IN THE UNITED STATES DISTRICT COURT

FOR THE DISTRICT OF DELAWARE

DUESENFELD GMBH,	)	
	)	
Plaintiff,	)	
	)	
v.	)	C.A. No. _____
	)	
ASCEND ELEMENTS, INC.,	)	**DEMAND FOR JURY TRIAL**
	)	
Defendant.	)	

COMPLAINT FOR PATENT INFRINGEMENT

Duesenfeld GmbH ("Duesenfeld") brings this action for patent infringement under 35 U.S.C. § 271 against Ascend Elements, Inc. ("Ascend"), and alleges as follows:

NATURE OF THE ACTION

1. Duesenfeld is a pioneer in the field of recycling lithium-ion batteries from electric vehicles. Duesenfeld grew out of a university research team that included Christian Hanisch, Bastian Westphal, Wolfgang Haselrieder, and Martin Schoenitz. Early in the electric vehicle renaissance of the 2010s, this team of researchers at Technical University of Braunschweig ("TU Braunschweig") foresaw a need for recycling the materials in electric vehicle batteries at scale. The compounds in these batteries must be mined from the earth, which is environmentally harmful, and these mines are often located in countries and geopolitical areas that compromise their ability to be part of a smooth-running supply chain. Continuous manufacture of electric vehicle batteries from virgin materials poses a substantial challenge to the environmental benefits that electric vehicles otherwise offer. Thus, these researchers identified the imperative to

successfully recycle the batteries to more fully realize the environmental benefits of the electric vehicle movement.

2. A critical step in recycling used electric vehicle batteries is grinding those batteries into a powder, called black mass. Black mass contains the critical metals, such as lithium, manganese, cobalt, and nickel, needed to build recycled batteries. But extracting the black mass was recognized as a dangerous process. To extract the black mass, it was necessary to first grind or "comminute" the spent battery. But lithium batteries contained hazardous, reactive materials, and grinding them produced byproducts that could react in unpredictable and potentially destructive ways. Extracting the black mass itself could generate toxic and explosive byproducts, necessitating creative chemistry to mitigate the hazards of reprocessing these materials.

3. Recognizing the risks in processing the comminuted battery material and the difficulties in cleanly extracting black mass, the researchers at TU Braunschweig devised a safer method for recycling batteries that minimizes the production of toxic byproducts and allows recovery of about 90% of the critical metals within used batteries. These researchers discovered that comminuting the discharged batteries and then drying the comminuted material using low temperatures and low pressures produced valuable materials that were inert and could be safely transported for recycling, while simultaneously suppressing the generation of a toxic compound, hydrogen fluoride, which is corrosive, potentially explosive, and extremely hazardous to humans. Because their novel process used low pressures to vaporize the liquids present in electric vehicle batteries, the researchers referred to their discovery as a "vacuum drying" process.

4. Led by Christian Hanisch, this team of researchers formed a start-up, Duesenfeld, and applied for patent protection for their pioneering vacuum drying process. In recognition of the groundbreaking nature of their invention, the United States Patent and Trademark Office issued U.S. Patent No. 11,050,097 ("the '097 patent," attached hereto as Exhibit 1).

5. Duesenfeld remains committed to providing research and development services to companies that are building plants for recycling electric vehicle batteries. In support of the know-how that Duesenfeld has generated, however, companies that use its patented technology must in turn acknowledge the value of Duesenfeld's contributions by paying a fair license fee to Duesenfeld.

6. Ascend is an American company that opened a factory in 2023 for recycling electric vehicle batteries. Ascend is now running a factory in Covington, Georgia, that produces black mass. Ascend spoke at length with Duesenfeld to determine if the parties could collaborate on incorporating Duesenfeld's patented technology into Ascend's recycling plant, and a representative of Ascend visited Duesenfeld's own plant in Wendeburg, Germany. Ultimately, Ascend declined to engage in a collaboration with Duesenfeld and did not take a license to Duesenfeld's patents.

7. On information and belief, Ascend chose to buy its vacuum drying machinery from a German company, URT Umwelt- und Recyclingtechnik GmbH ("URT"). Importation records detail the shipment of some 500 tons of battery recycling machinery in late 2022 from URT in Germany to Georgia for use in Ascend's plant. A local Covington, Georgia newspaper reported that Ascend's plant, which began limited operations in August 2022, became fully operational in March 2023. Publicly-available materials confirm that Ascend is using Duesenfeld's patented technology, as detailed below.

8. Duesenfeld therefore brings this action to enforce its rights in view of Ascend's unauthorized use of Duesenfeld's patented technology, seeking monetary and injunctive relief.

THE PARTIES

9. Duesenfeld GmbH is a corporation organized and existing under the laws of Germany, with its principal place of business at Rothbergstraße 8, 38176 Wendeburg, Germany. Duesenfeld owns patents covering foundational lithium-ion battery recycling technologies, including the '097 patent asserted here.

10. Defendant Ascend Elements, Inc. is a Delaware corporation. Ascend is registered with the Delaware Secretary of State to transact business in Delaware. On information and belief, Ascend maintains a registered agent in Delaware, namely Harvard Business Services, Inc., 16192 Coastal Highway, Lewes, DE 19958. Ascend's principal place of business is at 133 Flanders Road, Westborough, MA 01581. Ascend operates an electric vehicle battery recycling plant in Covington, Georgia, which practices Duesenfeld's patented technology.

JURISDICTION AND VENUE

11. This is an action for patent infringement under the Patent Laws of the United States, 35 U.S.C. § 1 et seq., over which this Court has subject matter jurisdiction pursuant to 28 U.S.C. §§ 1331 and 1338(a).

12. This Court has personal jurisdiction over Ascend because Ascend is incorporated in the State of Delaware and has purposefully availed itself of the privileges of conducting business in the State of Delaware and in this judicial district.

13. Venue is proper in this District under 28 U.S.C. §§ 1391(b), 1391(c), and 1400(b) because Ascend is incorporated in Delaware and therefore resides in Delaware.

DUESENFELD'S INVENTORS DEVELOPED PIONEERING LITHIUM-ION BATTERY RECYCLING TECHNOLOGY

14. The technology at issue relates to the field of recycling lithium-ion batteries such as those commonly used in electric vehicles. Electric vehicles have been lauded for offering environmental benefits, including reducing carbon dioxide emissions. But the batteries that power electric vehicles are heavy and expensive to build, and their production requires substantial amounts of energy to mine and process raw materials such as lithium, cobalt, and nickel.

15. Recycling these batteries, and thereby recapturing the underlying metals, further boosts the environmental benefits of electric vehicles by reducing the cost as well as the environmental burden of manufacturing the vehicles.

16. Christian Hanisch, Bastian Westphal, Wolfgang Haselrieder, and Martin Schoenitz were process engineering students at TU Braunschweig in Braunschweig, Germany, from 2010 to 2015, early in the renaissance for all-electric vehicles. These individuals foresaw that, as the initial waves of electric vehicles were eventually retired, it would become imperative to efficiently and safely recycle the metals from the electric vehicle batteries. But the toxic nature of these metals, and the hazards associated with metal recycling processes, posed challenges to their goal of recapturing the metals.

17. One major challenge in the battery recycling process was safely grinding up the batteries so that valuable materials could be extracted and reused. The batteries used in modern-day electric vehicles are referred to as "lithium-ion" batteries. These batteries contain a liquid, called an "electrolyte" fluid, which allows positively charged lithium "ions" and negatively charged electrons to migrate between positively and negatively charged regions of the batteries called the "cathode" and "anode," respectively. The cathode and anode, as well as the battery

casing and other materials, contain compounds that can react with the electrolyte in unpredictable and potentially dangerous ways when the battery is ground up.

18. Some prior art solutions to this problem focused on removing or deactivating the electrolyte prior to grinding, such as by freezing or cutting open the batteries, but these solutions were expensive and technically demanding. Other solutions focused on deactivating the electrolyte after grinding, such as by applying deactivating agents, but these agents could contaminate the ground-up solids and often failed to fully inactivate the electrolyte, leaving a risk of explosion.

19. Christian Hanisch and his team discovered a safe and more efficient recycling process for these lithium ion batteries. First, they ground the batteries into small particles, in a process called "comminuting," without pre-processing the batteries to remove or deactivate the reactive electrolyte. Instead, they dried the comminuted material in a special drying machine to remove the liquid electrolyte and render the remaining material inert. By drying in this way, they avoided the need to use deactivating agents that could potentially contaminate the valuable battery solids.

20. But the inventors faced another challenge in their battery recycling process: managing the generation of hydrogen fluoride. The electrolyte liquid described above contains the conducting salt, which in most lithium-ion batteries is lithium hexafluorophosphate ($LiPF_6$) and contains the element fluorine. When drying the electrolyte from the crushed material, the conducting salt, *e.g.*, lithium hexafluorophosphate ($LiPF_6$), could decompose and release hydrogen fluoride. Hydrogen fluoride is a toxic compound that can lead to the formation of hydrofluoric acid. It is corrosive, which can degrade the seals in the chambers used for the recycling process and damage the equipment. If mismanaged, the system can explode.

Hydrogen fluoride is also highly dangerous to humans. It can cause contact burns and corneal destruction, and it can be deadly if inhaled.

21. Hanisch and his team realized that hydrogen fluoride was generated when the drying process was conducted at the high temperatures normally needed to vaporize the electrolyte. Accordingly, they sought to perform the recycling process at low temperatures, below the threshold at which hydrogen fluoride forms. When holding the temperature low, however, the drying process was extremely slow. By reducing the pressure, the comminuted material could be dried at a low temperature, and the drying proceeded more rapidly. Hanisch and his team referred to their new system as a "vacuum dryer."

22. The dried and comminuted material could be sorted to remove impurities, such as plastic pieces and aluminum foils. The remaining metals were in a black powder, called "black mass." This black mass, separated from the reactive electrolyte by the vacuum drying process, was chemically stable and inactive, and could be safely packaged and shipped without risk of explosion. Further, by suppressing the generation of contaminants associated with hydrogen fluoride, the electrolyte could be extracted with high purity through the drying process and was therefore suitable for recycling.

23. Mr. Hanisch and his team filed for a patent on their novel drying process. In recognition of the novelty of their invention, the U.S. Patent and Trademark Office issued to them the '097 patent. Claim 1 of the '097 patent recites as follows:

> 1. A method for the treatment of used batteries, comprising the steps:
>
> (a) comminuting the batteries such that comminuted material is obtained;

(b) inactivating the comminuted material such that an inactivated comminuted material is obtained, wherein the inactivating step is performed during or after the comminuting step; and

(c) filling a transport container with the inactivated comminuted material; wherein the inactivating step is performed by drying the comminuted material, and

wherein the drying occurs at a maximum pressure of 300 hPa.

Exhibit 1 at 10:45-59.

24. The ’097 patent, titled “Method for the Treatment of Used Batteries, in Particular Rechargeable Batteries, and Battery Processing Installation,” was duly and legally issued on June 29, 2021, with Christian Hanisch, Bastian Westphal, Wolfgang Haselrieder, and Martin Schoenitz as named inventors. The ’097 patent claims priority to German patent application 10 2015 207 843.4, filed on April 28, 2015.

DUESENFELD GMBH

25. In order to realize and market this invention from laboratory and pilot plant scale to industrial scale, Mr. Hanisch founded Duesenfeld GmbH. Mr. Hanisch became the CEO of the company.

26. Duesenfeld operates a battery recycling facility in Wendeburg, Germany. Duesenfeld also provides consulting services to operators of recycling plants. Duesenfeld remains a leader in the research and development of improved techniques for electric vehicle battery recycling. As such, it offers its services to the operators of other recycling plants to troubleshoot their processes and to improve outcomes.

27. Duesenfeld's technology extends beyond the vacuum drying discussed above. For example, Duesenfeld also offers technology solutions for discharging batteries prior to recycling, to dissipate electric charges that could create an explosion if mishandled.

28. Through its consulting business, Duesenfeld works with companies that are creating electric vehicle battery recycling plants and licenses to them Duesenfeld's patented technology.

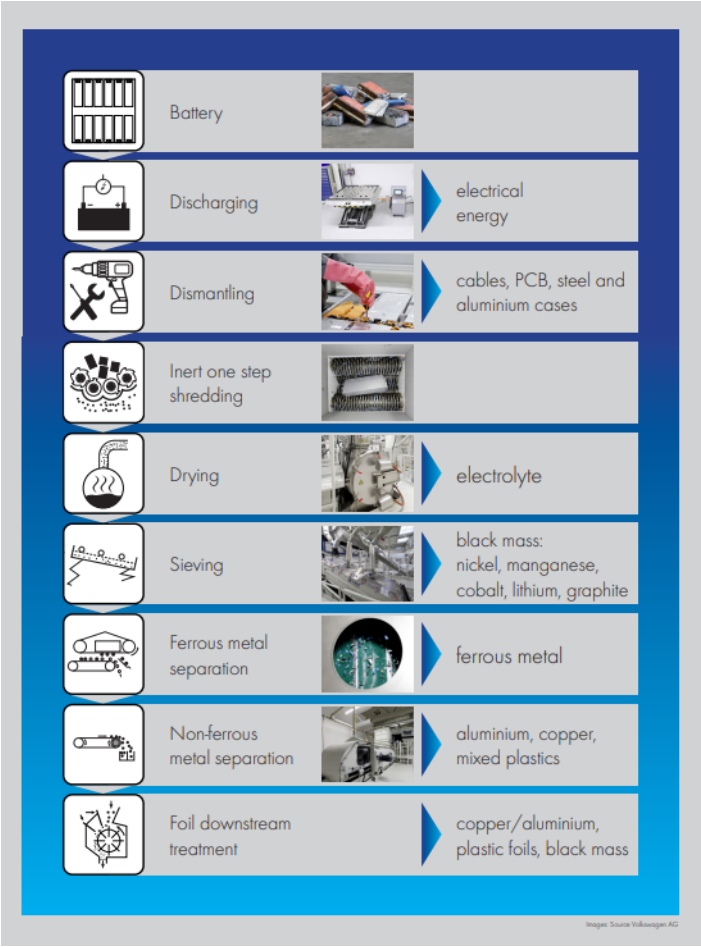
29. Duesenfeld's processes achieve important environmental benefits. Duesenfeld estimates that with its recycling technology, the carbon footprint of electric vehicle batteries can be reduced by 40% and over 90% of battery cell materials can be recaptured. In recognition of this research and development work and the great leverage for CO_2 savings worldwide by licensing this technology, Duesenfeld GmbH is among the finalists of the German Sustainability Award 2024.

URT UMWELT- UND RECYCLINGTECHNIK GMBH

30. URT is a German company that builds plants for recycling electric car batteries.

31. As stated on URT's website, URT first opened a plant in 2021 to recycle lithium-ion batteries from automobiles.[1] In the cited website, URT depicts its process as follows, including steps for shredding the batteries and drying the material:

[1] https://www.urt-recycling.com/seite/en/disposal/039:414/tn_414/Battery_Recycling.html, last accessed Oct. 17, 2023.



32. URT describes its shredding and drying process as follows:

> The previously deep-discharged batteries are fed into a single-stage shredding process via a sluice system. Subsequently, the shredded total fraction enters a vacuum dryer, which evaporates the electrolytes, which are then condensed again and filled in liquid form. This process section, from shredding to dryer discharge, is encapsulated and kept inert by a nitrogen atmosphere.

Id.

33. By 2021, Duesenfeld determined that it was outgrowing its Wendeburg battery recycling facility. Duesenfeld reached out to URT to solicit an offer to build an expanded battery recycling installation. Duesenfeld and URT entered into a non-disclosure agreement in mid-April 2021 so that URT could evaluate Duesenfeld's needs for an expanded recycling installation and draw up an offer to provide the required equipment.

34. In August 2022, Duesenfeld and URT entered into a cooperation agreement aimed at establishing a long-term cooperation for the joint implementation of further projects. The agreement provided a framework for Duesenfeld and URT to collaborate in designing and building recycling plants for third party customers using Duesenfeld's technology. Through this collaboration, Duesenfeld became thoroughly familiar with URT's equipment and processes, and vice versa.

DUESENFELD OFFERS ITS RECYCLING TECHNOLOGY TO ASCEND ELEMENTS

35. Ascend is an American company that specializes in the recycling of lithium-ion batteries for electric vehicles.

36. Ascend claims to have developed technology for converting black mass into materials for making new batteries. In 2023, Ascend opened a plant in Covington, Georgia, that produces inactivated black mass from used lithium-ion batteries.

37. Ascend publicized the building of its Covington plant, and Duesenfeld reached out to Ascend to offer a potential collaboration. In November 2022, Ms. Lydia Grote—head of licensing for Duesenfeld—contacted Ascend Elements, offering to set up a meeting to discuss Duesenfeld's proprietary battery recycling technology and its potential advantages for Ascend. Ms. Grote explained that Duesenfeld's plant construction partners could offer Ascend a turnkey recycling plant using Duesenfeld's technology, and she invited representatives of Ascend to visit Duesenfeld's Wendeburg battery recycling plant.

38. Ascend accepted Duesenfeld's offer to present on its proprietary battery recycling technology. The parties met via videoconference on November 25, 2022, where Ms. Grote presented to Ascend on Duesenfeld's proprietary battery recycling technology, including

Duesenfeld's vacuum drying process for comminuted battery material. Duesenfeld notified Ascend that Duesenfeld's vacuum drying process is patented.

ASCEND'S GEORGIA BATTERY RECYCLING PLANT

39. According to its website, Ascend began partial operations at its Covington, Georgia battery recycling plant in August 2022. In March 2023, Ascend held a "Grand Opening" ceremony at the Covington plant. *See* https://ascendelements.com/ascend-elements-base-1-grand-opening/, last accessed Oct. 18, 2023.

40. Canary Media has published a video on YouTube that describes Ascend's recycling process and shows video footage of the equipment and processing line at Ascend's Covington plant. *See* https://www.youtube.com/watch?v=jxIIU41DuCU ("Ascend Covington YouTube Video"), last accessed Oct. 17, 2023.

41. The Ascend Covington YouTube Video confirms the various facets of Ascend's grinding and shredding operation.

42. Ascend directs the batteries into a "wet shredder" in which the batteries are shredded:

Ascend Covington YouTube Video at 1:56. The text accompanying the video further describes the shredding process, explaining that:

> "…the discharged battery cells and modules head to a two story tall wet shredder that Ascend says is the biggest of its kind in the world. It's a wet process because the batteries still contain liquid electrolyte, which is a flammable substance. To protect against fires at this stage, the batteries drop through an airlock into a chamber that's purged of oxygen. Then they drop through the grinder."

Id.

43. According to the video, while the electrolyte in older recycling plants "would often be burned off and lost," Ascend "cooks off the electrolyte in a big rotating kiln," thereby drying the comminuted battery material, recovering the evaporated electrolyte, and producing the black mass from the remaining solids:

In older recycling plants, the electrolyte would often be
burned off and lost,

Pause (k)
but Ascend cooks off the electrolyte
in a big rotating kiln,

Ascend Covington YouTube Video at 2:12-2:22. As further pled below, the rotating kiln is a vacuum dryer.

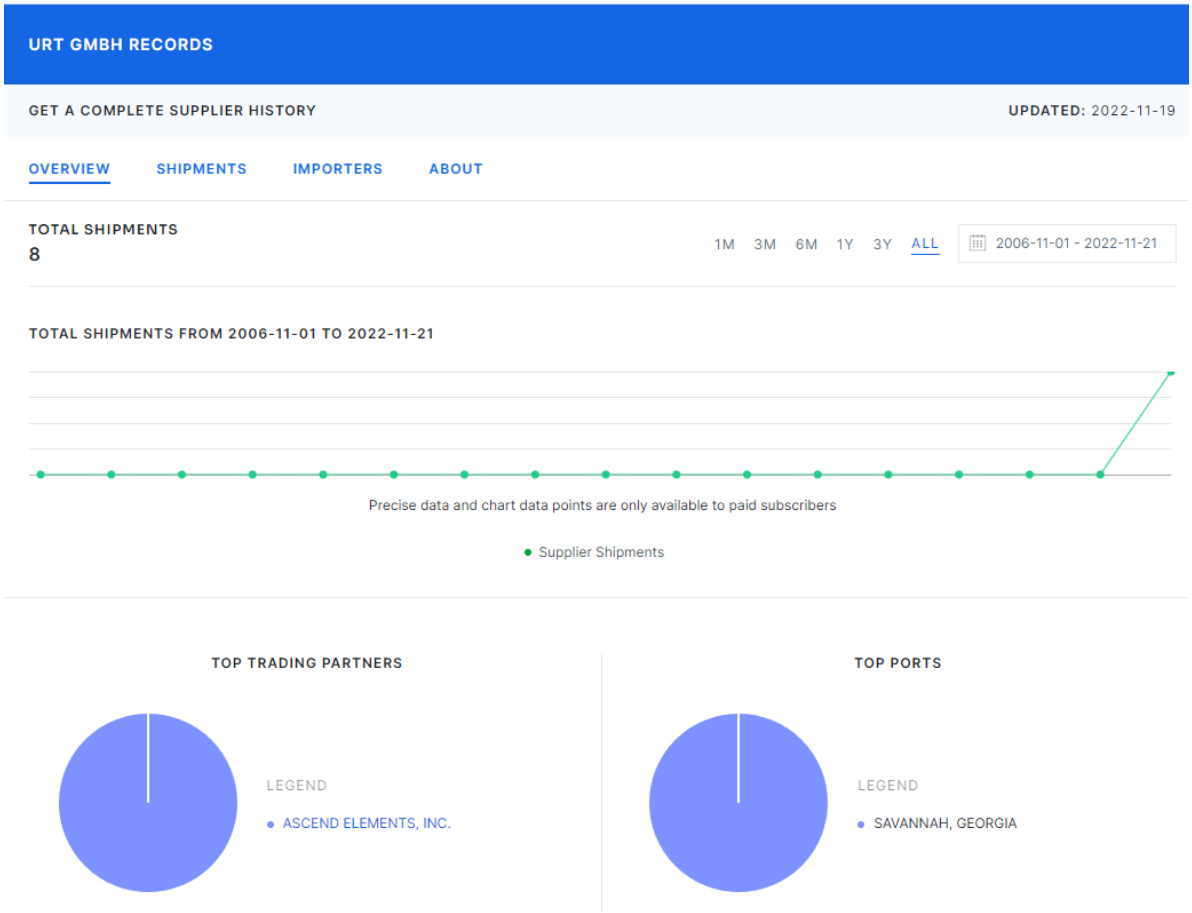
44. Ascend fills the dried material into sacks for transporting:

Ascend Covington YouTube Video at 2:34-2:39.

45. The video explains that "[t]he valuable dark powder fills up sacks that weigh a metric ton each," and further that "for now, those sacks go to customers." *Id.*

46. A separate YouTube video, published by Disruptive Investing on April 22, 2022, features an interview with Ascend CEO Mike O'Kronley at an Ascend pilot recycling facility in Westborough, Massachusetts. *See* https://www.youtube.com/watch?v=xwtmDFwL_Lk&t=806s, last accessed Oct. 18, 2023. In the video, Mr. O'Kronley explains that Ascend was able to extract black mass by shredding spent lithium-ion batteries at its Massachusetts pilot facility, before the opening of its larger plant in Covington, Georgia. *See, e.g.*, *id.* at 2:42-3:13.

47. Importation records confirm that Ascend imported its battery recycling equipment from URT. According to public records, URT has made eight shipments comprising 99 pieces of battery recycling machinery totaling approximately 500 tons, that were imported by Ascend Elements, Inc. into Savannah, Georgia:



See https://www.importgenius.com/suppliers/urt-gmbh, last accessed Oct. 18, 2023.

48. These public records show that the shipments arrived in the United States on dates ranging from July 26, 2022 through November 19, 2022, which is the same time period during which Ascend was ramping up operation of its Covington plant. *See id.*

49. Further confirmation that Ascend is using URT's machinery in Covington, Georgia, comes from an article published by the trade magazine Recycling International, dated August 9, 2023, which is attached as Exhibit 2 and incorporated herein by reference. The article describes URT's history from 2011 to 2023, including its partnership with Volkswagen and TU Braunschweig in building a prototype battery recycling plant, its building of a pilot plant at

Volkswagen in Salzgitter, Germany in 2020, and the ability of URT recycling plants to recover more than 98% of dry black mass during the battery recycling process.

50. According to the Recycling International article, URT is currently involved in "eight projects on four different continents." According to the article, "[o]ne plant ha[d] already been commissioned in Georgia, USA" as of the article's publication date on August 9, 2023. *See* Exhibit 2.

51. The Recycling International article gives further details about URT's process, including that it employs "vacuum distillation dryers":

> "Beginning with the inert one step shredding, previously discharged batteries or battery parts are transported via sluice technology into a nitrogen-flooded shredder, where they are shredded to a specific size. The input material is then fed via bunker systems into one or more vacuum distillation dryers, where the solvents evaporate from the electrolytes and are subsequently collected."

See id.

52. On information and belief, in view of the U.S. customs records showing URT's provision of 500 tons of battery recycling equipment to Ascend between July and November 2022, the plant "commissioned in Georgia, USA" is Ascend's lithium-ion battery recycling plant in Covington, Georgia, which Ascend celebrated with a Grand Opening in late March 2023.

ASCEND'S INFRINGEMENT

53. Ascend has directly infringed and continues to directly infringe the '097 patent. Claim 1 of the '097 patent, which is quoted above, is exemplary.

54. Ascend, at least at its plant in Covington, Georgia, performs a method for the treatment of used batteries, specifically, grinding them and generating black mass that can be recycled into new batteries for electric vehicles. The black mass can be safely packaged and transported for further use.

55. Ascend "comminutes" the batteries by grinding them up. As noted above, Ascend boasts that it has a "wet shredder" that is "the biggest of its kind in the world."

56. Ascend inactivates this shredded material after the comminution step. Ascend performs the inactivating step by drying the shredded material. As stated in the Covington YouTube video, Ascend "cooks off the electrolyte in a big rotating kiln." The result is the generation of black mass, which is chemically stable.

57. The drying occurs at low pressure. As described in the Recycling International article, URT's process, which Ascend adopted in Georgia, employs "vacuum distillation dryers." "Vacuum" pressure is generally understood to mean at or below 300 hPa, which is about one-third of an atmosphere. In order to dry the material in a commercially reasonable time frame, a lower pressure must be employed.

58. Further, Ascend has documented its ability to recover electrolyte in its battery recycling process and sell it back to battery makers. *E.g.*, ¶ 43. On information and belief, the recovered electrolyte can be resold because the electrolyte solvents are uncontaminated by hydrogen fluoride. It is now known that hydrogen fluoride generation in drying is strongly suppressed at temperatures below approximately 60ºC and increases sharply at temperatures above 60ºC. Therefore, on information and belief, Ascend's documented ability to recover and resell electrolyte in its battery recycling process requires drying at temperatures below approximately 60ºC.

59. On July 8, 2021, a customer of URT in Europe gave a presentation attended by Duesenfeld's Chief Technology Officer, Till Bussmann. The customer reported that the drying of shredded battery material occurs at about 50ºC, or about 122ºF. At this relatively low temperature, it would be economically infeasible to dry the black mass at atmospheric pressure

because it would take too long. It is therefore necessary to substantially reduce the pressure in URT's drying process as adopted by Ascend, well below 300 hPa, to achieve drying on a commercially reasonable time schedule.

60. Ascend fills transport containers with inactivated comminuted material, such as into the one-ton sacks depicted above.

61. On information and belief, Ascend has performed the same or a substantially similar method at its other facilities, including but not limited to its pilot plant in Westborough, Massachusetts, where Ascend grinds used lithium-ion batteries and extracts black mass. *See* ¶ 46.

COUNT I: INFRINGEMENT OF U.S. PATENT NO. 11,050,097

62. Duesenfeld incorporates by reference the foregoing paragraphs.

63. Pursuant to 35 U.S.C. § 282, the '097 patent is presumed valid.

64. Upon information and belief, Ascend has infringed, and is currently infringing, at least claim 1 of the '097 patent in violation of 35 U.S.C. § 271(a) by using without authority the machinery it employs as depicted above, for grinding, drying, and filling the battery material for transport, as described at ¶¶ 53-61.

65. Ascend's infringement has caused and continues to cause damage to Duesenfeld, and Duesenfeld is entitled to recover damages sustained as a result of Ascend's wrongful acts in an amount subject to proof at trial.

JURY TRIAL DEMANDED

Duesenfeld hereby demands a trial by jury on all claims and issues so triable.

PRAYER FOR RELIEF

WHEREFORE, Duesenfeld respectfully requests that the Court:

A. Enter judgment that Ascend has directly infringed one or more claims of the ’097 patent, either literally or under the doctrine of equivalents, in violation of 35 U.S.C. § 271(a);

B. Enter an order, pursuant to 35 U.S.C. § 284, awarding to Duesenfeld damages adequate to compensate for Ascend’s infringement of the ’097 patent (and, if necessary, related accountings), in an amount to be determined at trial, but not less than a reasonable royalty;

C. Enter an order, pursuant to 35 U.S.C. § 285, deeming this to be an “exceptional case” and thereby awarding to Duesenfeld its reasonable attorneys’ fees, costs, and expenses;

D. Enter an order that Ascend account for and pay to Duesenfeld the damages to which Duesenfeld is entitled as a consequence of the infringement;

E. Enter an order for a post-judgment equitable accounting of damages for the period of infringement of the ’097 patent following the period of damages established at trial;

F. Enter an order awarding to Duesenfeld pre- and post-judgment interest at the maximum rates allowable under the law;

G. Enter an order awarding to Duesenfeld a permanent injunction enjoining Ascend’s ongoing patent infringement; and

H. Enter an order awarding to Duesenfeld such other and further relief, whether at law or in equity, that this Court deems just and proper.

Respectfully submitted,

/s/ Karen E. Keller

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