

UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE PATENT TRIAL AND APPEAL BOARD

GUANGZHO EKO TRADING DEVELOPMENT CO., LTD.,
Petitioner,
v.
NINE STARS GROUP (U.S.A.) INC.,
Patent Owner.

Case No. IPR2025-01191
U.S. Patent No. 10,822,165 B2

REPLY DECLARATION OF STEVEN C. VISSER

I, Steven C. Visser, declare as follows:

I. INTRODUCTION

1. I have been retained by Guangzhou EKO Trading Development Co., Ltd. (“EKO”) as an independent expert consultant in this proceeding before the United States Patent and Trademark Office (“PTO”). I am not an employee of EKO or any affiliate or subsidiary of EKO.

2. I have been asked to reply to certain of the positions set forth in Patent Owner’s Response (Paper 15) in an *inter partes* review proceeding relating to U.S. Patent No. 10,822,165, which I refer to herein as the ’165 patent.

3. I am being compensated at my usual consulting rate for my work, plus reimbursement for any reasonable expenses. My compensation is based solely on the amount of time that I devote to activity related to this case and is in no way contingent on the nature of my findings, the presentation of my findings in testimony, or the outcome of this or any other proceeding. I have no other financial interest in this proceeding.

4. The prior declaration I submitted in connection with this proceeding, which I understand has been designated as Ex. 1006, sets forth among other topics my educational background and professional experience (Ex. 1006, ¶¶ 5-31 and associated CV attached to the end of the declaration), my understanding of the law (*id.*, ¶¶ 38-54), a discussion of the ’165 patent’s filing date and a listing of the

patent's claims (*id.*, ¶¶ 60-62), the knowledge and characteristics of a person having ordinary skill in the art (*id.*, ¶¶ 55-59), and certain claim construction opinions (*id.*, ¶¶ 63-66).

5. In forming the opinions set forth in this declaration, I have considered and relied upon my education, knowledge of the relevant field, knowledge of scientific principles including manufacturing and design principles, my work with those of ordinary skill at the time of the alleged invention, and my general experience in the field of art.

6. I have also reviewed and considered the materials listed in my prior declaration (*id.*, ¶ 37), the Board's Institution Decision (Paper 8), Patent Owner's Response (Paper 15), and the following materials to the extent relevant to my opinions:

Exhibit	Description
1014	U.S. Patent No. 6,311,017 B1 to Mori
1015	U.S. Patent No. 6,819,866 B2 to Da Silva
1016	U.S. Patent No. 7,913,871 B2 to Fisher
1017	U.S. Patent No. 9,033,176 B2 to Liistro et al.
1018	U.S. Patent No. 9,437,962 B2 to Liu et al.
1019	U.S. Pub. 2011/0017735 to Wang et al.
2002	Declaration of Xin Wang
2003	Declaration of Jiangqun Chen

II. RESPONSE TO CERTAIN OF PATENT OWNER’S ARGUMENTS

7. The paragraphs below respond to certain of the arguments and assertions made by Patent Owner in this proceeding. In these paragraphs, I address only a fraction of Patent Owner’s assertions. The fact that I do not respond to any particular assertion should not be considered to indicate agreement with that assertion or the argument to which it relates.

A. Wang Is Enabled

8. I understand that a prior art reference is enabled—and thus is available to render a patent’s claimed subject matter unpatentable—if it allows the claimed subject matter to be practiced without undue experimentation.

9. Factors considered when determining whether undue experimentation is required to practice claimed subject matter include (1) the quantity of experimentation necessary, (2) the amount of direction or guidance provided, (3) the presence of working examples, (4) the nature of the invention, (5) the state of the prior art, (6) the relative skill of those in the art, (7) the predictability of the art, and (8) the breadth of the claims at issue.

10. I also understand that it is only necessary for the prior art to enable a single embodiment falling within the scope of a patent’s claims. It is not necessary for the prior art to enable the full scope of the claimed subject matter.

11. Patent Owner argues that Wang is not enabled because it purportedly does not sufficiently disclose “waterproofing” of the disclosed trashcan. I disagree. Considering factors (1)-(8) above, in my opinion, a POSITA as of the ’165 patent’s effective filing date would have considered Wang to be enabled. Very little—if any—experimentation would have been required to implement Wang. Undue experimentation would certainly not have been required. Each of the factors is discussed in greater detail below.

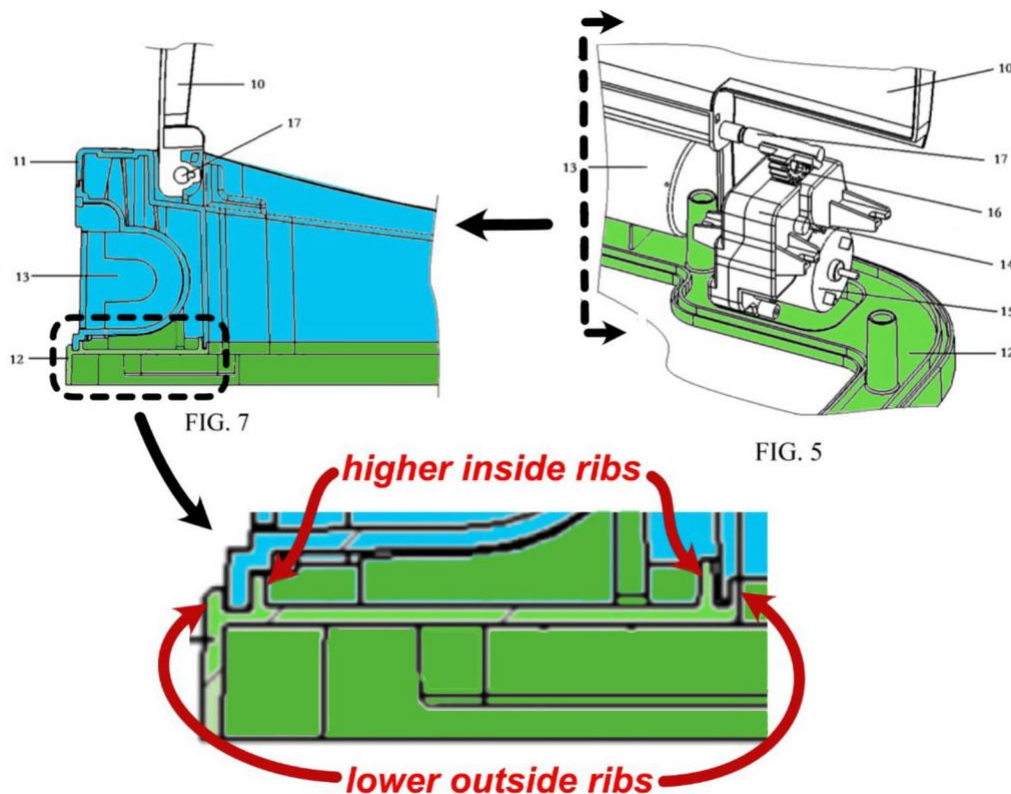
12. ***Quantity of experimentation necessary:*** In my opinion, no meaningful experimentation would be required to implement Wang.

13. Wang repeatedly states that its trashcan is designed to provide “good waterproof, moisture-proof, and corrosion-proof performance.” Wang, ¶¶ [0004], [0008], [0018]; *see also id.*, Title (referencing a “[w]aterproof sensing trashcan”); Abstract (stating that the trashcan is “waterproof”), ¶ [0001] (identifying the “technical field” as “waterproof” containers).

14. Moreover, a POSITA reviewing Wang would have immediately recognized that Wang both explains in its specification and depicts in its figures how this waterproof performance is to be achieved.

15. Wang shows a waterproofing technique in the drawings. A POSITA would have seen that Wang’s housing has a tongue-and-groove joint that operates to improve the waterproofing of the sensing trashcan. A POSITA would have

understood that a tongue-and-groove joint creates a tight joint by having a tongue inserted into a groove. Wang depicts the use of a tongue-and-groove at the interface of its “middle body seat” and the “annular covering housing.” The below zoomed in and cropped view of Figure 7 of Wang shows this, with the “middle body seat 12” (highlighted green) having grooves bounded by ribs formed in the outer wall. The grooves receive tongues (highlighted blue) that are part of the “annular covering housing.” Furthermore, Wang’s Figure 7 shows that the inside rib of the groove is higher than the groove’s outside rib further improving the waterproofing. The below figure shows where Figure 7’s cross-sectional view is taken from relative to the structure shown in Figure 5 of Wang (which also shows the higher/lower ribs):



Wang, Figs. 5, 7 (excerpted and annotated).

16. Wang also states that its trashcan is rendered waterproof because the “transmission component, power supply component, and ... control component are all wrapped in isolation space” such that they are “completely isolated from a garbage storage portion of the trashcan.” *Id.*, ¶ [0008].

17. More specifically, Wang’s sensitive components are all “disposed in an inner cavity formed” between a “middle body seat” and “annular covering housing” that are “buckled” together to “wrap[]” the components and “isolate[]” them “from the garbage storage space.” *Id.*, ¶ [0018]. Again, as shown in Figure 7 the body seat and annular covering housing interface in a way that allows for waterproofing.

18. A POSITA would also have recognized that Figure 4 of Wang depicts the use of 8 bosses. A POSITA would have known the bosses are included in the housing to assist in the secure connection between the middle body seat and the annular covering housing. I have highlighted the bosses in red in Figure 4 below:

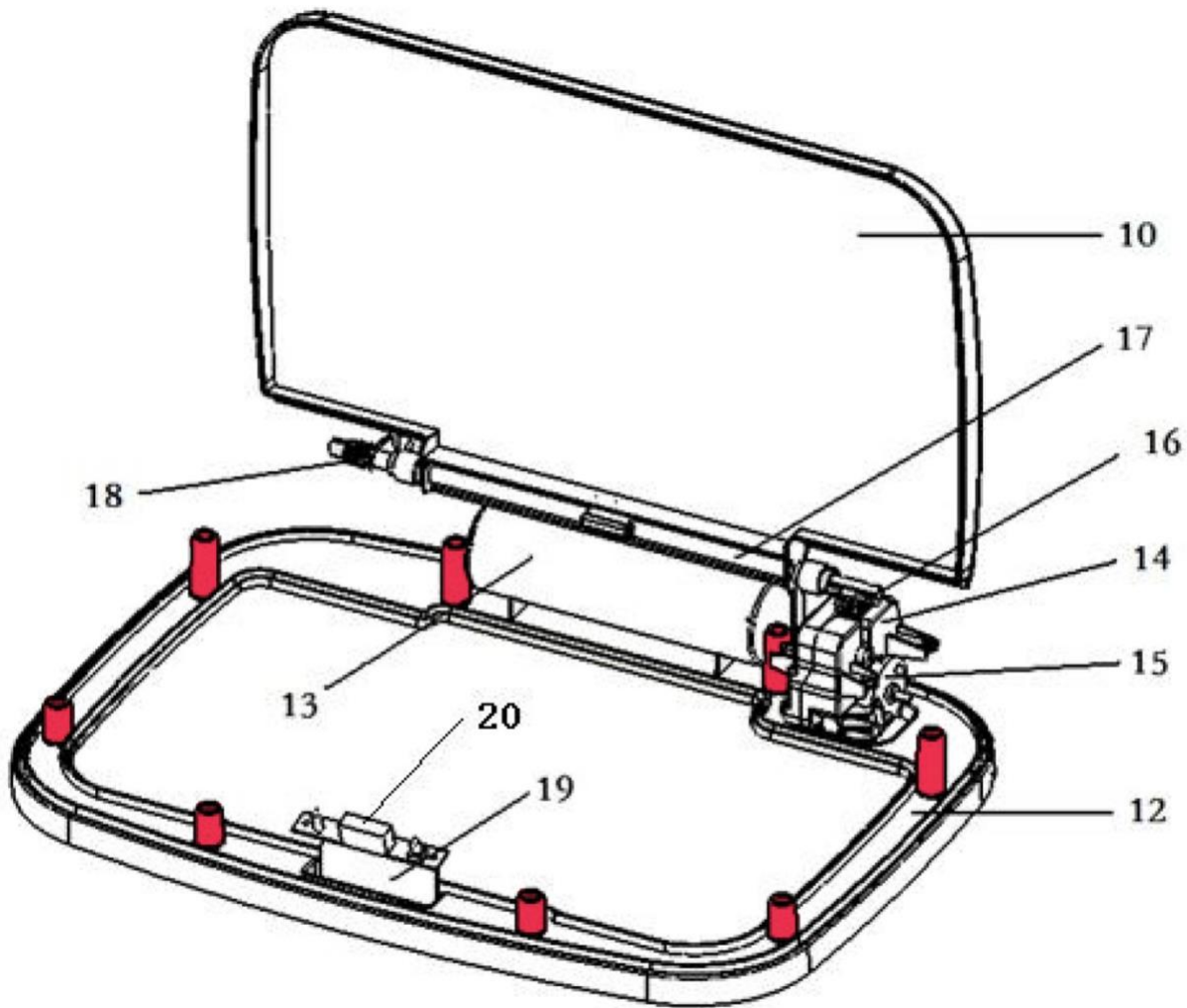


FIG. 4

Wang, Fig. 4 (annotated).

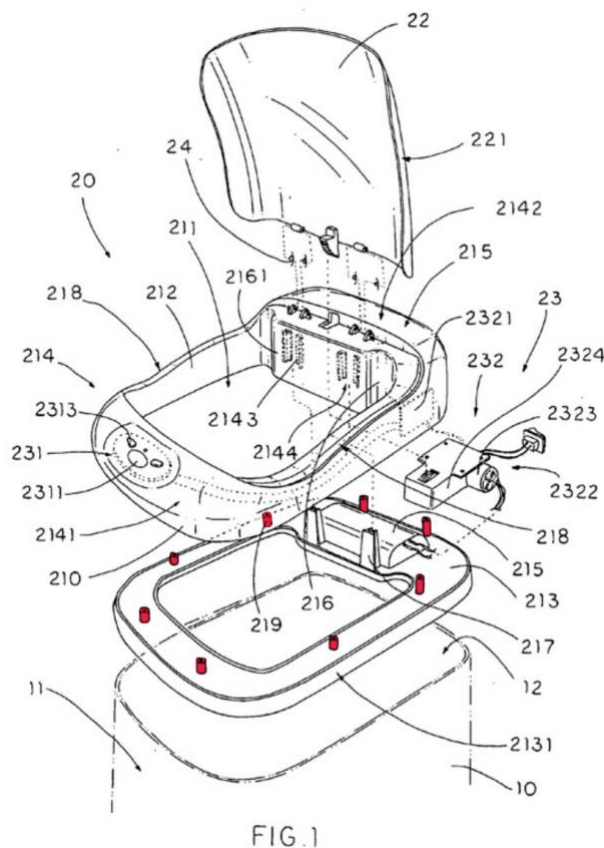
19. In the courses I teach, I introduce industrial design students to injection molding. I use several teaching samples from Protolabs to assist in teaching the basic design principles of injection molding. One of the concepts I teach is an introduction to bosses, which are raised circular ribs or platforms. Bosses are frequently used to engage fasteners to join plastic parts together. Below is a picture

of one of the plastic teaching samples I use in teaching students about injection molding. The green boss on the left is similar to those in Figure 4 of the '165 patent. Additionally, in the pieces in the teaching sample shown below, there are also tongue-and-groove elements to fasten the different colored pieces together. A POSITA would have been well aware of basic injection molding concepts such as bosses and tongue-and-groove connections in plastic, would have seen that Wang uses similar structures in its figures, and would have immediately understood that they allow Wang's middle body seat and annular covering housing to be secured together in a waterproof manner.



<https://www.protolabs.com/resources/design-tips/complex-plastic-part-design-o-ring-grooves-mushroom-studs-and-text/>

20. A previous application for an induction actuated container by Wang confirms what would have already been apparent to a POSITA reviewing Wang: bosses are used to fasten the top and bottom housing together. *See* Ex. 1019 (US Pub. 2011/0017735 to Wang, or the '735 Application). Figures 1 and 3 are reproduced below. The bosses are identified as “screw posts 2191 upwardly extending from the base sealing frame 213.” *Id.*, ¶ [0052]. The screws couple the housing together via the screw posts (bosses). I have highlighted the screw posts in red below in Figure 1 and the screws highlighted in red in Figure 3 below:



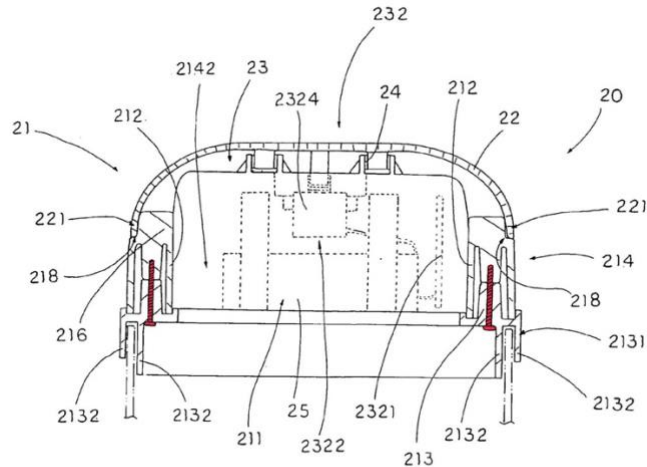


FIG. 3

Id., Figs. 1, 3 (annotated).

21. Thus, in Wang, the trashcan's sensitive components (like the controlling electronics, motor, and gear mechanism) are located within a housing that is secured to prevent moisture and contamination incursion. This is achieved using typical components, like a tongue-and-groove interface between housing components and bosses and screws that keep the housing together.

22. This is depicted in multiple figures, including Figure 3 and 6 (depicting the assembled middle body seat and covering housing), Figures 4-5 (depicting the interior space between the seat and housing), and Figure 7 (depicting a partial section view of the upper can body). Wang, Figs. 3-7.

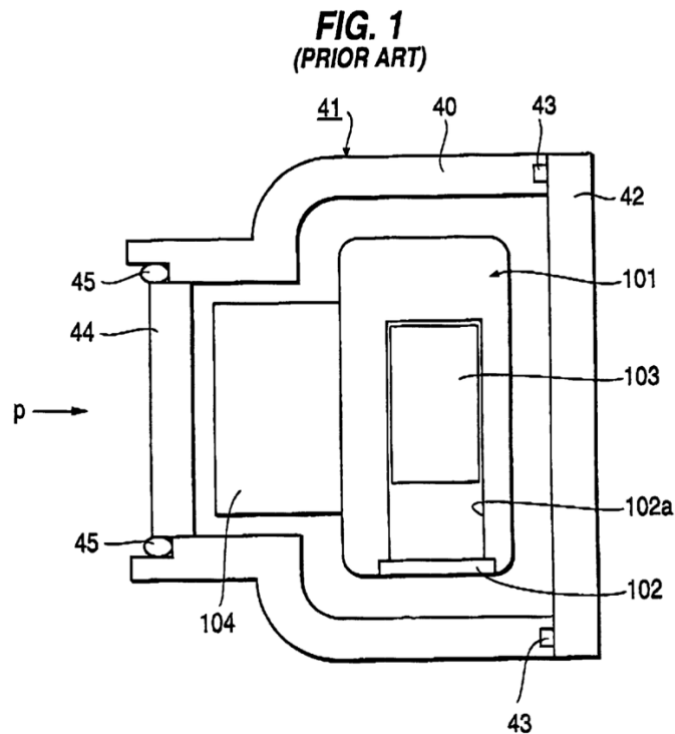
23. A POSITA would have been readily able to use this description to design a trashcan with adequate waterproofing without undue experimentation. By the time the '165 patent was filed, a POSITA would have recognized that isolating

components within a properly formed and interconnected housing is capable of (and does in fact) providing adequate waterproofing of the components inside the housing. A POSITA would have understood that this is particularly the case for a trashcan. A trashcan is not intended to be fully submerged in water or subjected to extreme soaking (like from a hose or irrigation equipment). Thus, to be “waterproof,” it is only necessary for the trashcan to resist the types of moisture that may be encountered when waste is deposited in the trashcan. Wang’s trashcan—with its interlocking housing pieces that form an interior isolation space—accomplishes this level of waterproofing.

24. Further, while a POSITA would have considered Wang’s disclosure itself to be sufficient, if further information were needed to achieve a greater degree of trashcan waterproofing, the prior art at the time the ’165 patent was filed was filled with known, straightforward, and implementable methods to improve the waterproofing of consumer products.

25. Showing this, Ex. 1014 (or U.S. Patent 6,311,017, the ’017 patent), which is an example prior art reference relating to a waterproof housing for sensitive electronic components, explains that “waterproof housings” that protect electronic “sub-assemblies” were “well known” long before the ’165 patent was filed. Ex. 1014, 1:8-12. While this reference provides an example of a camera that is protected

by a waterproof housing, it also notes that a wide range of other devices can be similarly protected. *See id.*, 4:2-9.



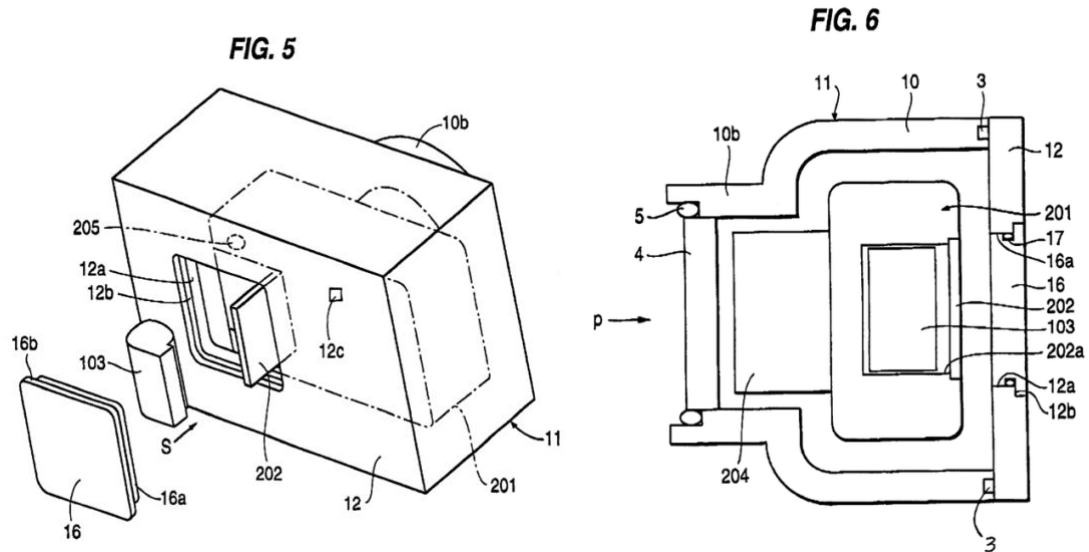
Id., Fig. 1.

26. Not only were waterproof housings in general well-known, but the art was filled with methods for achieving waterproofness.

27. For example, it was known that a “conventional” “glass, acrylic, plastic” container with “seals 43 and 45” allows “[w]ater and other materials” to be “kept out of” the housing. *Id.*, 2:7-12.

28. It was also known that such a seal can be in the form of a “waterproof seal member” “located in the exterior periphery of an inner portion ... of” a container

housing “cover ... to maintain the watertight state of the waterproof housing” just as in the ’165 patent’s own example. *Id.*, 7:64-67. Examples of this are shown below:



Id., Figs. 5, 6 (showing rectangular openings sealed with a seal member).

29. One of the seals shown above is in the form of a “waterproof seal member 3” “located between the body 10 and the back 12 to form a watertight state. *Id.*, 7:26-30

30. In another example, and while the ’165 patent is certainly not limited to this type of arrangement, the prior art recognized that a “waterproof housing[]” can be achieved via the use of a “gasket” located in a “gasket channel” that “circumscribes the exterior surface” of the housing. Ex. 1018, 1:18-22, 1:50-61. The gasket can be “an O-ring constructed from a suitable elastomer material.” *Id.*, 2:20-21.

31. This same method—use of a gasket or seal around the periphery of the housing—had even been used to waterproof trashcans. Ex. 1016, 1:18-25 (referencing “storage containers” such as “garbage cans”), 10:58-67 (container is rendered “water proof” via its use of a “seal known in the art, including an O-ring, a gasket, and the like” that is “attached” to the container’s “lid” or “base”).

32. The claim 1 of the ’165 patent only require that the “an articulation unit concealed in said first side concealed compartment of said control housing in a waterproof manner....” The manner of waterproofing or the efficacy of waterproofing has not been specified in claim 1. Therefore claim 1 will be met by the disclosure of the Wang patent simply by stating and showing a waterproof manner.

33. The ’165 patent’s specification provides no further information regarding how waterproof the compartments need to be.

34. Nor does the patent provide meaningful information regarding how waterproofing is achieved (beyond that already in Wang). The ’165 patent does state that “a bottom edge of the upper casing 35 is sealed and coupled at the sealing channel 342 of the base of frame 34.” ’165 patent, 5:63-65. The Wang reference discloses one such sealing channel as discussed above.

35. Furthermore the ’165 patent states that “[p]referably, a sealing element 343 is disposed along the sealing channel 342 of the base frame 34 and is provided

to seal a connection between the bottom edge of the upper casing 35 and the sealing channel 342 of base frame 34 to ensure the waterproof configuration of the first and second side concealed compartments 32, 33.” *Id.*, 5:65-6:3. While Wang does not specifically mention a sealing element 343, the ’165 patent suggests that sealing element 343 is “[p]refer[red]” but not necessarily required. Such an element is not required by the claims. Wang itself states that its trashcan is “waterproof.” And it provides an example method of achieving this (upper and lower housing pieces secured together with bosses and a tongue-and-groove interface). A POSITA would have immediately realized that the channel in Wang is a sealing channel and the bosses in Wang are used to couple the annular middle seat 12 (base frame) to the annular covering housing 11 (upper casing). This renders Wang’s trashcan waterproof and is one example of a sealed container falling within the scope of the ’165 patent’s claims. Moreover, as I note both above and below, the prior art is filled with additional, readily available methods to improve this waterproofing.

36. Other waterproofing methods besides the use of seals or gaskets were also known, in routine use, and available to a POSITA reviewing Wang.

37. This includes use of “potting compound” in gaps or holes (Ex. 1015, 9:24-32), “male/female” “interlocked” rim components (Ex. 1017, 9:55-60, 10:11-16), a “sealing surface” like “tape” (*id.*, 8:16-18), or a “thermo-form flange or other compression molding mechanism” (*id.*, 8:21-24).

38. In my opinion, a POSITA would not only have known of these waterproofing methods but would have considered them to be readily applicable to Wang.

39. Each of the waterproofing methods listed above were also recognized as acceptable for use with consumer products, including trashcans.

40. Because of this, next to no experimentation would have been required to employ them with Wang.

41. A POSITA would have recognized that applying a gasket, flange, potting compound, or tape to Wang's housing amounts to little more than routine work.

42. Likewise, forming Wang's upper and lower housing components such that they interlock would require little (if any) effort. Indeed, this is what a POSITA would have understood Wang to already teach.

43. All of these waterproofing methods were specifically identified in the prior art and identified as methods capable of waterproofing a housing.

44. ***Amount of direction or guidance:*** In my opinion—and as I explain above—Wang itself provides significant guidance regarding how its trashcan is to be waterproofed. It both describes its trashcan in words (explaining that sensitive components are protected within the inside of its housing) and depicts this arrangement in multiple figures. *See supra* paragraphs 13-23.

45. Moreover, the prior art supplements Wang's own waterproofing disclosure, providing numerous examples of how the waterproofing of a container or housing can be improved (including via the use of seals, gaskets, tape, potting compound, or interlocking housing elements). *See supra* paragraphs 24-43.

46. ***Presence of working examples:*** As I discuss above, Wang already includes a complete working example of its trashcan that is depicted in multiple, detailed figures. *See, e.g.,* Wang, Figs. 1-5.

47. ***Nature of the invention:*** Wang and the '165 patent are both directed to trashcans. This is a straightforward technical field that was well-developed as of the '165 patent's filing in 2016. A POSITA would have been able to readily understand how Wang's trashcan operates and would recognize that that trashcan is substantively the same as that referenced in the '165 patent.

48. ***State of the prior art:*** As of 2016, automatically opening trashcans like that disclosed by Wang were well known. In fact, the '165 patent itself identifies this type of trashcan as conventional. *E.g.,* '165 patent, 1:35-66.

49. Further, waterproofed containers—including containers intended to hold waste—were also conventional and well known when the '165 patent was filed.

50. Thus, as of the '165 patent's 2016 effective filing date, the art relating to waterproof containers was well developed and included numerous examples not only of trashcan designs, but also of methods to improve container waterproofing.

51. ***Relative skill of those in the art:*** In my original declaration, I opined that a POSITA would have had a technical college degree and experience designing consumer products. Ex. 1006, ¶ 57; Response, 16.

52. In my opinion, this POSITA would have been more than capable of following Wang's disclosure (along with that in related prior art) for purposes of developing a waterproof trashcan.

53. I understand that Patent Owner proposes that a POSITA would have possessed a greater level of skill. While I do not believe this is required (*see* discussion of my qualifications below), a POSITA possessing a greater level of skill and knowledge would have even less difficulty implementing Wang.

54. ***Predictability of the art:*** In my opinion, a POSITA would not have considered trashcan technology to be complex. Instead, it would have been considered entirely predictable.

55. The functionality of a trashcan like that in Wang is apparent from its structure. And a POSITA would also have immediately recognized that adding seals, tape, gaskets, or interlocking mating structures would have rendered such a can more waterproof.

56. ***Breadth of the claims:*** In my opinion, the '165 patent's claims are broad. They embrace a variety of waterproof containers and are not limited to the

specific trashcan shown in the patent's figures. As I explained in my opening declaration, Wang teaches the same trashcan.

57. I have reviewed the two declarations cited by Patent Owner (Exs. 2003-2004).

58. The declarations appear to discuss the efforts of the inventors identified on the face of the '165 patent to address supposed "reliability concerns" with the trashcan discussed in Wang. Ex. 2002, ¶¶ 11-12; Ex. 2003, ¶¶ 11-12.

59. The declarations then go on to list a handful of specific design details that appear to relate to the trashcan embodiment discussed in the '165 patent's specification, including its "sealing and isolation structure," specific "shaft-sleeve structure," and "balanced arrangement."

60. To begin, none of these design details appear to be required by the '165 patent's claims. The claims do not require the same sealing structure referenced in the '165 patent's specification, or the same shaft-sleeve depicted in the patent's figures.

61. Moreover, the work discussed in these inventors' declaration does not constitute undue experimentation. Instead, at best it is routine, ordinary design optimization that is performed whenever a product is brought to market. A POSITA would have been more than capable of performing this same work when armed with Wang's disclosure and the prior art background knowledge I discuss above.

B. Patent Owner's Discussion of my Qualifications

62. Patent Owner takes the position that a POSITA in the '165 patent's technical field "would have several years of experience designing or manufacturing automatic induction-actuated trash containers or similar electromechanical consumer appliances." Response, 16-17.

63. Patent Owner further requires that a POSITA possess knowledge regarding "sensor-based control systems, electric motor actuation mechanisms, gear reduction systems, environmental sealing techniques, and structural design considerations...." *Id.*

64. Patent Owner then takes issue with my background, arguing that I purportedly do not have experience with the "engineering, manufacturing, or development of electromechanical systems such as induction-actuated trash containers." *Id.*

65. In my opinion, Patent Owner sets the level of skill possessed by a POSITA too high. Further, it does not properly account for my background and experience.

66. Years of specific and focused experience designing induction-actuated trash containers is not required to understand the '165 patent. Nor is extensive experience with electromechanical systems.

67. I understand that a POSITA is only required to have ordinary skill, not extraordinary skill.

68. The '165 patent relates to a trashcan, a simple and straightforward consumer product. Only general product design experience is required to understand how trashcans operate.

69. The '165 patent itself characterizes inductive, automatically opening trashcans as “conventional” at the time of filing. '165 patent, 1:37-38.

70. The patent also makes clear that it is directed to “container[s]” in general, not necessarily trashcans. *Id.* 1:48-53

71. This confirms, in my opinion, that specialized knowledge is not required: the patent relates to a “conventional” and known type of container.

72. Further, because the patent is not limited to just trashcans, experience with any type of automatically actuating consumer product (like a container, panel, tray, dispenser, or the like) is plainly relevant.

73. Next, the '165 patent also explains that its trashcan employs standard, off-the-shelf mechanical and electrical components. '165 patent, 1:35-66 (“electrically operated containers” “conventional”).

74. And rather than providing specifics about the components it employs, the '165 patent refers to these components generically. *Id.*, 5:32 (referencing an

“actuation unit 60”), 6:50-42 (referencing a “sensor unit 51” with a “circuit board” and “sensor”), 7:7 (referencing a “servo motor 61”).

75. Because the ’165 patent itself does not provide this level of information (and instead assumes that it is already conventional), specialized knowledge regarding how to design and develop electromechanical systems cannot be required.

76. In my opinion, the POSITA definition set forth in my opening declaration—a POSITA would have a technical degree (such as industrial design, industrial engineering, or mechanical engineering) and two years of product design experience—is consistent with the ’165 patent’s disclosure. It requires only a moderate amount of technical education and recognizes that a general understanding of consumer product operation is sufficient to understand trashcan operation.

77. While I believe that Patent Owner’s definition is erroneous, my educational background and work experience would still qualify me as a POSITA (and expert) even if that definition is adopted.

78. I have been a professor of industrial design at Purdue University since 1989. Ex. 1006, ¶ 8. As part of this, I have taught numerous classes focusing on the integration of electrical and mechanical parts into consumer products. *Id.*, ¶ 9.

79. These classes discuss—among other things—how mechanical and electrical principles relate to and bear on those products and how consumers use them.

80. In my opinion, this provides me with the academic background Patent Owner requires: my teaching experience is “related” to “mechanical” or “electrical engineering.”

81. Next, I do in fact have years of experience designing a variety of products employing sensors, electric motors, gears, and environmental sealing techniques.

82. For instance, I have designed video game controllers, lighting elements, a vehicle lift control mechanism, foot operated trashcans, a health video camera, portable audio devices, a fiber optic cross, and a temperature control system.

83. While Patent Owner argues (*see* Response, 18) that none of the patents that I am an inventor on are related to induction-actuated trash containers, waterproof container structures, or similar electromechanical consumer appliances, my experience is not limited to designs I have created that are patented.

84. As can be seen below, I have professionally and as a teacher dealt with waterproofing issues in designs. I also have experience designing and developing electromechanical consumer appliances.

85. While I have not specifically designed an induction actuated trash container, I have designed many devices of a similar complexity and addressed waterproofing issues as a designer and design educator.

86. As an industrial designer, I work with engineers, including electrical engineers, mechanical engineers, production engineers, to develop designs for production.

87. Patent Owner appears to suggest that the “technological advancements” of the ’165 patent are beyond my qualifications.

88. Specifically, they suggest that my “qualifications do not reflect the technical expertise required to evaluate the electromechanical engineering aspects of the claimed invention.” Response, 1.

89. I disagree. I have over 37 years of experience in the design and production of consumer products of a similar or more complex nature than that described in the claims of the ’165 patent.

90. I have spent hundreds of hours analyzing patent claims as an expert witness.

91. This experience includes analysis of patent claims, specifications, and file histories for: claim construction, validity, comparison of patent disclosures in prior art, POSITA analysis, and infringement analysis.

92. I also have significant technical experience, including with the electromechanical engineering aspects of product design.

93. As early as 1989, I began designing consumer products including housings intended to be produced in injection molded plastics. These housings

typically were clam shell construction, with two main housings formed to enclose internal components including mechanical and electrical components.

94. In my initial declaration I included 10 pages highlighting my design experience. *See* Ex. 1006, ¶¶ 5-31.

95. Here I detail the experience I have had as an industrial designer and industrial design educator.

96. The '165 patent describes an “electrically operated device.” I have experience designing and developing such a device. Examples of electromechanical devices I have designed include:

- The QLD Wheelchair Lift
- Cell phones for Samsung
- Pendant light for Omega Lighting
- Track lighting system for Omega Lighting
- A Rotary Assembly table for the Raven Group
- A video game controller for ExerTron
- A MXR Programable light for Apollo Technologies

97. Patent Owner suggests I lack the technical ability to understand the advancements in the claims of the '165 patent. I disagree and believe that I have engaged in work far more complex than the '165 patent.

98. I am currently leading a team in a research project to design the housing for an electromechanical devices for Wabash MPI/Carver, Inc.

99. The designs being created include an AutoPellet press that is a combination of electrical controls and mechanical systems. Some of the issues we needed to design for included waterproofing the housing for the hydraulic pump, in case of a leak. The housing needed to have enough volume to contain all the hydraulic fluid in case of a catastrophic failure.

100. Additionally, we needed to design a housing that isolated the electrical components from the hydraulic components. To do this we designed a sealed compartment, seen on the right side of the image following paragraph 105 below, separating the electrical components from the hydraulic portion on the left side.

101. The design of a housing for the sealed side included gasketing materials to make the door waterproof, to protect from liquid spills such as a drink being spilled on top of the unit, to protect the electrical components from moisture.

102. Additionally, we needed to consider locating controls and sensors to allow for the device to be operated safely.

103. The AutoPellet RP press was introduced at PittCon March of 2026. The housing was a combination of sheet metal fabrication, aluminum extrusion, hinges, switches, and controls.

104. The technological complexity of the AutoPellet RP press (due to controls and use of hydraulics) exceeds that of the design claimed in the '165 patent.

105. As industrial designers we were tasked with arranging the electrical and mechanical components of the device. We explored a wide variety of configurations of these components to arrive at the final solution shown below, including sealing and separating the electrical components from moisture, such as the hydraulic fluid.



(showing the *Carver AutoPellet RP* introduced at PittCon March 2026).

106. This is, of course, not the extent of my experience designing products with electromechanical components.

107. In 2015-2018 time frame, I was the lead designer (product designer) on a Purdue team designing the Braunability QLD wheelchair lift.

108. The design included the design of a housing for the hydraulic pump and electrical system that powered the lift.

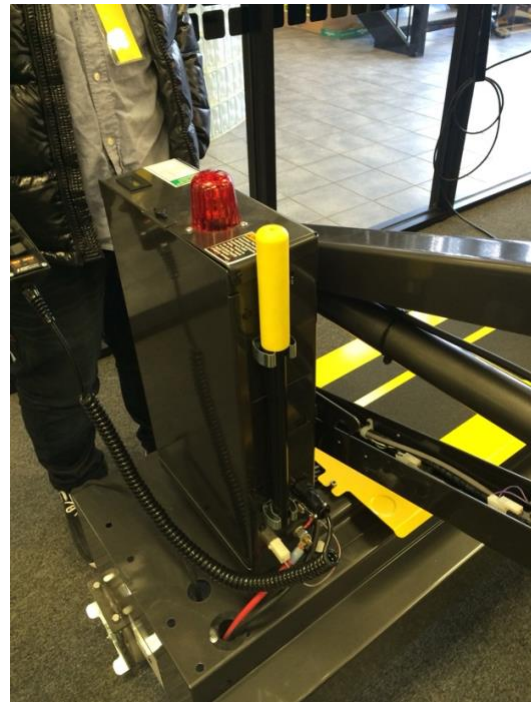
109. The main housing was designed to protect the electrical and mechanical components from the weather, including the rain.

110. The new design included a number of innovations, including a curved plastic top that improved the aesthetics as well as improved the waterproofing over the previous sheet metal fabricated box; an integrated design for a deep drawn vertical channel; a simplified hand controller that needed to function in the rain.

111. The design went on to be produced in Europe, winning several awards; including a Gold A' design Award in Italy, a gold IDA (International Design Award), and a Gold Appliance Design Award in the USA.



(New design with improved plastic curved top)



(Old design sheet metal box)

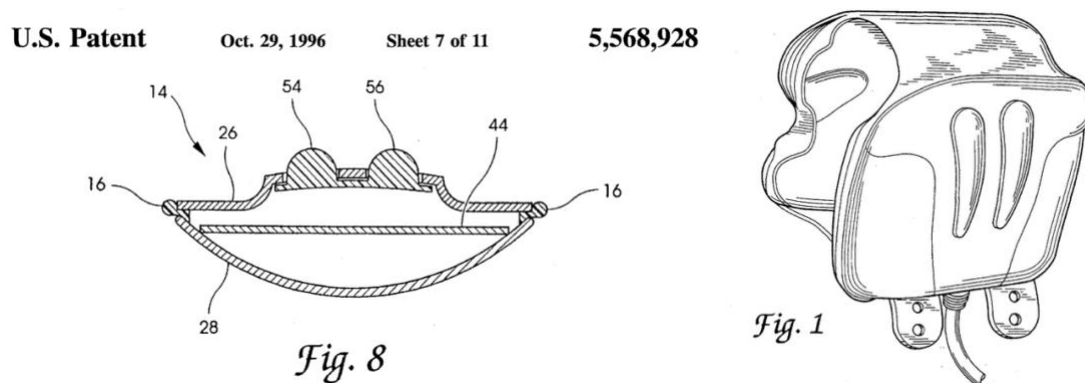
112. This product was discussed in several publications:

- <https://www.metro-magazine.com/news/braunabilitys-q-series-wheelchair-lift-wins-design-award>
- <https://www.idesignawards.com/winners/zoom.php?eid=9-16670-18>

113. I also have designed several products that combine injection molded housings with electrical and mechanical components.

114. For example, the ExterTron Video Game Controller employed an injection molded housing with a rubber-like connecting member (16) between the two halves of the housing (26 and 28).

115. It also included internal electronics and mechanisms including a pivoting toggle plate that allowed the user to activate the controls by twisting his or her wrist. An example of this design is shown in the patent images below:



116. The technological advancements embodied in the '165 patent are well within the scope of my experience as an industrial designer.

117. I am familiar with the manufacturing techniques of injection molding, sheet metal fabrication, and arrangement of components.

118. I have designed devices that are of similar complexity to the trashcan disclosed in the '165 patent. Additionally, I have designed product that had to contained liquids, including a contact lens travel case for Reliance Inc. in 2004. It included a hinged lid and screw caps for containing the contact lens fluids. A Pompeii Washbasin that used a ball to stop the flow of water. The identity mouthguard that was intended for use in one's mouth and used multi-shot injection molding. The C-Ring self-watering flowerpots that used a combination of injection molded plastic parts, rotational molded, and elastomeric tubing to contain the water also designed for Reliance Inc..

119. As a professor, I introduce students to injection molding, including locating ribs and bosses and avoiding undercuts. I also introduce students to sheet metal forming techniques including stamping, rolling, and deep drawing.

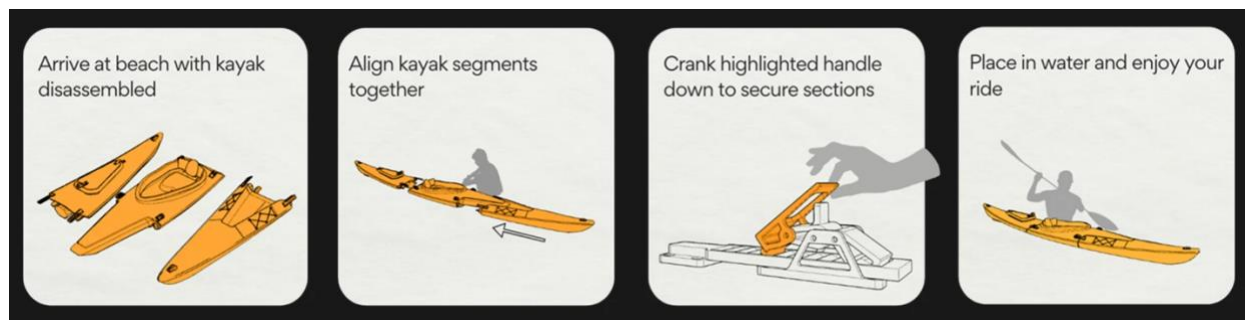
120. I also teach students to arrange internal components of electronic and mechanical components to achieve new design configurations.

121. For example, one of my students created a modular sea kayak design in my class. The kayak could be separated into three pieces for easy storage and transport. It also needed to be watertight and take into consideration the manufacturing process and user needs.

122. The design went on to win First Place in the 2024 Association of Rotational Molders Student Design Competition.

KAALIN

A Modular Sea
Kayak

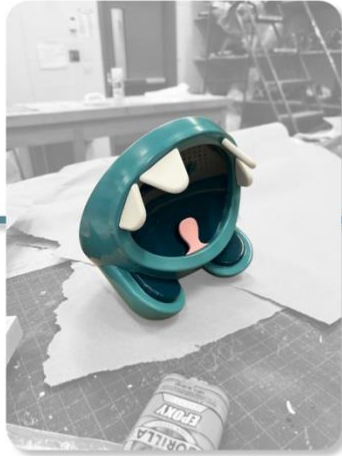


See <https://www.rotomolding.org/student-design-competition>.

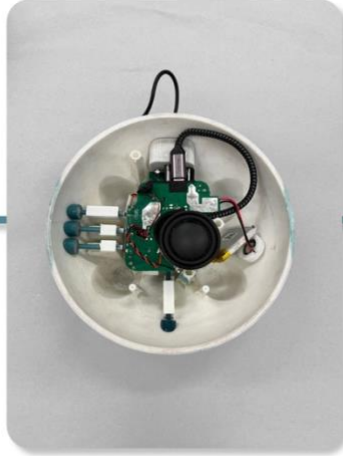
123. This spring, another of my students designed a combination of a Bluetooth speaker and a diffuser. This required her to consider the locations of the speaker, fan diffuser motherboard, speaker motherboard, internal diffuser dish, fill plug, ultrasonic plate, speaker, button locations, upper housing, battery, and lower housing.

124. She needed to separate the water in the diffuser from the electronics for the speaker to avoid damage to the electronics. As a teacher, I helped her figure out

how to waterproof the diffuser unit from the speaker unit. An example is shown below:



07 Assemble teeth & uvula.



08 Add in buttons and supports.



09 Attach ultrasonic plate.

125. In my opinion, this collective experience provided me with significant exposure to and insight into how consumer products employ the types of electromechanical systems referenced by the '165 patent.

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 willfully false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1101 of Title 18 of the United States Code.

Date: June 30, 2026

Location: Oulu Finland

Signature: 
Steven C. Visser