than automotive revenues in general. This growth is expected to be particularly strong in China, which today is the only country where drivers are already receiving red-light warnings in 5G-connected vehicles.

Explosions of Innovation & Competition

Developing an efficient and cutting-edge EV requires more than just swapping out the ICE and fuel tank for an electric motor and battery. Next-generation EVs require re-engineering the automobile. EVs use reducers, not traditional transmissions, to control motor speed, and require complex systems of inverters, controllers, and converters to transfer electricity from the battery to the motor and other accessories. To keep batteries charged and operating efficiently, EVs require on-board chargers, battery heaters and coolers, and charge ports. Although removing the ICE powertrain leaves more room for passengers and cargo, it also presents new challenges, such as heating the cabin without the heat generated from the ICE.

EVs will implement 5G technology in myriads ways. Some will be mere improvements over functionality already provided by today's vehicles, like providing hotspots and traffic updates. Other uses, such as machine-to-machine communications to allow real-time collision avoidance or black-ice alerts, promise to be transformative. 5G-connected vehicles are predicted to be the dominant 5G Internet-of-Things “device” by 2023—and are a prime example of the benefits (and challenges) that come from transformative (and disruptive) technological convergence.

The bumper-to-bumper reengineering required to get 5G-connected EVs on the road will require traditional automakers and suppliers in the already ultra-competitive automotive market to find ways to differentiate themselves. In addition to traditional companies, the market is crowded with new entrants. In China alone, nearly 500 registered EV manufacturers have raised over \$18 billion since 2011. A wave of initial public offerings involving companies developing commercial EVs, battery technology, charging infrastructure, and light detection and ranging (LiDAR) have flooded the market, too. In addition, 5G connectivity has necessarily brought the telecom giants—the most active standard-essential patent (SEP) plaintiffs—to the automotive industry's doorstep. In the EV space, competition, it seems, is the residue of innovation.

Increasing Generation of IP, Litigation, & Licensing

We recently conducted an analysis of patenting activity in the primary technologies comprising the modern EV, such as inverters, battery technologies, and on-board chargers. Our analysis of patent trends over the previous decade confirmed many of the high-level observations that have been made about the robust generation of IP occurring in the EV space.

The last decade has seen a steady increase in worldwide and U.S. patent filings relating to automotive technology, fueled primarily by innovations related to EV and connected-vehicle technologies. For example, the number of worldwide applications related to electric-propulsion technologies doubled between 2010 and 2013, and increased by nearly 1,400% by 2020. In the U.S., filings related to electric propulsion generally increased by nearly nine-fold, while filings relating to energy storage have increased nearly 700% in the last three years.

Large automakers have accounted for most of this growth. Ford finally broke into the top ten U.S. patent assignees by grants in 2018. Toyota has been in the top 20 in each of the last five years, and GM, Hyundai, and Kia have cracked into the top 25 in recent years. Suppliers to those traditional automakers have been active as well. In three of the last five years, Bosch was a top 25 U.S. patent assignee by grants, and Denso and Continental are focusing on innovations related to specific EV technologies.

This uptick in patent activity is not surprising given the re-engineering that EVs demand and the integration of 5G technologies in automobiles. For example, U.S. patent applications relating to autonomous EVs and artificial intelligence have soared in recent years, as have applications related to ancillary technologies, such as battery recycling and charging stations. And, a review of the assignees of these patents and applications suggests that new entrants and EV startups have joined the fray.

Predictably, this increase in IP generation and the increasing demand for EV has led to an uptick in litigation. Suits by non-practicing entities (NPEs) targeting the automotive industry increased 150% between 2019 and 2020. And there are indications that NPEs are receiving more third-party funding, enabling them to buy and assert higher-quality patents. The multitude of startups attempting to establish themselves in the EV space may continue to feed these trends—NPEs will very likely attempt to capture the IP generated by EV startups if they ultimately fail.

However, the arrival of telecom companies to the automotive industry's door may pose the biggest risk of drawn-out legal battles. Indeed, the automotive field is already the battleground for a dispute relating to SEPs that will have ramifications beyond the automotive industry. The German automotive supplier Continental has sued the Avanci licensing platform—which licenses technologies that enable vehicle connectivity—and several of the 2G, 3G, and 4G SEPs owners that comprise it.

At issue is whether SEP holders can decide at which point in the supply chain to license their patents. Continental has challenged Avanci's practice of licensing exclusively to automakers (rather than suppliers), alleging it violates antitrust law and breaches SEP owners' obligations to license those patents on fair, reasonable, and non-discriminatory (FRAND) terms.

An endorsement of Avanci's practice of only providing licenses to the manufacturers of an end product—i.e., a vehicle—rather than the suppliers of components the end product incorporates—i.e., the chips enabling vehicle connectivity—will have far-reaching consequences. Continental's appeal of a district court's dismissal of its complaint has attracted the attention of amici. In one corner are companies supporting Continental, such as Apple, Honda, and Tesla. In the other are companies supporting Avanci and the SEP holders, like Qualcomm and InterDigital.

Next Steps for Companies

The confluence of increased IP generation, increased competition from EV upstarts and telecommunications companies in an already competitive field, and the fragmentation of the historically stable automotive industry demands that companies with connections to the automotive industry act now.

At a minimum, companies must implement both short-term and long-term strategies. A short-term strategy is required given the speed of innovations and rapidly-changing automotive market. A long-term strategy is necessary to best position companies to maximize and fully leverage the anticipated growth in the EV market over the next decade. Both strategies will require putting in place procedures to identify innovations, protect them from unauthorized disclosure, and determine whether to rely on patent protection or trade-secret protection. As all IP lawyers know, there are advantages and disadvantages to both.

Patents can be used offensively to exclude competitors from using patented technology. But, more importantly, patents can be used in a countersuit to level the playing field when a competitor sues first—if the threat of such a suit did not dissuade a competitor from suing in the first place. Given the present and projected increase of patent litigation in the automotive industry, having patents to deter a suit and assert in a countersuit is a must. And the arrival of telecom giants and the new arrivals in the automotive industry make having patent assets that much more important. Companies must evaluate, and reevaluate, how susceptible they are to litigation, build an appropriate patent portfolio, and develop suitable litigation strategies.

Patents can also be used in licensing contexts. They can be cross-licensed to help settle disputes of infringement, monetized through licensing to generate revenue, or strategically licensed to drive up the price of a competitor's products through the extraction of royalties. Companies, as a result, should be evaluating and monitoring their competitors' patent portfolios and product offerings in order to identify strategic licensing opportunities.

Large automakers and automotive suppliers—which have accumulated massive EV patent portfolios that only continue to grow—clearly understand that the companies with not only the best technology, but the best protected technology, will win the brewing automotive patent wars. Their large portfolios have them well positioned to initiate and survive litigation, and to leverage their IP through licensing. But they are not stopping there.

The world's largest automakers, as well as automotive suppliers Denso and Continental, are members of the LOT Network, a non-profit consortium of 1,400+ companies looking to avoid unwanted litigation with NPEs. These companies have pledged to grant licenses to all members of the LOT Network if their patents are ever acquired by an NPE. Traditional uses of patents, such as participation in patent pools or assertion, are unaffected by membership in the consortium. Companies should be considering whether sharing their innovations and resources with their competitors makes strategic and long-term business sense.

Similarly, patent pools—agreements between patent owners to pool their patents and make them available to license at typically lower rates than in bilateral agreements—are attracting the attention of large automakers and technology companies that have entered the automotive space. The Avanci licensing platform—a pool of mobile communications SEPs—already counts BMW and Volkswagen among its licensees, and 5G SEPs giants Ericsson, Nokia, and Qualcomm among its licensors.

Such patent pools often help minimize transaction costs and litigation risks, especially when the patents relate to complex technologies that demand the implementation of complementary patents. Companies operating in the automotive space should consider whether joining a patent pool makes good strategic or business sense.

Of course, just because a competitor has patents does not mean that those patents are valid and enforceable. Unified Patents, an organization of 200+ international members that seeks to invalidate patents at the USPTO, has attracted the attention and resources of Daimler, Ford, Honda, Nissan, and Toyota, among other industry players. But, companies do not need to join in order to challenge their competitor's or an NPE's patent portfolio. Incidental to evaluating and monitoring patent portfolios, companies should consider launching preemptive challenges, such as inter partes review and post-grant review at the USPTO. Deciding between the two requires active monitoring of newly issued patents, as petitions for post-grant review must be filed within nine months of a patent issuing.

It is for good reason that EV company Tesla, a member of both the LOT Network and Unified Patents, has yet to feature in this article. Despite being responsible for immensely innovative technologies, Tesla files and owns relatively few patents. This should come as no surprise in light of Elon Musk's statements against patents and Tesla's commitment to the open source movement. But that commitment does not mean that Tesla is without recourse for protecting its valuable IP. Tesla has sought trade-secret protection for its inventions, and pursued legal recourse when those trade secrets have been allegedly misappropriated. Robust policies for protecting trade secrets, which are substantially less expensive than patents, and have no statutory expiration date, must also be considered by companies active in the EV space.

There are other steps automotive companies—both established and new—must be taking now as competition in the EV space heats up. Companies should monitor patent activity by others in the automotive space to ensure freedom-to-operate, explore strategic acquisition of companies and/or their patents, and identify areas where competitors are innovating. Companies should be reviewing their employee handbooks and confidentiality policies to ensure employees are educated on IP issues, can recognize innovations that require protection, and fully understand the need for confidentiality—both during and after their employment.

Given the competition for top talent, increased mobility in the automotive industry is expected. Companies should take a closer look at employment agreements, consider whether covenants-not-to compete are enforceable and appropriate, and put appropriate policies and exit interviews in place to ensure that departing employees understand their obligations and do not, wittingly or unwittingly, take valuable company information to their new employer.

Conclusion

For the first time in over a century, the automotive industry stands on the precipice of a new era. EVs and 5G-connectivity will transform the automotive industry in ways that we have not seen since Henry Ford brought the Model T to the masses. As we saw then, only the strongest and best-positioned and best-prepared will survive. In today's highly-competitive and fast-moving technological world, companies must act now to protect their innovations if they wish to not just survive, but thrive.