UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

DK CROWN HOLDINGS INC. (FORMERLY DRAFTKINGS INC.), A DELAWARE CORPORATION,
Petitioner

v.

DIOGENES LIMITED,
Patent Owner

IPR2023-00265

U.S. Patent No. 9,704,338

DECLARATION OF OLAF VANCURA, PH.D. IN SUPPORT OF PATENT OWNER'S PRELIMINARY RESPONSE

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I. INTRODUCTION

I, Olaf Vancura, Ph. D declare as follows:

1. My name is Olaf Vancura. I have been retained as an expert in this proceeding on behalf of Patent Owner Diogenes Limited ("PO"), and its counsel, DLA Piper LLP (US). I am personally knowledgeable about the matters stated herein, and am competent to make this declaration.

2. I understand that DK Crown Holdings Inc. (f/k/a DraftKings, Inc.) ("Petitioner") filed a Petition for *Inter Partes* Review ("Petition") of US 9,704,338 ("the '338 patent") (EX-1001).

3. I am being compensated for my work in this matter at my standard hourly rate. I am also being reimbursed for reasonable and customary expenses associated with my work and testimony in this matter. My compensation is not based on the outcome of this matter or on the outcome of my opinions.

4. I have been asked to provide my conclusions and bases thereof regarding several aspects of the issues in dispute. Based on my investigation in this matter, I conclude that the games described in U.S. Patent Application Publication No. 2008/0113765 ("DeWaal", EX-1004) and U.S. Patent Application Publication No. 2008/0311981 ("Schugar", EX-1005) do not "naturally align" as alleged by Petitioner and that a person of ordinary skill in the art ("POSITA") would not have been motivated to combine DeWaal and Schugar.

5. My analysis and conclusions regarding both subjects are presented in more detail below.

II. BACKGROUND AND QUALIFICATIONS

6. I have extensive experience in gaming and gambling software.

7. My professional experience and expertise is described in my current CV (EX-2013).

8. I completed my Bachelor of Science in Electrical Engineering, with a minor in Mathematics, from Santa Clara University in 1987. I completed my Master of Arts in Physics from Johns Hopkins University in 1989. I completed my PhD in Physics from Johns Hopkins University in 1992. Thereafter, I joined Harvard University as a Post-Doctoral Fellow, and subsequent to that, I joined the Harvard-Smithsonian Center for Astrophysics as an Astrophysicist.

9. Circa 1995, I began working in the gaming space as a consultant, author and inventor. For several years, I created and taught the mathematics of gambling curriculum at nearby Tufts University. The class was very popular, oversubscribed by some 3 times available spaces, and nominated for "Best Course at Tufts."

10. In late 1997, I transitioned to the gaming industry full-time by joining Mikohn Gaming in order to initiate and lead their venture into gaming content. At Mikohn, I was promoted several times and ultimately headed their games division, leaving in 2006 as Chief Creative Officer.

11. In 2010, I joined American Gaming Systems as Vice President of Game Development, heading up an R&D team of 65 people, and was responsible for all hardware, software, game design, licensing and content.

12. I have designed (as chief architect, creatively responsible for concept, functional specification of game play and all underlying math) dozens of casino games (including slot machines with physical and/or video reels, video pokers and table games). In the design process, I typically code (program) the game "from scratch" and analyze game properties, evaluating and experimenting with various game play methods and math models before converging to a specification.

13. As a consultant, I have also coded, optimized and analyzed many casino games that are not my own, providing mathematical analysis and reports for gaming regulators. I am familiar with the mathematical and algorithmic underpinnings of electronic bingo-based (Class II), traditional Las Vegas-style (Class III) and pool/pull-tab-style slot machines. I am familiar with gaming regulations and have worked extensively with regulations and/or regulators covering multiple jurisdictions throughout the United States.

14. I (as sole or co-inventor) have been awarded over 80 United States patents related to gaming, including a number of patents directed to the implementation of base games in conjunction with bonus games. I have provided a

list of some of these patents, which I believe to be most relevant to this action, as EX-2014.

15. I have designed games that earned multiple awards from the industry and players including, e.g., the #1 and #3 "Most Innovative" game by Strictly Slots magazine readers in the same year. An estimated $8 billion has been wagered upon my games.

16. I am an author of multiple books on gaming/games. *Smart Casino Gambling* takes an applied mathematics approach to gaming and discusses ways of gaining an advantage, or at least minimizing the disadvantage, against the house. *Knock-Out Blackjack* describes a novel card-counting system I co-invented which was named one of the "Top 100 Events in Gaming" for the 20th century by *Casino Player* magazine. *Advantage Yahtzee* describes my computer-derived optimal solution to maximize expected score in the popular Yahtzee home game, a game of fantastic complexity with over 10^{100} possible paths. A neural network I created and coded, which learned to play Blackjack at an expert level, was described in my paper "A Computer Teaches Itself to Play Blackjack" as found in *Finding the Edge*, a compendium of academic gambling studies for which I served as lead editor.

17. I have been invited to give talks for the Dartmouth Chance Lecture series, University of Nevada Las Vegas Excellence in Gaming series, Cornell World Class Masters, University of Nevada Reno Executive Development Conference,

Mensa Annual Gathering and the National Institute of Standards and Technology, among others.

III. DOCUMENTS AND OTHER MATERIALS RELIED UPON

18. In forming the opinions set forth in this declaration, I have reviewed the documents in the following table:

Exhibit No.	Description
EX-1001	U.S. Patent No. 9,704,338 (the "'338 patent")
EX-1002	Prosecution File History of the '338 patent
EX-1003	File History for U.S. Patent No. 9,117,341
EX-1004	U.S. Patent Application Publication No. 2008/0113765 A1 ("DeWaal")
EX-1005	U.S. Patent Application Publication No. 2008/0311981 A1 ("Schugar")
EX-1007	Declaration of Dwight Crevelt
EX-2002	U.S. Patent 7,073,793 ("Vancura I")
EX-2003	U.S. Patent 7,284,756 ("Vancura II")
EX-2004	U.S. Patent 7,172,505 ("Vancura III")
EX-2005	U.S. Patent 6,918,834 ("Vancura IV")
EX-2006	U.S. Patent 6,645,071 ("Vancura V")
EX-2007	U.S. Patent 6,033,307 ("Vancura VI")
EX-2008	U.S. Patent 8,795,055 ("Vancura VII")
EX-2009	U.S. Patent 8,496,524 ("Vancura VIII")

Exhibit No.	Description
EX-2011	U.S. Patent 6,726,562 ("Vancura IX")
EX-2012	U.S. Patent 6,173,955 ("Vancura X")
EX-2013	CV of Olaf Vancura, Ph. D
EX-2014	List of Relevant Patents with Olaf Vancura as Inventor/Co-Inventor

19. Additionally, I have utilized my own experience and expertise, including regarding the knowledge and capabilities of a person of ordinary skill in the relevant art in the timeframe of the claimed priority date of the '338 patent.

IV. PETITIONER'S GROUNDS FOR CHALLENGE

20. In this declaration, I offer opinions on the following grounds presented by Petitioner:

Ground(s)	Claims	Basis	Reference(s)
1	1, 4-5, 7-9, 13, 19, 32	§102	DeWaal
2	1, 4-15, 17-19, 32	§103	DeWaal in view of Schugar

21. These grounds are presented in the alternative based on differing proposed claim constructions.

V. RELEVANT PATENT LAW AND LEGAL STANDARDS

A. Date of Invention

22. I have been asked to use the date of the filing of the earliest application to which priority is claimed (*i.e.*, September 6, 2012) as the date of invention for purposes of my analysis.

B. Anticipation

23. I am informed and understand that a patent claim is invalid under 35 U.S.C. §102 if a prior art disclosure teaches every element required by the claim, either expressly or inherently. The identical invention must be shown in as complete detail as is contained in the claim. When a claim covers several structures or compositions, either generically or as alternatives, the claim is deemed anticipated if any of the structures or compositions within the scope of the claim is known in the prior art.

C. Obviousness

24. I am informed and understand that a patent claim is invalid under 35 U.S.C. § 103 if the differences between the invention and the prior art are such that the subject matter as a whole would have been obvious at the time of the invention to a person having ordinary skill in the art to which the subject matter pertains. Obviousness, as has been explained to me, is based on (i) the scope and content of the prior art, (ii) the differences between the prior art and the claim, (iii) the level of ordinary skill in the art, and (iv) any secondary indicia of non-obviousness (*e.g.,* "secondary considerations" such as commercial success in the market place of the claimed invention), to the extent that they exist.

25. I further understand that obviousness may be demonstrated by showing that it would have been obvious to combine the teachings of more than one item of

prior art. In determining whether a piece of prior art could have been combined with other prior art or with other information within the knowledge of a person having ordinary skill in the art, the following are examples of approaches and rationales that may be considered:

- Combining prior art elements according to known methods to yield predictable results;
- Simple substitution of one known element for another to obtain predictable results;
- Use of a known technique to improve similar devices (methods, or products) in the same way;
- Applying a known technique to a known device (method or product) ready for improvement to yield predictable results;
- Applying a technique or approach that would have been obvious to try (choosing from a finite number of identified, predictable solutions, with a reasonable expectation of success);
- Known work in one field of endeavor may prompt variations of it for use in either the same field or a different one based on design incentives or other market forces if the variations would have been predictable to a person having ordinary skill in the art; and

- Some teaching, suggestion, or motivation in the prior art that would have led one of ordinary skill to modify the prior art reference or to combine prior art reference teachings to arrive at the claimed invention.

26. I further understand that an invention may be obvious if one of ordinary skill in the art, facing a wide range of needs created by developments in the field, would have seen an obvious benefit to the solutions tried by the applicant. When there is a design need or market pressure to solve a problem and there are a finite number of identified, predictable solutions, it may be obvious to a person of ordinary skill to try the known options. If a technique has been used to improve one device, and a person of ordinary skill in the art would recognize that it would improve similar devices in the same way, using the technique would have been obvious.

27. I further understand that a person of ordinary skill in the art is a hypothetical person who is presumed to be aware of all of the relevant art at the time of the invention. The person of ordinary skill may be able to fit together the teachings of multiple patents and/or printed publications employing ordinary creativity and the common sense that familiar items may have uses in another context or beyond their primary purposes.

28. I also understand that when considering the obviousness of a patent claim, one should consider whether a teaching, suggestion, or motivation to combine the references exists so as to avoid impermissibly applying hindsight when

combining or modifying the prior art. I understand this test should not be applied rigidly, but that the test can be important to avoid such hindsight.

29. I also understand that one of ordinary skill in the art must have a reasonable expectation of success in combining or modifying prior art references.

30. I also understand that all elements of a claim must be considered in an obviousness analysis.

D. Standard of Proof

31. I understand that the standard to prove unpatentability in an *Inter Partes* Review proceeding is by a preponderance of the evidence, which means more likely than not.

VI. LEVEL OF ORDINARY SKILL IN THE ART

32. I have considered the level of ordinary skill in the art relevant to the ’338 patent. I understand that factors such as the education level of those working in the field, the sophistication of the technology, the types of problems encountered in the art, the prior art solutions to those problems, and the speed at which innovations are made may help establish the level of skill in the art.

33. After reviewing the ’338 patent, the relevant portions of the prosecution history of the ’338 patent, and cited references, it is my opinion that the relevant art of the ’338 patent is in the field of electronic gaming.

34. Based upon my knowledge of this field, I conclude that a person of ordinary skill in the art ("POSITA") at the time of the earliest filing date of the '338 patent (September 6, 2012), and for that matter, at all subsequent times through the present, would have had a Bachelor's degree in electrical engineering, computer science, or a similar field; and at least two years of experience in the wager-based gaming industry. Additional work or research experience can substitute for less or different education, and vice-versa.

35. I am and was at the time of the earliest filing date at least a person of skill in the relevant art, of a level at least as high as or more than ordinarily skilled persons, and I am able to provide insight and opinions into the understandings of such persons at all relevant times by virtue of my education, training and experience.

VII. THE '338 PATENT

36. I have reviewed the '338 patent, together with its file wrapper and the file wrapper of related applications.

37. Having recognized a need for new products to generate and maintain interest in online betting platforms, which was a problem unique to this technology space and not a concern of in-person betting establishments, the '338 patent describes a novel solution to this problem. For example, the '338 patent states:

> A unique differentiator of the product of the present disclosure may be that at any desired time after initiation of an event (such as at any time after a "ticket" is purchased until completion of an event, after each leg

> has been completed, between legs, including potentially as a leg is "in-play", and/or during a designated span of time before, during and/or after any of the legs), any desired number of players who remain eligible for a prize (and potentially those still eligible for bonus and/or consolation prizes) or to win or have correct (win) predictions for each of the events or legs that are completed, may be offered a "buy-out" or an opportunity to sell their tickets (in whole or alternatively may be in part (i.e., a fractional amount) to the game operator or through the game operator (or alternatively directly) to a third party (e.g., one or more system operator(s), business entity or entities such as a merchant(s), one or more other persons, other player(s), etc.). Thus, for example, the game operator (or any other entity) may offer the player a fractional amount of the potential Jackpot Pool to buy the ticket for the still pending game(s) and thereby provide the player the opportunity to cash in and avoid the risk of being eliminated on a later leg or the final event. In other examples, a ticket held by players may be comprised of one or more divisions, and the buy-out offer or sale may involve just certain divisions of the ticket, so that those divisions are sold but the player retains ownership of the remaining divisions of the ticket. In yet another example, a ticket held by a player may include an accumulator or parlay wager, in which case the player may receive (or initiate) a buy-out offer or sale for a fractional amount of a prize (e.g., a jackpot), and which may occur at any time, such as before, during and/or after any of the legs specified by the wager have been completed.

EX-1001, 2:38-3:3.

38. A buy-out offer can strike a balance between the interests of bettors and the sportsbook operator (or the "house") during the life of a wager. A multi-leg wager (for example, an accumulator or "parlay" wager) allows a bettor to make one wager requiring the successful outcome of multiple events, such as the result of three football games. All of the wagered outcomes are required to win; the winnings from one event are staked on the next event in a series until either the bettor loses or the series completes successfully. In multi-leg wagering, prior to the start of all of the sporting events wagered upon, a bettor purchases one ticket having each of the bettor's predicted outcomes of the games or "legs" of the event contained thereon. A successful bet or ticket, in a parlay embodiment, is worth a predetermined value based on the application of each game's (or leg's) payback to each of the successive events. A successful bet is more difficult because it is contingent on multiple successful outcomes, and can also be very profitable to the bettor given the progressive increase in stake between successful legs.

39. For example, a bettor having a four-fold parlay, or a bet involving four sporting events, having won the first two of the four relevant bets on their ticket, stands a better chance to win the overall wager than what existed prior to the completion of those first two events. Conversely, the house stands a more significant risk of losing the bet. A buy-out allows a bettor to sell its wager back to the house

for a profit that is less than the maximum amount of the possible winnings, to the potential benefit of both parties.

40. Accurate, timely and consistent buy-out offers improve bettor confidence. It is desirable for an online wagering system to operate accurately and with stability across a plurality of players. The ’338 patent provides the capability to provide a buy-out offer to a plurality of players based on the criteria described in the ’338 patent, and to do so consistently across similarly situated tickets, independent of bettors’ geography. Thus according to the patented methods, a bettor receives a partial or full buy-out offer reflecting a value derived from real-time information from potentially a multitude of sources.

41. These technological advancements potentially foster additional bettor engagement and platform profits. Combined with buy-out offers’ improved real-time accuracy, these improvements, in my opinion, are apt to drive bettor engagement by increasing popularity of placed bets, amounts wagered (since wagers may be cashed-in for partial value to avoid “all or nothing” scenarios) and placement of new bets, which in turn increases revenue.

42. Increased bettor enjoyment should result in keeping customers at an online betting site, i.e., better site “stickability,” than an online wagering system lacking these features.

43. The complexity of the required method, system, or device required to generate buy-out offers in real time with, for example, real time odds changes that may depend in a time-sensitive manner, e.g. for sporting events which team currently has possession, instantly upon a turnover, a made/missed shot, a rebound, a strikeout, an error, etc., is greatly increased vis-à-vis a single-outcome bet resolution at the end of a game, and increases further with additional legs, or complexity of in-play betting or bet types like single-game parlays parimutuel pools.

44. The buy-out functionality is technical and time-sensitive in nature. A large volume of information from various sources may be collected and analyzed, "instantly," for a real-time valuation. For any particular wager, this information includes the maximum payout for the bettor's bet and the probability of a successful outcome. The probability calculation can take into account many types of real-time information from the sportsbook operator, such as odds changes, the maximum payout for the multi-leg event bet, the probability of a successful outcome on the remaining leg or legs, and in parimutuel betting how many tickets have been sold holding the same ticketed outcome, as well as the value and composition of the pool, including for example whether any consolation prizes are offered for near miss tickets. The probability of success calculation for an in-leg multi-leg wagering event may also take into account external data from a multitude of sources.

45. The collection and processing of this volume of information from a multitude of sources, accurately and in real time, is not possible outside of the technological environment of an online sports wagering system. For example, in the context of multi-leg wagers, the probability of success must be continuously re-calculated between legs of a multi-leg wager, or before or while any particular leg event is in progress, based upon on a variety of mid-game statistical fluctuations, some examples of which are noted earlier.

46. Further, the system identifies all similarly situated bettors to whom a particular buy-out offer will be made, regardless of geography, and facilitates real-time communications to and from that plurality of bettors.

47. This buy-out feature provides additional decisions for the player, which creates added excitement and engagement during the legs—thus fulfilling the need in the gaming industry "for new products to generate and maintain consumer interest." EX-1001, 1:49-50.

48. The '338 patent provides a unique, ordered combination of elements that, taken together, improve prior art in online wagering systems. Such methods, systems and devices, to my knowledge, were neither typical nor accomplished previously in the prior art.

VIII. CLAIM CONSTRUCTION

49. I have been informed that the parties are proposing competing claim constructions. However, claim construction is irrelevant to my opinions on the motivations to combine DeWaal and Schugar, and I therefore do not address claim construction in this Declaration.

IX. SUMMARY OF REFERENCES IDENTIFIED BY PETITIONER

50. Petitioner relies on two references, DeWaal and Schugar. A brief discussion of each reference is provided below.

A. DeWaal

51. The Petition relies on DeWaal in both grounds.

52. DeWaal is titled "Gaming System and Method Providing Venue Wide Simultaneous Player Participation Based Bonus Game" and published on May 15, 2008.

53. DeWaal is generally directed to "a multi-round bonus event to a plurality of players wherein each players' input(s) determine, at least in part, an award, if any, provided to that player for the bonus event." EX-1004 at [0009]. DeWaal describes the bonus as a "secondary game" that occurs separately from a "primary" or base game and offers different incentives to players.

54. DeWaal describes attributes of a typical bonus game in the following manner:

> Secondary or bonus games are also known in gaming machines. The secondary or bonus games usually provide an additional award to the player. Secondary or bonus games usually do not require an additional wager by the player to be activated. Secondary or bonus games are generally activated or triggered upon an occurrence of a designated triggering symbol or triggering symbol combination in the primary or base game. For instance, a bonus symbol occurring on the payline on the third reel of a three reel slot machine may trigger the secondary bonus game. Part of the enjoyment and excitement of playing certain gaming machines is the occurrence or triggering of the secondary or bonus game (even before the player knows how much the bonus award will be). In other words, obtaining a bonus event and a bonus award in the bonus event is part of the enjoyment and excitement for players.

Id. at [0004].

55. A bonus game, such as the one disclosed by DeWaal, is an additional game mathematically layered onto (or into) the primary game. A bonus game typically results in a win for the player and is constructed such that a range of win amounts (including, as a design choice, zero) is possible. The reason this can be done is that there is no wager typically associated strictly with the bonus game; instead there is a wager for the game as a whole.

56. It is known that bonus games: may be triggered in a variety of ways; typically have gameplay different than that of the base game; usually require no additional wager, so that bonus game is an opportunity for the player to earn an

additional award risk-free; may be offered as an option to a game payoff, so that the game payoff becomes the wager for the bonus game. *See e.g.,* U.S. Patent No. 6,726,562 (EX-2011), 1:32-42; U.S. Patent No. 6,173,955 (EX-2012), 10:59-67.

57. The bonus game in DeWaal is initiated by a central controller upon one or more triggering methods (the phrase "triggering event" is used interchangeably with "qualifying condition"). As disclosed:

> In one embodiment, the central controller determines to provide a bonus event upon an occurrence of a triggering event or qualifying condition. In one embodiment, the triggering event or qualifying condition occurs based on a play of a game at one of the gaming machines in the gaming system. For example, the triggering event or qualifying condition is a symbol-driven event, such as a generated symbol or symbol combination in a primary game of one of the gaming machines in the gaming system. In another embodiment, the triggering event or qualifying condition occurs by exceeding a certain amount of game play (number of games, number of credits, amount of time) or reaching a specified number of points earned during game play. In an alternative embodiment, the triggering event or qualifying condition occurs randomly and independent of game play. In different embodiments, the triggering event or qualifying condition is predetermined, randomly determined, determined or weighted based on the player's wager, determined or weighted based on the status of one or more players (such as determined through a player tracking system), determined based on time, or determined based on any other suitable parameter or function.

EX-1004 at [0014].

58. Upon an occurrence of a suitable triggering event, the central controller of DeWaal identifies at least one player and preferably a plurality of players who are "eligible" to play the bonus event. *Id*. at [0109]. In other words, at such time as the triggering event occurs (that is, the qualifying condition occurs), eligible players may be provided the bonus game.

59. The triggering event (i.e., qualifying condition) and eligibility are two different concepts in DeWaal that work in a complementary fashion such that for a player to play the DeWaal bonus game, both must be true (a triggering event / qualifying condition must have occurred AND the player must be eligible).

60. DeWaal discloses an embodiment, suitable for the gaming device (Id. at [0079]), in which a "player must make a separate side-wager on the bonus game or wager a designated amount in the primary game to qualify for the secondary game." *Id*. at [0083]. Here, I believe DeWaal discloses what is now commonly referred to as an "ante" wager, or extra or side or "buy-a-pay" wager, which must be placed in order to make the player eligible for (i.e., "unlock") certain pays, features and/or a bonus game. For example, in U.S. Patent 8,795,055 ("Vancura VII") (EX-2008): "The buy-a-pay feature is an arrangement whereby a subset of payoffs must be "bought" in order to be active. Historically used on mechanical slots, for example, a first coin would buy a set of "Cherry" pays, the second a set of "Bar" pays, and the

third a set of "7" pays. For example, a player playing one coin and hitting 7-7-7 would not get paid on such a machine. The "buy-a-pay" formats are used on video slots now as well, in order to offer access to payoffs, features or bonus games that otherwise would not take place." DeWaal then states, seemingly to avoid any confusion, that in this embodiment, the "triggering event must occur and the side-wager (or designated primary game wager amount) must have been placed to trigger the secondary game." *Id*. In other words, both a triggering event in the base game and an addition side-wager are necessary. As such, the side-wager by itself is not sufficient to trigger the bonus game but is separate from and acts in concert with the triggering condition.

61. DeWaal also discloses another embodiment in which "qualification of the bonus or secondary game is accomplished through a simple 'buy in' by the player, for example, if the player has been unsuccessful at qualifying through other specified activities." *Id*.

62. DeWaal discloses yet another embodiment, in reference to the "Multi-Round Bonus Event," in which "players who logged into a suitable player tracking system (e.g., either with a player tracking card or in another manner) and players who buy into the bonus event by placing a separate wager are eligible for the bonus event." *Id*. at [0118].

63. Considering these embodiments, it is not clear to me that there is any wager directly associated with the bonus game. The "buy in" of para. [0083] implies qualification (and, seemingly also eligibility), whereas the "buy into" of para. [0118] references eligibility alone. Per the teachings of DeWaal, it is not clear to me whether this "buy into" eligibility occurs before or after the qualification condition has been met. It is also not clear to me whether the "buy into" is a one-time occurrence or occurs repeatedly while awaiting a qualification condition.

64. Furthermore, what is meant by "separate wager" in para. [0118] that "enables a player to participate in the bonus event" is not clear in light of its definition of "comprises a side-wager or entry fee." *Id.* A side-wager refers to eligibility per para. [0083], comes before a qualifying condition, and a separate qualification condition must occur for the bonus game to take place. It is not clear to me how a side-wager enables the bonus game.

65. Throughout the history of slot machines, multiple reels with various indicia thereupon have (almost ubiquitously) been utilized as the base game. Propelled by popular mechanical slot machines in the 1990s and exploding thereafter with video slots, bonus games have become popular because they typically require no additional wager, offer different gameplay and have a positive expected value for the player.

66. In my opinion, at the time of invention, it was well known that base games generally do not make good bonus games, and vice-versa. Indeed, DeWaal itself recognizes the differences between primary and bonus games and that the two types offer different advantages and incentives.

67. Once the bonus game of DeWaal is triggered, the bonus game "includes a plurality of rounds" in which "each of the eligible players makes inputs from a plurality of outcomes in each round." *Id*. at [0012].

68. If the player picks a designated selection in one of the rounds, "the central controller offers that player to either quit the bonus event and keep the total award accumulated in the bonus event or continue the bonus event and play a subsequent round." *Id*. at [0018]. The offers to quit are offered between rounds of the bonus event. *See id*. at [0158]. If the player chooses to quit, "the central controller provides (or causes that player to be provided) with the accumulated award." *Id*.

69. In DeWaal, if an award offer to quit is accepted, because it is a bonus game, the current award offered is given to the player and the game is simply over for the player. The player is not encouraged to, and in fact cannot, continue playing.

70. Furthermore, in DeWaal, the award is based upon a player's previous correct choices within the bonus game itself. It is not taught that a player should be offered the expected value of the game or something based on this expected value. Only players actually "winning" in DeWaal, (i.e., having made all of the right picks

of only designated selections to that point in the game) will ever be offered an award to quit the game. It is only offered if the player has some form of positive equity (that is, all picks have been "winning" outcomes). The player must be "winning" to quit.

71. In DeWaal, the award to quit the game is only offered after a round takes place and only if a winning pick occurred during that just-completed round. In DeWaal, a potential award is not offered while the player is presented with selections but prior to picking from among those selections. In DeWaal, a potential award is not offered prior to initiating play.

B. Schugar

72. The Petition relies on Schugar in Ground 2.

73. Schugar's disclosure is solely directed to a primary game in which at least one wager is directly at-risk.

74. Schugar "allows a player to borrow money against the player's position in a game already in progress." EX-1005, [0020]. Schugar notes that when a player "is playing a game in which the player can be 'winning' before the game is over, the player may wish to have a way to cash in on the winning state before completing the game." *Id*. at [0077]. That player "may find it attractive to be able to accumulate (or 'bank') a portion of a positive expectation situation for later redemption." *Id*. In this manner, "even if the player ultimately loses his or her wager, the player has not lost

everything because the banking has been performed." *Id*. The expected profit banked may be redeemed for cash at a later time or redeemed for cash instantly. *Id.* at [0083].

75. Most embodiments described in Schugar involve a situation in which the player has a positive expectation in the current state of the game. The teaching of paragraphs [0070 - 0071] considers a "winning" position in craps in which the player receives a surrender value to end the game "based on equity in his position." For example, the entire teaching of paras. [0077]-[0105] of Schugar is in respect to positions with an expected profit (i.e., the player is "winning" and wishes to bank some portion of the expected profit).

76. Mathematically, a positive expectation occurs when the player has the advantage, (i.e. the player's expected return is over 100%). *See id.* at [0020]. Schugar points out that a loan, in order to place an additional wager upon the game in progress, can be made "based on this positive expectation." *Id.* at [0023]. This ensures that the player "is guaranteed to make a profit regardless of an outcome of the game." *Id*. at [0024].

77. Schugar notes that a player having "a positive expectation based on his or her wagers and the game state" is in an "equity state" within the game. *Id*. at [0042]. The term "equity" is defined as when "the player's expected profit is greater than 0, or if the player's expected winnings is greater than the initial wager." *Id*. at [0124].

78. For example, Schugar teaches that "a player can use equity in a current wager in order to place an additional wager." *Id*. at [0120]. The wager "has equity in that the bettor may not be guaranteed to win but he or she has a positive expectation in the wager based on the current game state." *Id*.

79. Schugar does keep open the possibility that "the player need not be in a positive expectation situation in order to utilize the method of cashing in value for a current wager in progress in order to place a second wager," but notes that "a bettor in a positive expectation situation may be more eager to make further bets when he or she is winning their current wagers." *Id*. at [0120]. However, Schugar teaches that "even if the player is in a negative expectation situation, the player can still utilize the method described herein of cashing out a portion of a current bet in progress in order to pay for an additional wager." *Id*. at [0127]. A method of "using equity in a first wager in progress in order to fund a second wager" is shown in FIG. 6. *Id*.

80. In my opinion, the primary goal of Schugar is to get a player to "bank" (i.e., cash in for future use or immediate cash) or "borrow" to additionally wager on the game borrowed-against (said "bank" or "borrow" when in a positive expectation situation). Schugar also discloses "cashing in" value for a current wager in progress in order to place a second wager (when in a negative expectation situation) all or a portion of the expected value of the player's current bet, only insofar as it pays for an additional wager. Schugar only discloses the ability to "bank" a positive

expectation in a primary game. While Schugar does mention a bonus game, there is no disclosure or contemplation of a bonus game including this banking feature.

81. Schugar teaches that the system may present a player with an "offer" to bank his or her positive expectation. The offer takes the form of "an automatic pop up window which allows the player to choose whether he wishes to bank some or all of his recent gains in expectation for later redemption (with a return of the game state to the prior or other position with lesser expected value than the current state)." *Id*. at [0092].

82. In each and every instance that this pop up window is described, it is tied to a player having a positive expectation and either suggests a wager with which the player is guaranteed not to lose (*Id.* at [0048]) or requires that the player agree to revert the game to a previous state in exchange for acceptance of the offer. *See e.g., Id*. at [0084], [0092], [0098]. No other "offer" is disclosed.

X. A POSITA WOULD NOT HAVE BEEN MOTIVATED TO COMBINE DEWAAL AND SCHUGAR

83. In my opinion, a POSITA would not have been motivated to combine DeWaal and Schugar.

84. DeWaal discloses a bonus game, or a "secondary game" that occurs separately from a "primary" or base game. EX-1004, [0004]. In other words, a bonus game is an additional game within a game.

85. Even in embodiments disclose the initiation of a bonus game via a side-wager, DeWaal still teaches that a triggering event (that is, random qualifying condition) must still take place in order to play the bonus game. Because of this, the side-wager (which may or may not create an instance of the DeWaal bonus game based on other random, conditional factors) is not the same as a wager on a primary/base game.

86. Bonus games operate inherently differently from primary/base games. Throughout the over 100-year history of slot machines, multiple reels with various indicia thereupon have (almost ubiquitously) been utilized as the base game. Propelled by the popular mechanical Wheel of Gold/Wheel of Fortune slot machines in the 1990s and exploding thereafter with video slots, bonus games have become popular because they typically require no additional wager, offer different gameplay, have a positive expected value for the player, and the player enjoys "earning" a reward that is risk-free.

87. In typical slot machines, the overall game comprises a primary game, which is the game initiated as a result of making a wager (e.g., primary game comprises the slot reels that initiate spinning upon a wager being placed) and one or more bonus games. The base game occurs with each wager. A bonus game, however, randomly and infrequently occurs, typically results in a win for the player and is

constructed such that a range of win amounts (including, as a design choice, zero) is possible.

88. A bonus game is an additional game mathematically layered onto (or into) the primary/base game. For example, U.S. Patent No. 7,073,793 ("Vancura I") (EX-2002), filed in 2003, discloses a system and method for a "survey-based casino game as a bonus game for an underlying casino game." EX-2002, Abstract. This is shown in FIG. 2:

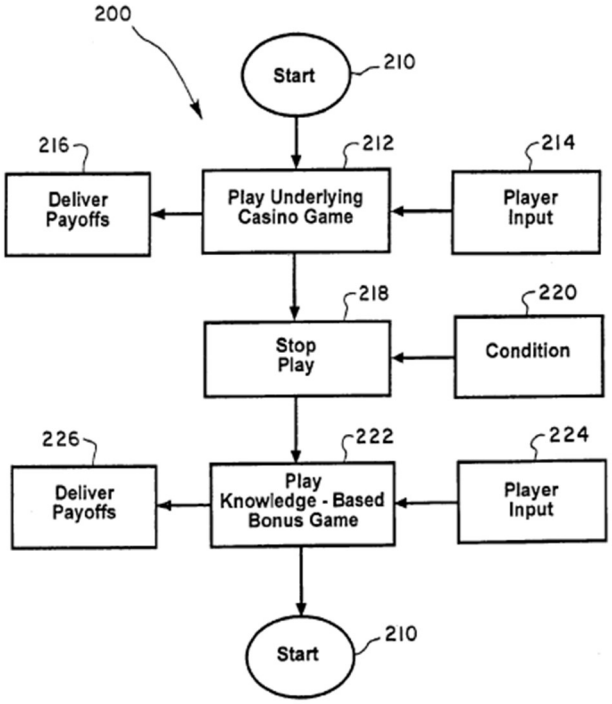

Fig. 2

EX-2002, Fig. 2.

89. In other words, the bonus game is played on top of or in addition to an underlying game. The underlying game 212 stops at 218 before the bonus game play begins 222. *See id*.

90. Vancura I further explains that "[a] knowledge-based casino game, under the teachings hereof, works well as a bonus game to a conventional underlying casino game of chance." EX-2002, 4:40-42. More specifically:

> [A] knowledge-based bonus game is provided in combination with an [underlying] game of chance. A wager is received from a player to play both the underlying game of chance and potentially the knowledge-based bonus game. The underlying game of chance is played and the underlying game of chance has a first house advantage based upon the received wager. Play of the knowledge-based bonus game occurs at a given statistical frequency.

Id. at 2:43-50.

91. In other words, the base game is played by initiating a wager, while the bonus game is played at a given frequency in combination with the primary game.

92. Vancura I includes a mathematical description of the overall math for slot games, including that of an in-game bonus game that may be triggered from the base or underlying game (although the same methodology may be applied to external triggering). *See* EX-2002, 4:55-65 This mathematical description is copied below.

House Advantage = $-[R + fB - X] / X$

Where:

R = Player's Expected Return for Underlying Game in Units

f = Frequency (of Bonus Game)

B = Player's Expected Return for Bonus Game in Units

X = Units Wagered

Id.

93. A base game always yields an average win less than the wager. This is because, in order to preserve a House Advantage, the average base game return must necessarily be less than the wager (that is, $R < X$). In contrast, a bonus game, on average (or, as a design choice, always), yields a win significantly greater than the wager. The reason bonus games can award generously (that is, $B >> X$) is their frequency is small; bonuses are infrequent occurrences. There is no wager directly associated with the bonus game; instead there is a wager for the player's overall game as a whole.

94. A base game occurs with every wager, hence the coefficient associated with R is 1. On the other hand, a bonus game occurs with limited frequency, via a conditional probability f, which is typically of order 1 in 100 games (e.g., $f \approx 0.01$). So, the coefficient associated with B is f, where $f << 1$. The contribution to the House Advantage, per the above equation, for a bonus game goes as the quantity $-fB / X$. So, in the case of a bonus game triggered internally (e.g., by an underlying or base game), the bonus game (as a design choice) may either (a) utilize a base game wager for bonus paytable purposes (B is a function of X), (b) utilize a base game wager for

bonus frequency purposes (*f* is a function of X) or (c) utilize some combination thereof (both B and *f* are functions of X). Importantly, and contributing to the popularity of bonus games among players, there is no wager placed at-risk as a result of playing the bonus game, for the X units of consideration are already wagered upon the overall game (underlying base game plus conditional chance of bonus game).

95. A number of the patents listed in EX-2014 confirm and solidify the different incentives and other well-known distinctions between bonus games and base games.

96. U.S. Patent 7,284,756 ("Vancura II") (EX-2003) describes the need for certain forms of bonus games in "an underlying game such as a slot machine." EX-2003, 1:33-35.

97. U.S. Patent 7,172,505 ("Vancura III") (EX-2004) teaches that bonus games are "games within a game" that typically "provide[] a break from the traditional reel-spinning base-game portion of the wagering experience." EX-2004, 1:29-31 (emphasis added). Moreover, Vancura III describes that "[o]nce in the bonus game, the player is treated to an experience" that is unique from the base game, such as where "no additional wager is required, and yet the player is generally assured of winning an award." *Id.* at 1:32-34. The bonus game also plays "quite differently than the base game." *Id.* at 1:34-36. "For example, it may involve the player choosing from among several objects (WMS Filthy Rich, Atronic Sphinx,

IGT Little Green Men, etc.), a game of strategy (Mikohn Yahtzee, Mikohn Battleship), spinning a physical wheel located in the top-box (Anchor Wheel of Gold, IGT Wheel of Fortune), dropping a ball through a Pachinko forest (Mikohn Boingo), or other possibilities (Anchor Pinball, Barcrest Run for the Money, etc.)." *Id.* at 1:36-43. A bonus game "is generally initiated via a special combination of so-called trigger symbols within the base game." *Id*. at 1:44-45. Too, "a major goal of most players is to achieve the bonus game." In contrast, a typical base game is "simply a 'wager and wait' affair." *Id*. at 2:25-28.

98. U.S. Patent 6,918,834 ("Vancura IV") (EX-2005) teaches that "[c]asino bonusing games are increasingly popular ***when placed in operation with underlying casino gaming machines*** such as, for example, slot machines." EX-2005, 1:11-13 (emphasis added). Such bonus games "not only attract players but provide additional gaming excitement." *Id*. at 1:13-14.

99. U.S. Patent 6,645,071 ("Vancura V") (EX-2006) teaches, for a "parallel" or persistent bonus, that "[w]hen utilized as a bonus game, a player tends to play underlying games longer, because with each play the player draws closer to solving the puzzle in the bonus game." EX-2006, 2:9-12.

100. U.S. Patent 6,033,307 ("Vancura VI") (EX-2007) teaches that "[i]t is well known in the gaming industry that bonus games attract and keep players at a gaming machine." EX-2007, 1:16-17. The bonus game "is typically another gaming

machine or a random selection device which is enabled by a bonus qualifying signal from an underlying or primary gaming machine." *Id*. at 1:17-21.

101. U.S. Patent 8,795,055 ("Vancura VII") (EX-2008) identifies that "[a] need exists in the casino gaming industry to create methods of playing features or bonus games, as often players are motivated to play slot machines to get into the bonuses themselves." EX-2008, 1:18-22.

102. U.S. Patent 8,496,524 ("Vancura VIII") (EX-2009) states that "[s]lot machines having an underlying casino base game with an accompanying bonus game are also well known." EX-2009, 1:22-24. In particular, "a bonus game manifested as a 'game within a game' is popular… Typically, bonus games are triggered, or activated, based on the random play of the underlying base game." *Id* at 1:24-27 (emphasis added). Furthermore, "often players are motivated to play slot machines to get into the bonus games themselves." *Id*. at 2:32-34. That is to say, the bonus games are the reason players play. And also, "A particular need exists to enhance bonus play wherein players actively participate and do not merely passively observe." *Id*. at 2:34-36.

103. For these reasons, a POSITA would have understood, and continue to understand, that certain game types are more suited for bonus games, rather than primary games, because of how the games function differently.

104. In short, the bonus games disclosed in DeWaal are different than a primary/base game, and the players' wagers which initiated the primary game are not at any risk, and no additional wagering takes place within the bonus game. Conversely, Schugar's disclosure is directed to a primary game—just one game with the wager at risk and with a goal of affording additional wagering upon the primary game. In DeWaal, the "secondary or bonus games usually provide an ***additional*** award to the player." EX-1004, [0004] Any player that accepts the "offer to quit" in exchange for the "additional award" between rounds is paid the award and is eliminated from the bonus event. *Id.* at [0142]. On the other hand, "[i]f the player rejects the offer, the player is advanced to the subsequent round." *Id.* at [0162]. In contrast, Schugar teaches an offer of an award that the player can accept if he or she also reverts to a previous game position. EX-1005, [0084]. For example, "the player wishes to bank his or her $15 expected profit, the game state can return to the previous state (e.g. the puck is at +2 with a $10 wager on the left side)." *Id.* at [0082]. This arrangement would not work for DeWaal. As mentioned above, DeWaal only offers its "award to quit" in the bonus event (i.e., only after a primary or base game is concluded). A player cannot revert in DeWaal because the game, by its nature, does not allow the player to fluctuate from the starting position to a "winning" or "losing" position as part of the game play (and possibly, back to the starting position), as described in Schugar. In DeWaal, the player is either "winning" (all picks are

correct) or the game is over. Further, the "award to quit" in DeWaal ends the bonus round; its purpose is to take a win and not continue playing. If the player wishes to continue playing, he or she has to reject the "award to quit."

105. Therefore, the games described in the references do not "naturally align" as alleged by Petitioner. Instead, to modify a bonus game, a POSITA would have looked to other bonus game disclosures, and similarly, to modify a primary game, a POSITA would have looked to other primary game disclosures.

106. Indeed, DeWaal itself recognizes the differences between primary and bonus games and that the two types offer different advantages and incentives. More specifically, DeWaal notes that "part of the enjoyment and excitement of playing certain gaming machines is the occurrence or triggering of the secondary or bonus game (even before the player knows how much the bonus award will be). In other words, obtaining a bonus event and a bonus award in the bonus event is part of the enjoyment and excitement for players."). EX-1004, [0004].

107. Schugar makes the distinction as well. Schugar's disclosure is solely directed to a primary game in which a wager is directly at-risk and mentions a "bonus game" as something separate (and not further described) that, for example, may be initiated if the primary game ends in a tie. EX-1005, [0130].

108. While base games and bonus games may be coupled together (e.g., within a slot machine environment) via a triggering mechanism, the complexion,

play and purpose of each type of game is quite different. Mathematically they are different, having disparate frequencies, properties and award attributes that fulfill different functions in slot machine design.

109. Generally, base games do not make good bonus games, and bonus games do not make good base games. *See, e.g.*, EX-2002, 4:40-42 ("A knowledge-based casino game, under the teachings hereof, works well as a bonus game to a conventional underlying casino game of chance.").

110. In my view, the bonus game of DeWaal and the and primary/base game of Schugar do not "naturally align" as alleged in the Petition.

111. DeWaal repeatedly describes its "award to quit" only in the context of a bonus game and does not contemplate usage of this feature in a base game. On the other hand, Schugar repeatedly discloses only primary game examples in its teachings.

112. In my opinion, a POSITA would not have looked to DeWaal to modify a primary/base game and would not have looked at Schugar to modify a bonus/secondary game.

113. Further, in my opinion, a POSITA would not have looked to Schugar to address DeWaal's stated need for "new and different ways to provide awards to players including bonus awards" because Schugar's banking disclosure accesses existing, known equity in a primary game's position as opposed to new ways of

providing (unknown or unexpected, per DeWaal "even before the player knows how much the bonus award will be") awards to players.

I declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code.

3/27/2023
Date

Olaf Vancura, Ph.D.