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

BIRD BUDDY, INC.,

Petitioner

v.

WOODSTREAM CORPORATION,

Patent Owner

IPR2026-00141

Patent US11,627,242

EXPERT DECLARATION

Contents

I. Qualifications and Professional Experience

1. My Name is William Walker Clark.
2. I am a Professor and Interim Department Chair of the Mechanical Engineering and Materials Science Department at the University of Pittsburgh. (EX1002).
3. I have a Bachelor of Science, Master of Science, and Ph.D. in Mechanical Engineering issued by the Virginia Polytechnic Institute and State University. (EX1002).
4. I have taught mechanical engineering and related topics since 1989 as a graduate researcher, Instructor and Professor. Since 2005 I have been a Professor of Mechanical Engineering at the University of Pittsburgh. (EX1002).
5. I have a multitude of publications on which I am an author or co-author. I also am named on 20 issued patents and am a Fellow of the National Academy of Inventors (EX1002).
6. I have taught courses on microprocessor control, mechatronics, control systems, mechanical engineering design, and other engineering topics. (EX1002).

II. Relevant Legal Standards

7. I understand that the '242 Patent was filed after the AIA, and that post-AIA legal standards apply.

8. I understand that the Petitioner is challenging the '242 Patent on the basis of obviousness.

9. I understand that obviousness is defined under 35 U.S.C. § 103.

10. I understand that determining whether an invention is obvious is an inquiry into whether the claimed invention as a whole would have been obvious before the effective filing date of the '242 Patent.

11. I understand that to determine whether an invention is obvious, a multi-part inquiry is required, where the following elements must be ascertained:

    a. the scope and content of the prior art;

    b. the differences between the prior art and the claimed invention; and

    c. the level of ordinary skill in the pertinent art.

12. I understand that each claim is evaluated for obviousness on its own in its entirety, and that the inquiry into obviousness is from the perspective of a hypothetical person having ordinary skill in the art prior to the effective filing date of each claim.

13. I understand that to evaluate the prior art, first the claims must be examined to determine their content. Then, prior art may be found which is in the same

field of endeavor as the claims or which is reasonably pertinent to the particular problem with which the inventor was concerned.

14. I understand that to evaluate the claims to determine the differences between the prior art and the claims, the claim language must be interpreted and compared to the prior art.

15. I understand that the level of ordinary skill in the art is a wholistic inquiry, and that certain factors, listed below, can be relevant:

    a. the type of problems encountered in the art;

    b. the prior art solutions to those problems;

    c. the rapidity with which innovations are made in the relevant fields;

    d. the sophistication of the technology; and

    e. the educational level of active workers in the field.

16. I understand that a person of ordinary skill in the art has ordinary creativity.

17. I understand that the Supreme Court laid out various rationales which can support a determination of obviousness, and that these rationales are mere examples, and other rationales can also support obviousness.

18. I understand that the rationales that can support obviousness include:

    a. whether prior art elements can be combined according to known methods to yield predictable results;

b. whether simple substitution of one element for another yields predictable results;

c. whether a known technique or device can be used in the same way (as claimed);

d. whether the prior combination is obvious to try, meaning there are a finite number of identifiable, predictable solutions, and that there would be a reasonable expectation of success;

e. whether known work in one field may prompt variations for use in the same or different fields based on design incentives or market forces provided the variations are predictable to one of skill in the art; and

f. whether some teaching, suggestion, or motivation in the prior art would lead one of ordinary skill to modify the prior art reference or combine prior art teachings to obtain the claimed invention.

19. Petitioner's counsel has further briefed me on the foregoing legal standards to aid in my understanding of the legal standards, and I have applied these legal standards in my analysis.

III. Qualifications of a Person Having Ordinary Skill in the Art (POSITA)

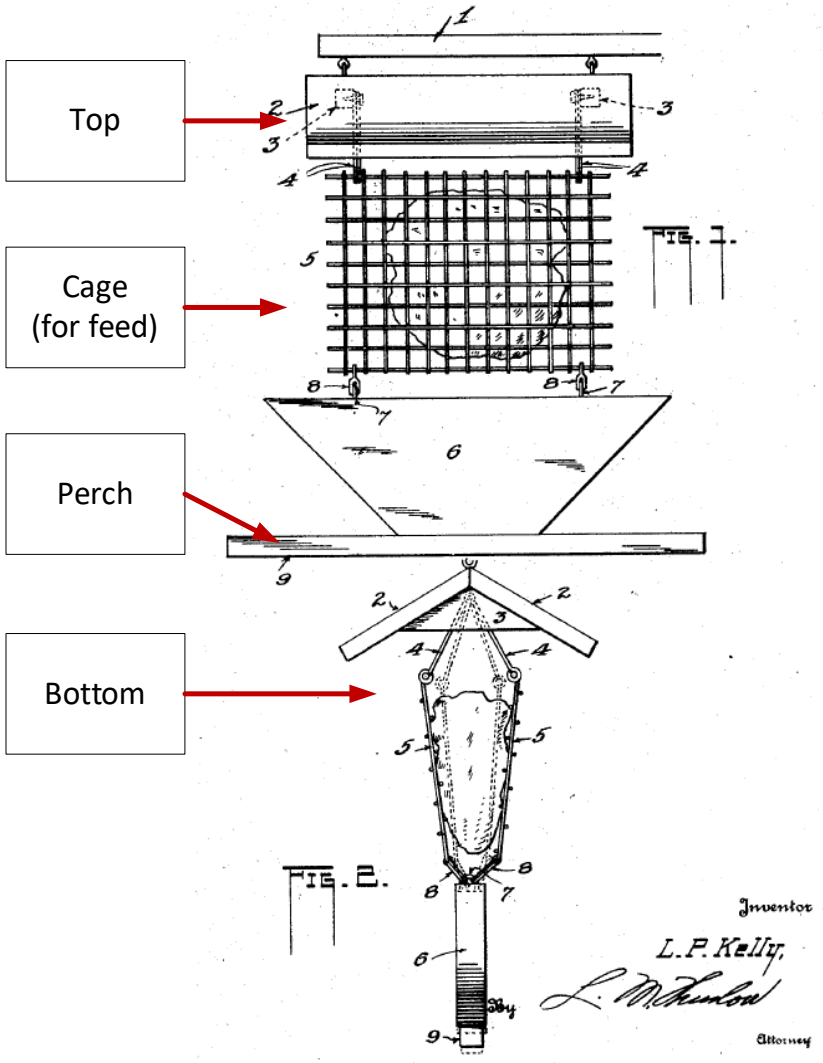
20. A Person of Ordinary Skill in the Art (POSITA) would have had a bachelor of science degree in mechanical engineering (or equivalent), or would have

had at least two years of experience with the design of electromechanical devices prior to the critical date of the ‘242 Patent.

IV. The State of the Art in 2015

A. Overview of the State of the Art

21. Bird feeders are an old and well-known technology. Early bird feeders were being patented over a century ago, and by the late 1990s and early 2000s it was commonplace to see bird feeders incorporated with wireless data transmission technologies, cameras, and other electronic components. (EX1017; EX1020). For example, Lewis Kelley filed an application for a hopper-style feeder in 1924, over a century ago:



(EX1017 at FIG. 1).

22. Almost all bird feeders are built around a feeding structure. The feeding structure is typically a hopper or a silo, both of which have been popular implementations of bird feeders for a long time.

23. The silo-type feeder is typically a cylindrical feeder often equipped with perches and access ports so that birds can land on the perches to access

sustenance (solid or liquid) through the access ports. (EX1008 at col. 8:38-44). The ‘242 Patent illustrates a silo-type bird feeder.

24. Humphries illustrates a typical silo-type bird feeder:

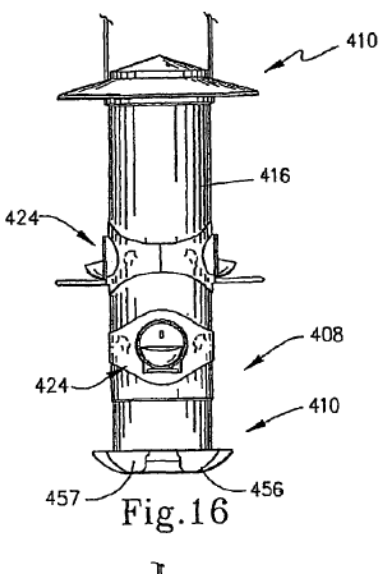


Fig.16

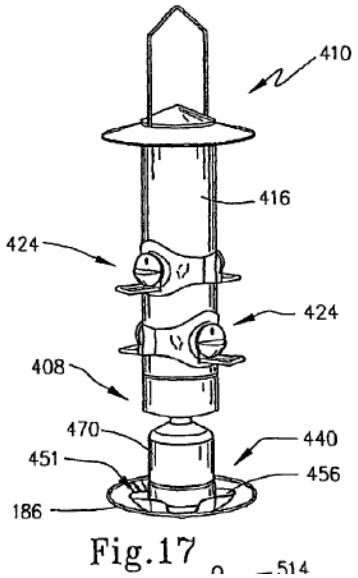
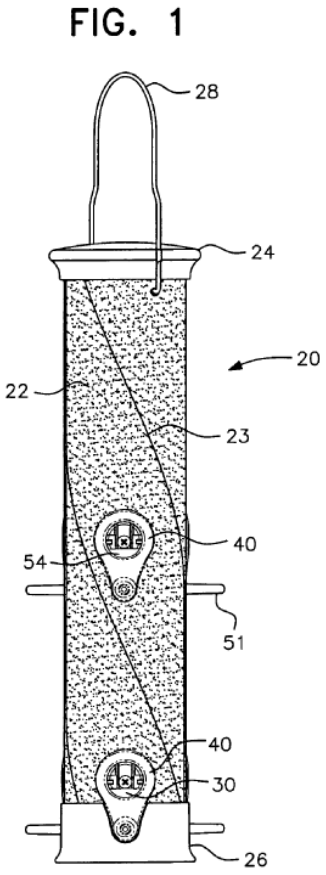
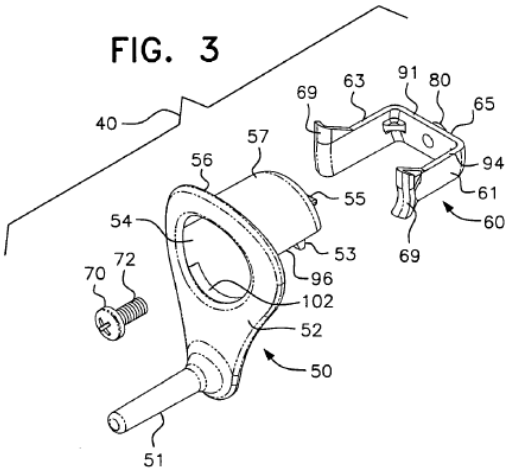


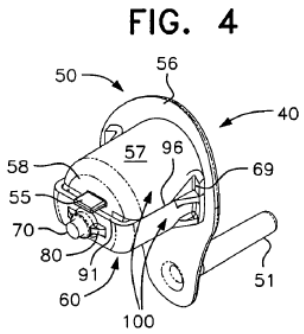
Fig.17

(EX1008 at FIGS. 16, 17).

25. Silo-type feeders are so common that even Woodstream, the Patent Owner, has patents to silo-type feeders, as shown in Rich, which discloses a silo-type feeder with a mountable feed port assembly:

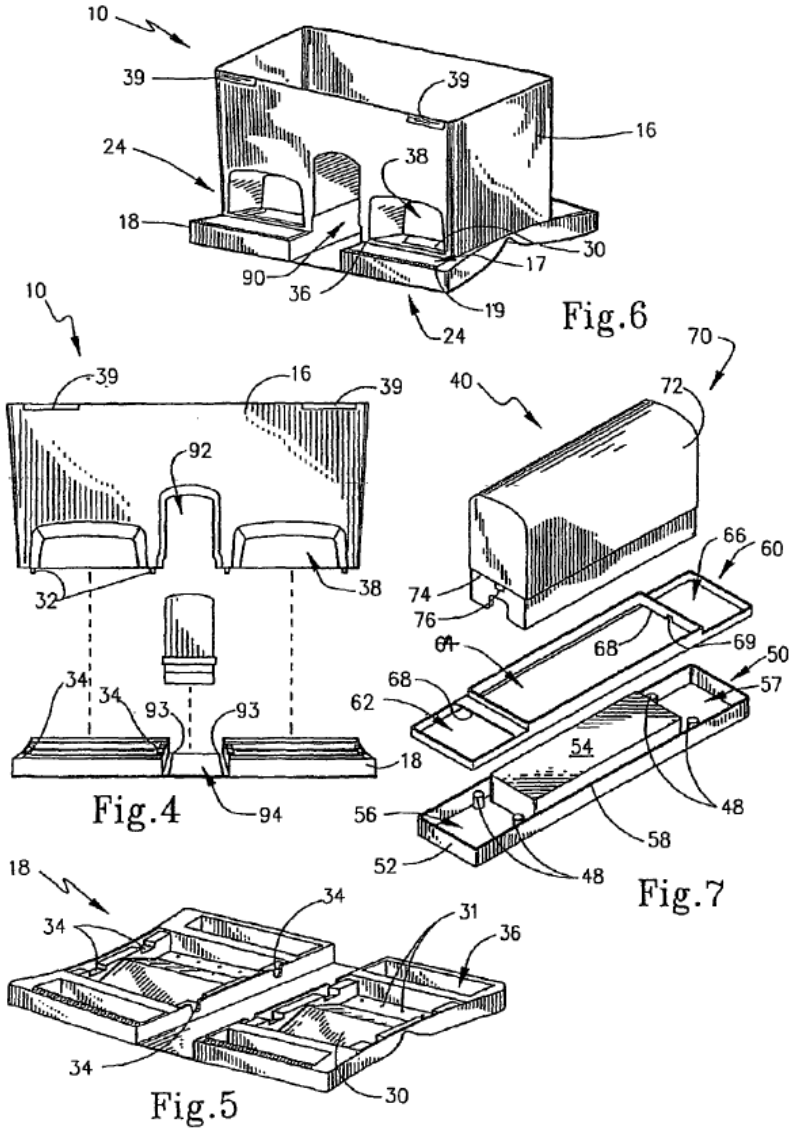






(EX1018 at FIGS. 1, 3, 4).

26. Other types of feeder include hopper feeders, feed tables, and the like. For example, Humphries, below, also discloses a hopper-style feeder. As a hopper feeder, food is placed in a hopper and gravity causes the food to fall down into a tray, where it can be accessed by birds and other animals. (EX1008 at FIGS. 1-15, col. 5:33-67, col.6:1-3, *et seq*).



(EX1008 at FIGS. 4-7).

27. While hopper feeders and silo feeders have been around for centuries, bird feeders with miniature electronics are newer, accompanying the microchip and miniaturization revolutions in the post-war era and through the present.

28. The Bird-vu is an example from approximately a quarter-century ago of a bird feeder that incorporates electronics. (EX1020; EX1021 at 32).

29. The Bird-vu included an interior-mounted camera, a wireless transmitter (that was paired with a receiver that could be plugged into a television), and a battery. (*Id*).

30. Users of the Bird-vu could connect a wireless receiver to their TV set and watch the video feed from the Bird-vu remotely. (*Id*). The Bird-vu's camera was positioned directly above the feed port, which permitted the camera to capture all activity on the feed tray. (*Id*).

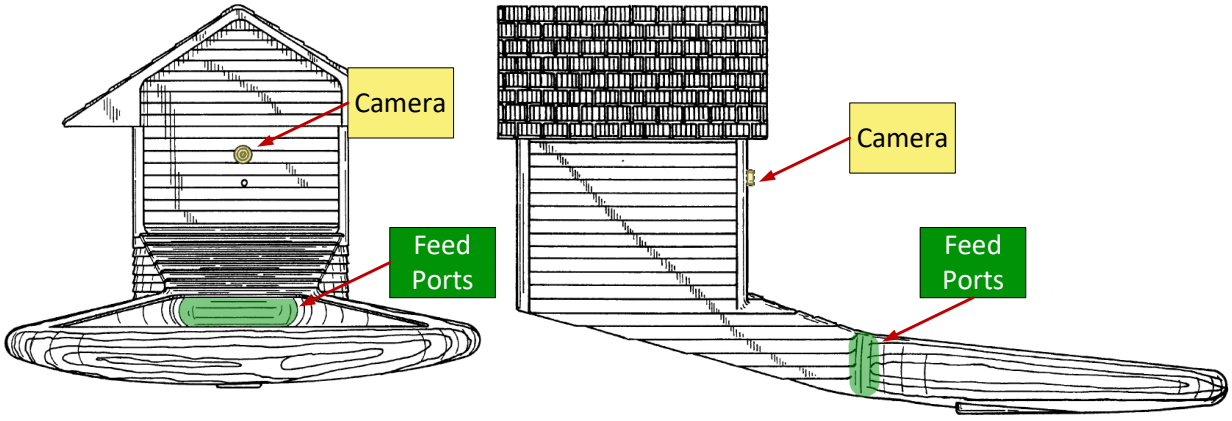


FIG. 3 FIG. 2

31. While the Bird-vu is a relatively early example of a wireless bird feeder, the space has been crowded with products, and many alternatives existed in the early 2000s and 2010s. One such alternative is captured in Bennett.

32. Bennett illustrates a wireless, silo-type, bird feeder from 2014. Bennett comes equipped with a microcontroller, and side or top-mounted audio and video sensors. (EX1005 at FIG. 1A, ¶¶41-44). The system in Bennett

captures images and transmits them, wirelessly via an antenna, across a wireless medium (e.g., WiFi) so that the images can be viewed remotely. (*Id*., ¶51). Bennett also contains a separator to insulate the electronic components from the feed contained in the feeder; a sensible precaution given the well-known fragility of some electronics. *(Id*., ¶41*)*.

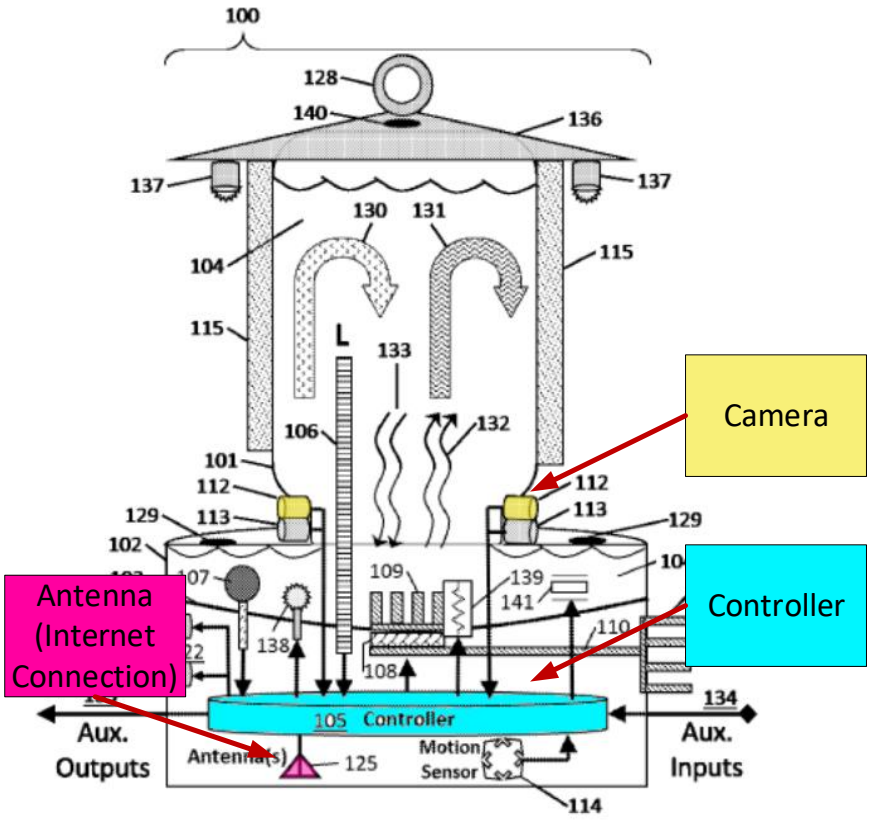


FIG. 1A

33. However, bird feeders in 2015 were hardly just the realm of commercial projects. By 2015, it was well-known how to create wireless bird feeders at home, using commercially available parts.

34. In one example, Yamanoor teaches how to create a wildlife monitor using a Raspberry Pi as a controller for the camera and motion detector. (EX1014 at 39, *et seq*). As shown below, this project results in a simple camera control system that can be mounted to a silo-type bird feeder to capture images of the birds as they come and go.

(EX1014 at 56) (illustrating an implementation of Yamanoor using a prototyping "bread" board).

35. In another example, in Riley, a bird feeder project is presented where the feeder tweets when motion is detected or when food is low. (EX1015 at 21, *et seq*). Riley also contains advice on how to construct and weatherize the bird feeder. (*Id*).

36. Thus, it is clear that knowledge of how to create wireless, electronic bird feeders was well-known, and many variations and types of bird feeder existed and were well-within POSITA's knowledge and ability to construct.

B. Prior Art Bird Feeders

i. Bennett

37. Bennett discloses a bird feeder that can provide, in various embodiments, liquid or solid food. (EX1005). Bennett comes equipped with a camera, a

controller, and an internet connection (via an antenna). (EX1005 at FIG. 1A).

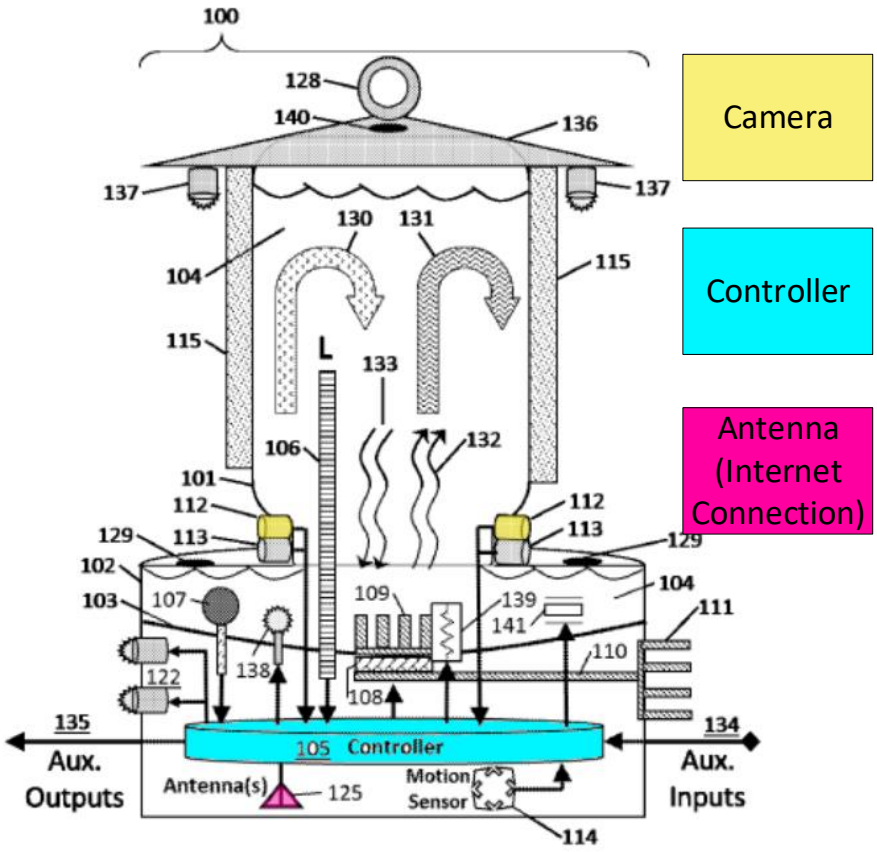


FIG. 1A

38. Food in Bennett is stored in the upper portion of the feeder (the silo portion), and in the upper portion of the bottom part of Bennett. (EX1005 at ¶41). To prevent food from damaging the electronics, a separator intervenes between the food and the electronics. (*Id*). Additionally, the system can derive power from a battery or other internal power source using a power management system. (*Id.*, ¶58).

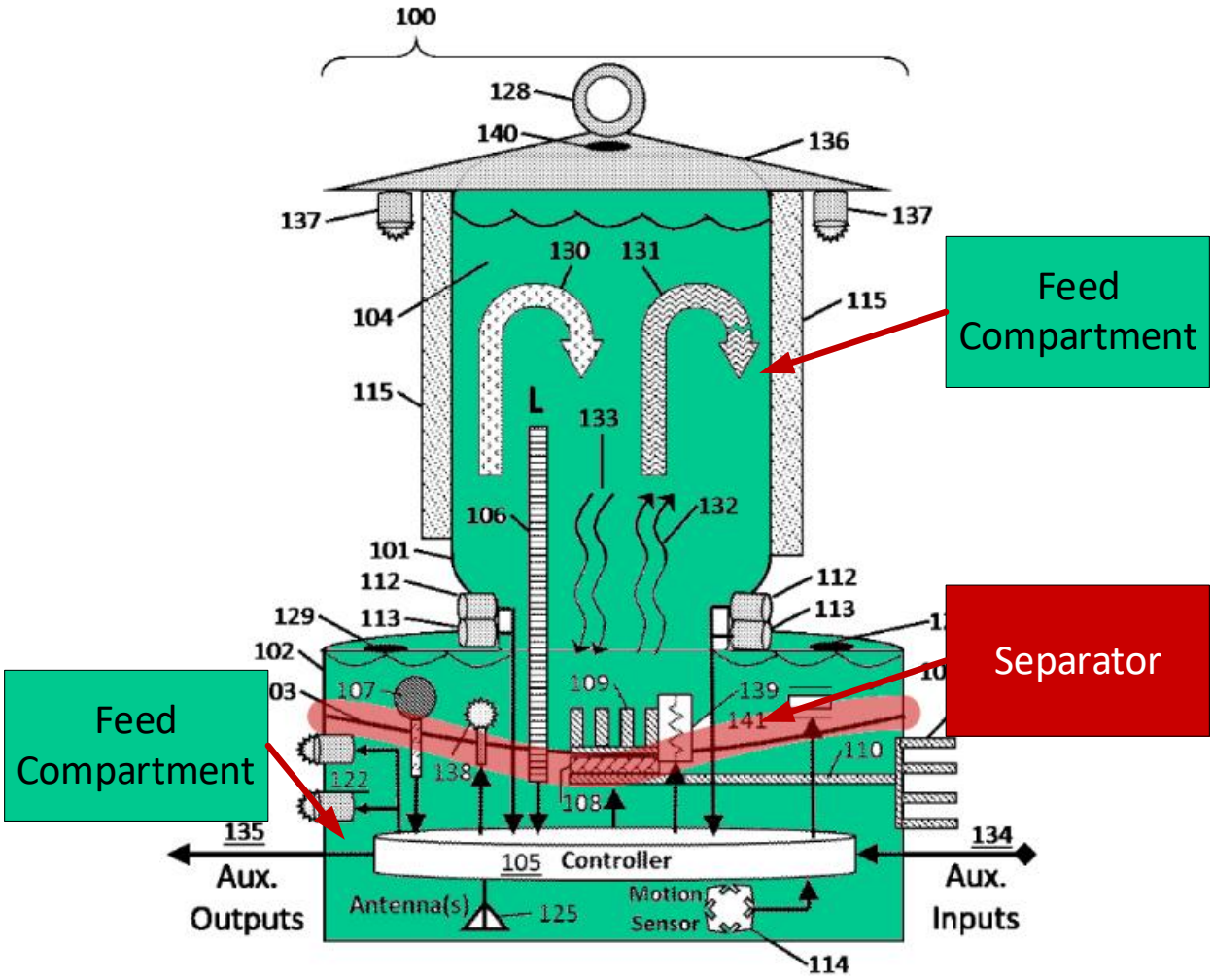


FIG. 1A

39. As can be seen in FIGS. 1A and 3A, the camera can be mounted either on the side, facing outward toward the feed ports (112 facing 129), or on the top (112) facing downward toward the feed ports (309). (EX1005 at FIGS. 1A, 3A). In either case, the camera is aligned with the feed ports.

40. As a result, Bennett is capable of capturing images of feeding birds and transmitting those images, via Wifi, (EX1005 ¶55), to another device for viewing or replay. (*Id*).

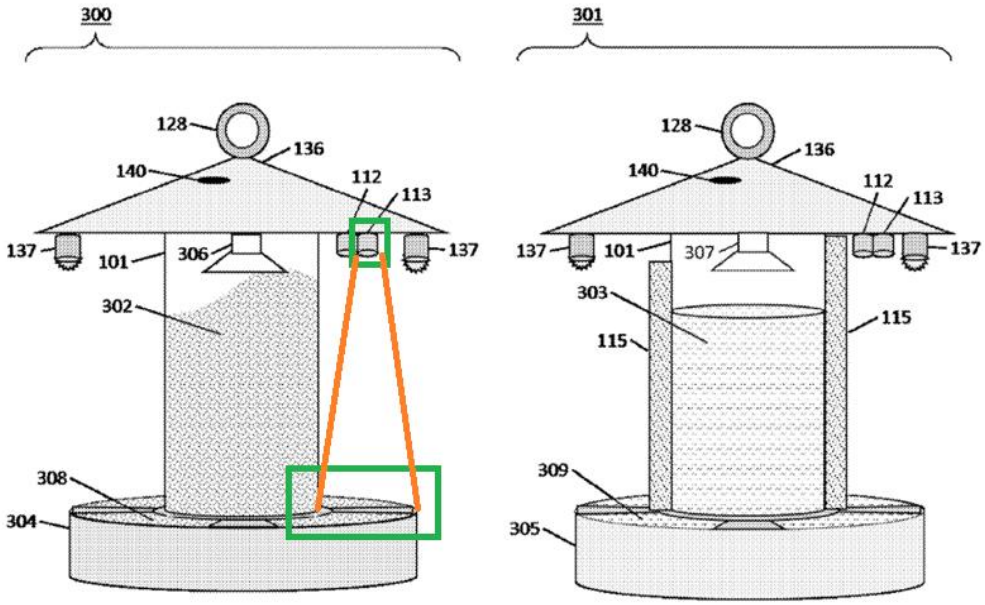


FIG. 3A

ii. Bonham

41. Bonham is a bird house that includes a computer, batteries, and an antenna for providing an internet connection. (EX1006 ¶¶13, 14). In essence, Bonham takes a simple box and places a hole in it to permit birds to come and go. (*Id*). Then, on the interior roof of the box, batteries, a microcontroller board, the antenna, and the camera are collectively mounted. (*Id*). A motion detector is mounted on an interior side of the box near the entrance hole, so that the microcontroller can detect the coming and going of birds, and turn the camera on when birds are present (and moving). (*Id*).

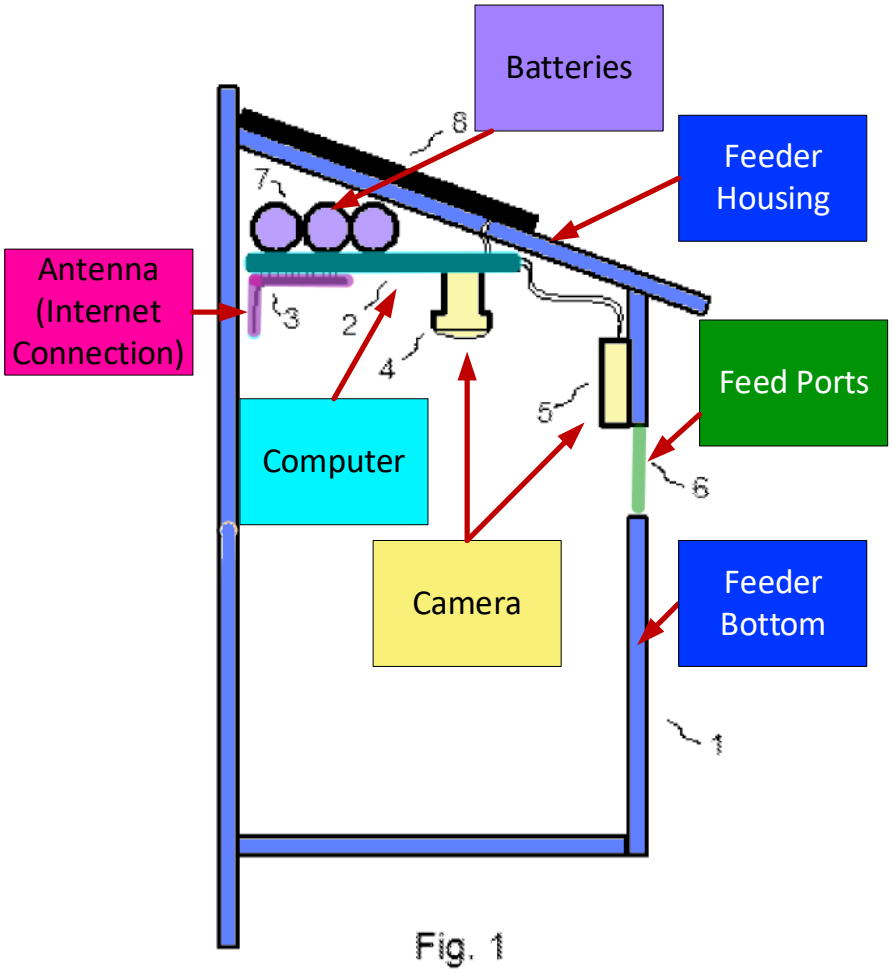


Fig. 1

iii. Kin

42. Kin is a pet feeder with a camera and the capability to be controlled remotely. (EX1007 ¶17).

43. Kin provides images of pets at the feeder, and permits the user to dispense food to the pets on demand. (EX1007 ¶¶15-17). The food is stored within the feeder housing and dispensed by a fixed-feed supplier. (*Id*).

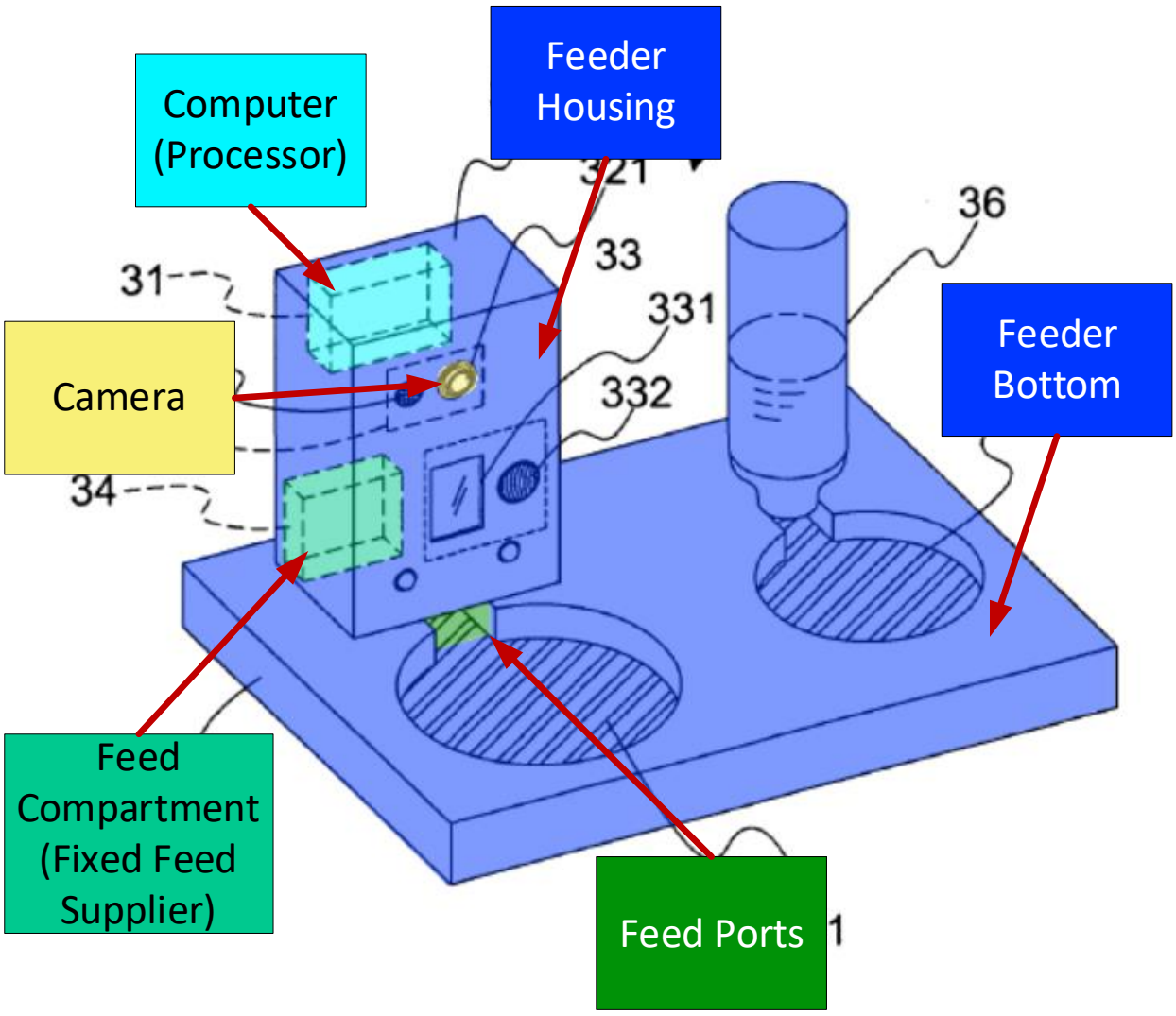


FIG.2

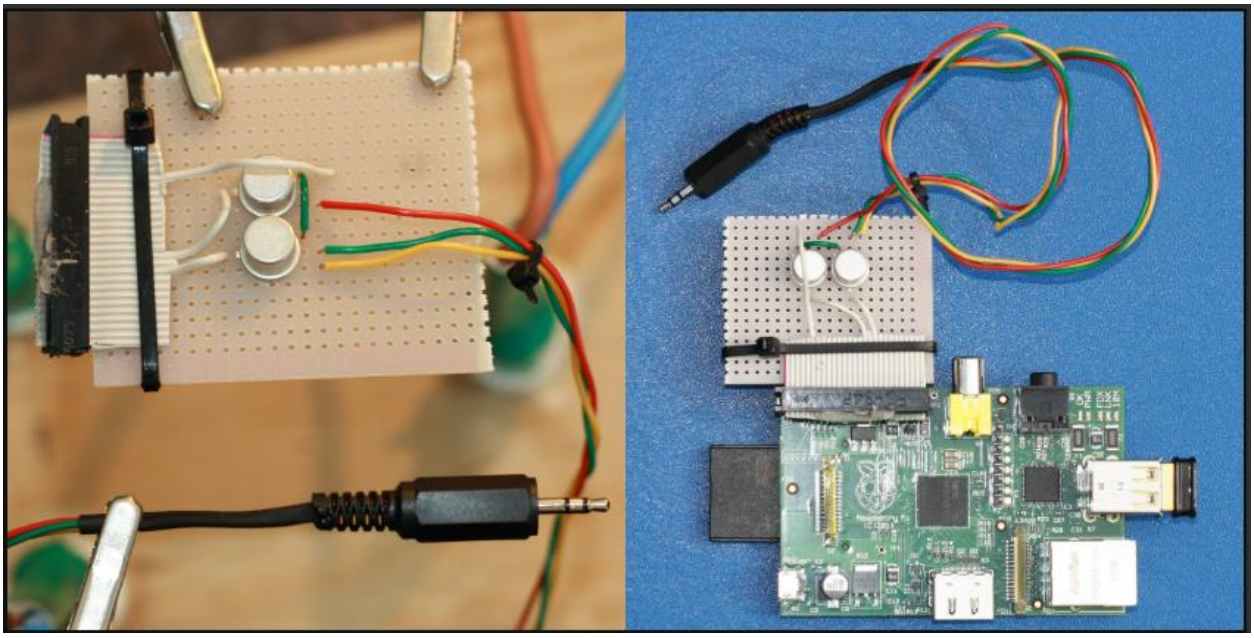
(EX1007 at FIG. 2).

iv. Bevan

44. Bevan is a blog article describing how to use a Raspberry Pi to control a camera for a bird feeder. (EX1010 at 5-9). Bevan discloses a table-type bird feeder and a camera with motion detection capability for snapping pictures of birds that approach the bird feeder. (EX1010 at 5-9). Bevan explains how

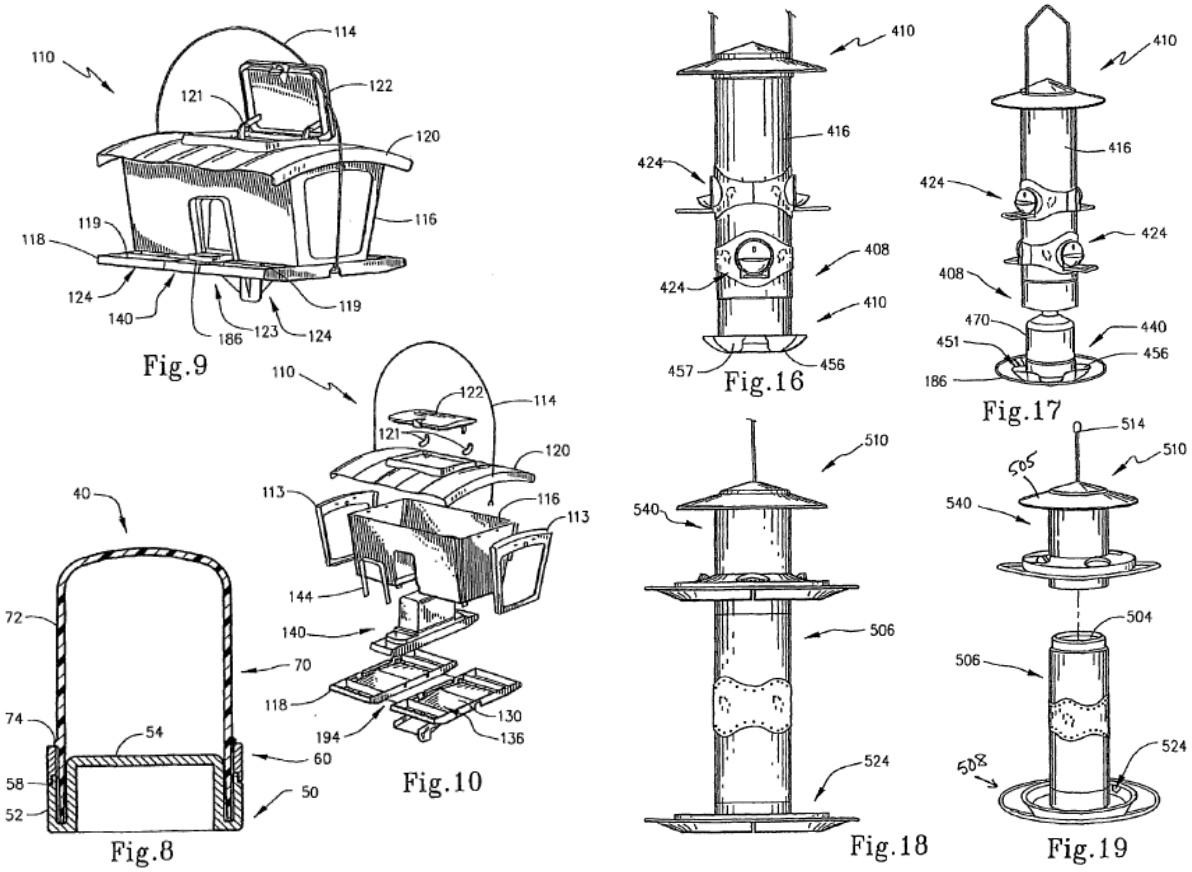
to configure and program the Raspberry Pi to control the camera system, and provides insight into how to build the bird feeder. (EX1010 at 5-9).

45. I note that projects such as Bevan were not atypical in 2015. Mechatronics textbooks, such as Riley and Yamanoor, taught how to make similar devices. (EX1010 at 5-9). Such projects were also common in the mechatronics courses taught by myself and other professors prior to 2015.



v. Humphries

46. Humphries discloses a variety of silo- and hopper- style bird feeders with modular components. (EX1008 (Abstract, Summary)).



C. Technologies used with Bird Feeders

47. Certain other technologies are also commonly used with bird feeders, or would have been obvious to use with bird feeders. For example, USB dongles, including USB WiFi dongles, were an old and well-known technology for facilitating wireless communications using WiFi. (EX1009 ¶¶76, 107, 112). Rofougaran discloses a WiFi dongle with multiple functionalities that would be appropriate as a plug-and-play wireless network adapter for a bird feeder. (*Id*). Indeed, USB dongles offer many other advantages as well. (*Id*).

48. Various other connection types, such as USB, micro-USB, HDMI, CSI, DSI, and the like, were all typical at the time, with such connections being readily found on microcontroller boards and SoCs (systems-on-chips) and the like. (*Id*). For example, popular microcontroller brand Raspberry Pi offered a board (the Raspberry Pi 2 Model B) that came with micro-USB, USB, CSI, DSI, HDMI, numerous GPIO pins, and more. (*Id*). Such a board would have been a clear contender for a controller in a bird feeder, and indeed, many textbooks describe using Raspberry Pi (or Arduino) as a controller. (*Id*).

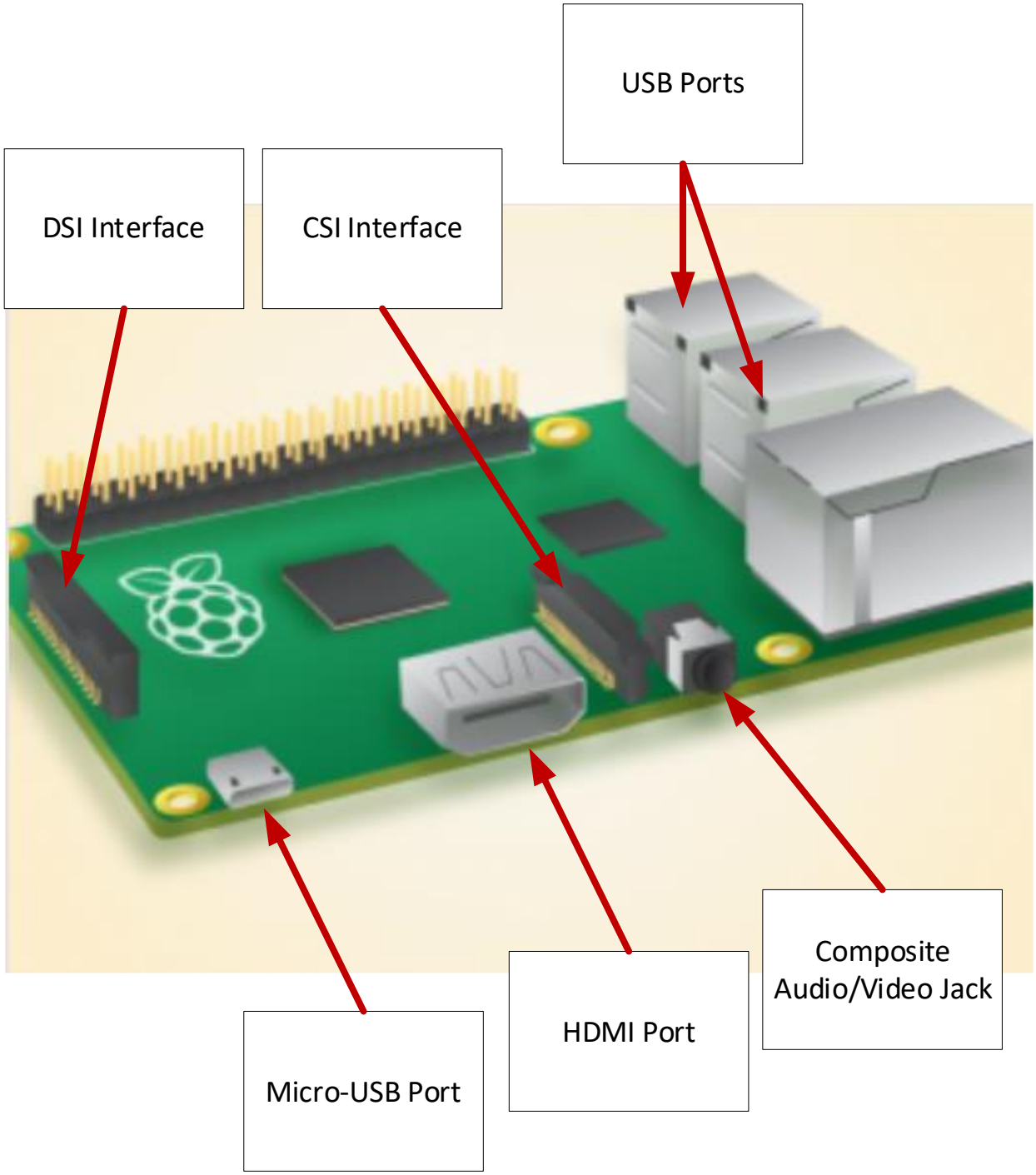
i. Raspberry Pi 2 Model B

49. The Raspberry Pi 2 Model B was one of a finite number of microcontrollers on the market. The Raspberry Pi 2 Model B, like an Arduino or similar device, is used by hobbyists and professionals to control electronic and mechanical systems. For example, Raspberry Pi devices would have been used as controllers for camera systems, as discussed in Bevans. (EX1010 at 12).

50. The Raspberry Pi 2 Model B comes with numerous standard connections, including USB ports, CSI and DSI interfaces, an HDMI connector, a composite audio-video jack, serial pin connections for general purpose input and output (GPIO), and a micro-USB port for providing power. (EX1010 at

12). These elements are all clearly visible below, in the figure of the Raspberry Pi 2 Model B.

51. As mentioned above, many microcontrollers like the Raspberry Pi 2 Model B were available in 2015. However, the use of one or another, especially in an application like a bird feeder, is arbitrary. That is, it is a simple matter of choosing one to use, as most work in the same way and had comparable functionality.



ii. Rofougaran

52. Rofougaran is a USB dongle that can provide WiFi connectivity (as well as other connectivity, for example, GPS). (EX1009 ¶¶76, 107, 112).

53. Rofougaran works by plugging it into a USB receptacle, at which point the hardware on the USB dongle can be accessed. (*Id*). The functionality of that hardware includes enabling WiFi communications. (*Id*).

54. It is important to note that Rofougaran is also one of many WiFi dongles that existed in or before 2015. The choice of any particular WiFi dongle is arbitrary, as they all worked in like manner, and any WiFi capability would have been perfectly acceptable if the goal was to enable WiFi connectivity in a device.

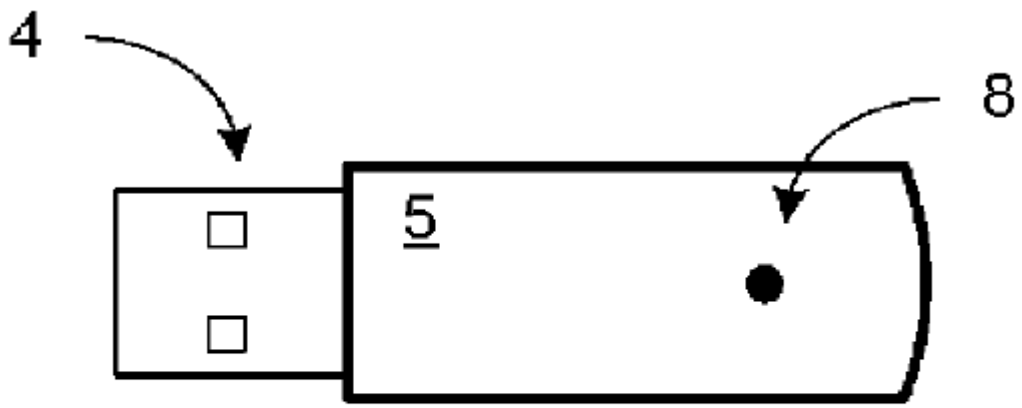


FIG. 3

V. Overview of '242 Patent

55. The '242 Patent purports to present a novel bird feeder design, however, this is untrue. The '242 Patent claims are generic, with the dependent claims also covering conventional elements.

56. The ‘242 Patent discloses a standard, silo-type bird feeder. There is nothing novel or new about silo-type bird feeders, which predate the ‘242 Patent by decades.

57. The ‘242 Patent then adds various standard electronics to the silo-type bird feeder. For example, the ‘242 Patent presents a bifurcated feed compartment that contains food on one side and a battery, a microcontroller, and a transmitter on the other side. (EX1003 at FIG. 1, col. 3:5-10).

58. None of these aforementioned elements are anything other than conventional, and all of them would be obvious to try in addition to being predictable, as their use would have been clear to a POSITA and the outcome of using any claimed element would have also been obvious.

A. The Claims are Conventional

i. Independent Claim

59. Turning to claim 1, claim 1 calls for a self-contained bird feeder configured to provide detailed images wirelessly. This function is conventional, as earlier patents and products, like Bennett or the Bird-vu, provided the same functionality. Wireless transmission of imagery from a bird house is thus conventional.

60. Claim 1 also calls for a computer, a built-in camera, and an internet connection. None of these were new in 2015 either. For example, Bennett

discloses a controller, as does Bonham, both of which are computers that control operation of the bird feeder. Each reference relied on herein also discloses a built-in camera that is part of the bird feeder and which captures images of birds. Finally, an internet connection is disclosed by many of the references, including Bennett and Bonham. It is clear each of these three elements is conventional: they are all at least desirable, in any design of a bird feeder that transmits data wirelessly data, and they were all known to POSITA before the effective filing date of the '242 Patent.

61. Claim 1 also calls for a feeder housing and a feeder bottom. POSITA would have considered these elements conventional: all feeders, being physical structures, have housings, and all feeders, being physical structures, have physical bottoms. Even under a generous reading of the claim terms, virtually all feeders have a top component and a bottom component because most feeders may be disassembled to permit access to the feed reservoir to permit refilling of the feed. Of course, Bennett, Bonham, and Zernov all show feeders with tops and bottoms.

62. Claim 1 further calls for a feed port disposed in the feeder bottom. Feed ports were well-known, and for gravity fed feeders, were often and logically placed at the bottom of the feeder to permit gravity to do the work.

63. Claim 1 calls for the camera to be internally mounted to the bird feeder such that the camera is aligned with the feed port to observe feeding birds. This was also a conventional design choice, since, as with most feeders that include a camera, the objective is to view the birds as they eat and drink.

64. Claim 1 calls for a computer located within the feeder housing. We have already seen many designs that do this, but it was also a conventional design choice since it permits maximum protection of the electronic components by protecting them from outside conditions and forces (e.g., inclement weather).

65. Claim 1 calls for an internal power source. This is also conventional, as it is a conventional design choice to place the battery (or other power source) inside the feeder housing to protect the power source from outside conditions and forces (e.g., inclement weather).

66. Finally, claim 1 calls for a WiFi adapter located within the feeder housing. For example, Bennett discloses a connected network that may be WiFi, which would have been accomplished using a WiFi adapter. Moreover, given the likely proximity of the feeder to a home, it would have been preferable to transmit images over the home's WiFi network. It would have also been conventional to place the adapter inside the feeder housing to protect it from outside conditions and forces (e.g., inclement weather).

ii. Dependent Claims

67. The dependent claims are also conventional, and recite only additional conventional elements.

68. Claim 2 calls for a WiFi dongle to be used as the WiFi adapter. WiFi dongles are well-known (principally as a species of USB dongle), and the advantages of using USB, including plug-and-play functionality, a single connector type to connect any peripheral, low-cost solution for both system and peripheral implementations, enhanced performance capability, support for legacy hardware and software, and low power implementation, would have been well-known to ordinary consumers, as well as to POSITA.

69. Thus, the use of a WiFi dongle as the WiFi adapter is no more than an obvious choice to use a conventional product for its intended purpose.

70. Claim 3 is conventional. Claim 3 has two primary parts, first, it calls for a separator inside the feed compartment, though it does not specify the function of the separator. Secondly, it requires the feeder be gravity fed. Gravity fed feeders are the most common type of feeder, be they hoppers, silos, or other types, and are conventional. The separator is also conventional in designs that place the electronics in proximity to the feed, because it

permits the feed and electronics to be separated. Bennett shows one example of a feed separator.

71. Claims 4-6 are also conventional. Claim 4 merely claims the media interfaces used by the Raspberry Pi 2 Model B and similar devices. Claim 5 calls for USB ports of two types (including micro-USB, which was commonly used to provide a power connection), and claim 6 calls for an HDMI port, which is a well-known and standard video interface. There is nothing unconventional about using these well-known components in a bird feeder, as their use is both obvious and predictable, as are the results of using these components.

72. As a result, the claims of the '242 Patent recite only conventional combinations of elements that were common and predictable in bird feeders.

VI. Claim Construction

73. I have been advised by counsel for the Petitioner to apply the ordinary and customary meaning to the claims. I have done so.

74. I have also considered the terms "built in" and "internally mounted." Based on the prosecution history and the intrinsic evidence of the specification, figures, and claims of the '242 Patent, I have concluded that a POSITA would understand the terms "built in" and "internally mounted" to have specific meanings I lay out below.

75. I note that, regardless of whether the claim constructions put forward here are adopted, the prior art renders the claims of the '242 Patent obvious.

A. "Built In"

76. The term "built in" should be construed to mean "functionally inseparable from [the bird feeder]." This is the meaning POSITA would have understood this claim term to have in view of the intrinsic evidence and prosecution history.

77. The claims require "a bird feeder with a built in camera, computer, and internet connection, the bird feeder comprising[…]" The applicant applied "built in" as a modifier to camera, computer, and internet connection. (EX1004 at 233). During prosecution, applicant explained repeatedly, when trying to distinguish over the prior art, that "built in" meant "functionally inseparable from" the bird feeder.

78. The applicant argued that the claims of the '242 Patent distinguished over the prior art because Lovett's components were OEM type components that could be separated from the bird feeder and could still meaningfully function on their own:

> Applicant's camera, computer and other elements are self contained within a bird feeder, **not the stand-alone type of discrete OEM devices disclosed by Lovett**. This

distinction is **important** because **the claimed invention does not contain any components that have significant value as separate components outside the bird feeder; does not provide any means for separating the functionality from the feeder**; and therefore does not present problems with these stand-alone elements.

(EX1004 at 67) (emphasis added).

79. Applicant argued that Lovett's components were described as separable, and not built in:

> Lovett does not disclose a computer **in** the feeder housing of the bird feeder according to the claimed invention. Lovett discloses a box that provides physical support and electronic interconnections to a **third party camera or controller** which are always described as **separable** devices that may provide video generation and internet connectivity regardless of its location. Lovett does not have any self contained video capability within the bird feeder—only those provided by the third party mechanism outside the bird feeder.

(EX1004 at 68, 97) (emphasis added).

80. The applicant made similar arguments with respect to the computer, arguing that Lovett did not disclose a computer built in to the feeder housing. (EX1004 at 233). For example, when describing the claimed built in computer, the applicant stated that the:

> [] dedicated computer (e.g., Raspberry Pi) is built in to the bird feeder. It is integrated with the self-contained bird feeder structure and design, providing the video generation functionality using digital information retrieved from the internal camera.

(EX1004 at 262).

81. Applicant argued repeatedly that "built in" required the elements be not functionally separable from the bird feeder.

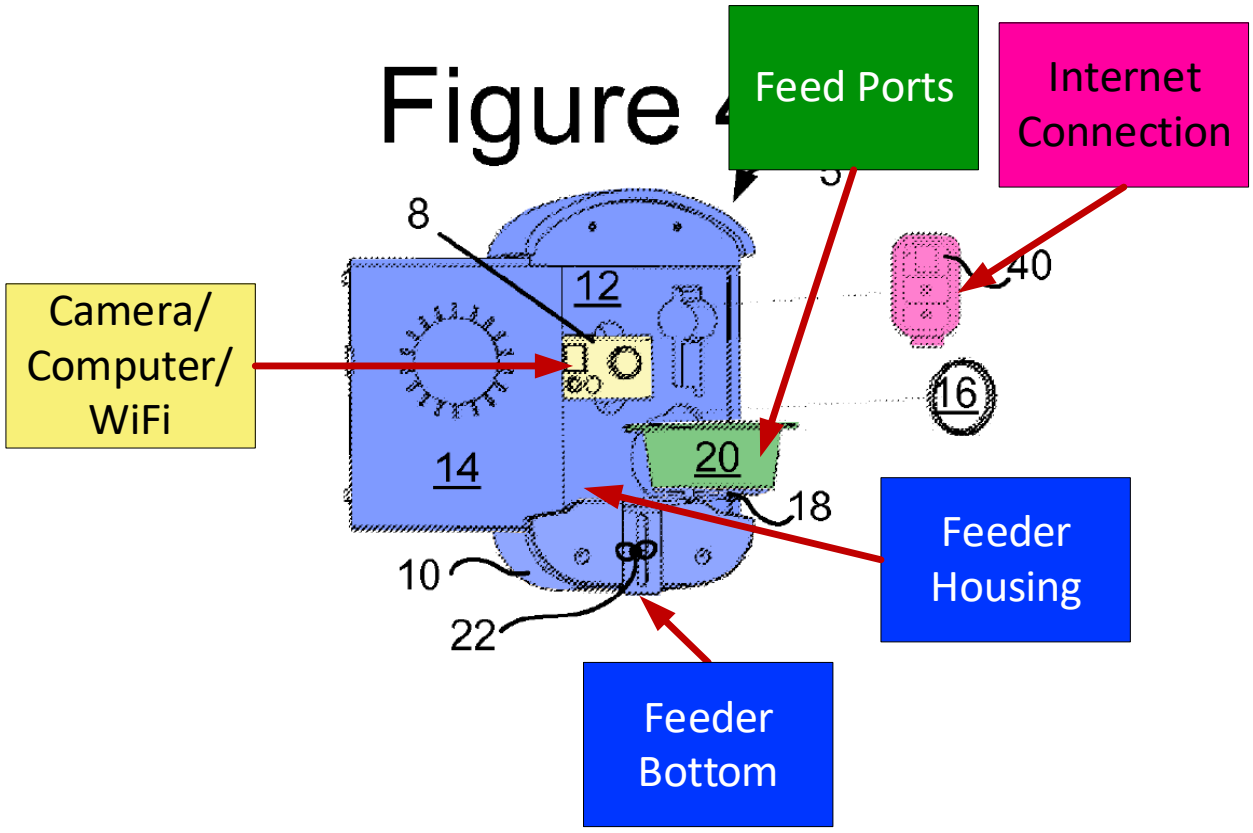
B. "Internally Mounted"

82. The applicant defined the term "internally mounted" to mean that the component is "inside and mounted to the feeder [housing]." This is the meaning a POSITA would have understood this claim term to have in view of the intrinsic evidence and prosecution history.

83. The claims require "the camera internally mounted to the bird feeder such that the camera is aligned with the feed port to observe feeding birds […]"

84. PO distinguished their claims over Lovett by arguing that "Lovett neither discloses nor suggests the camera, power source, nor WiFi adapter *inside* the bird feeder." (EX1004 at 66, 259, 261) (emphasis in original).

85. In Lovett, the camera is mounted to a housing, while a bowl is held on an arm that extends away from the housing. The camera is pointed at the bowl.



86. The applicant repeatedly attempted to distinguish Lovett by arguing that Lovett did not contain elements that were *inside* the bird feeder:

> Lovett is not a self-contained feeder. Lovett neither discloses nor suggests the camera, computer, power source, nor WiFi adapter *inside* the bird feeder. Therefore,

> Lovett is not self-contained, as is the Applicant's claimed invention.

(EX1004 at 95) (emphasis in original).

> Lovett is asserted to disclose a self-contained bird feeder for providing detailed images over a wireless network. However, Lovett neither discloses nor suggests Applicant's claimed built in camera (nor power source, or WiFi adapter) ***inside*** the bird feeder. Therefore, Lovett is not self-contained, and does not disclose a built-in camera as required by the Applicant's claimed invention.

(EX1004 at 230) (emphasis in original).

87. Furthermore, the '242 Patent itself contains only examples where the camera is both inside and mounted to the feeder housing. "A viewing port is **machined into the bird feeder**. The viewing port is aligned with the feed port to provide an optical path from an **internally mounted** camera to the area in front of the feed port. A digital camera is **mounted in the bird feeder**." (EX1003 at col. 4:21-42) (emphasis added). This is reinforced by the fact that the field of view of the camera is located inside the bird feeder: "In the present invention, the bird feeder is not located in the field of view of

the camera. It is in the ***same*** location as the camera—inside the claimed bird feeder." (EX1004 at 230) (emphasis in original).

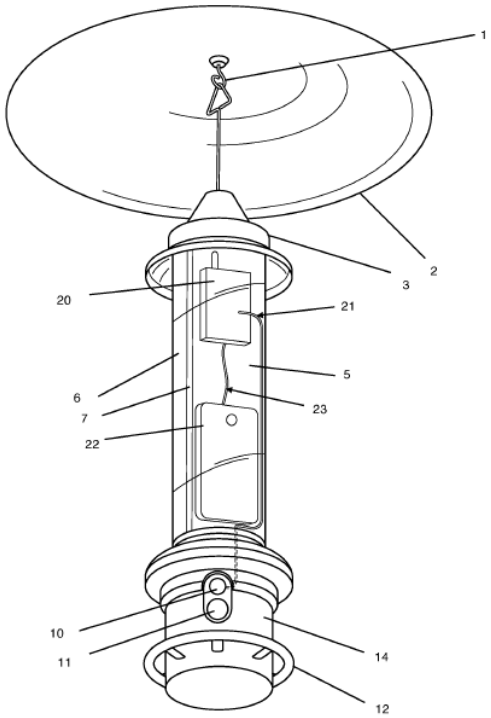


FIG. 1

88. Therefore, the correct meanings is "inside and mounted to [the feeder housing]."

VII. Ground 1 | Bennett

A. Claim 1

i. Claim 1(pre)

1(pre)	A self-contained bird feeder configured to provide detailed images over a wireless network, comprising:

89. Bennett discloses a self-contained bird feeder configured to provide detailed images over a wireless network. (EX1005 (Abstract)).

90. Bennett is a self-contained bird feeder with a camera. Bennett is self-contained because Bennett includes no external parts that are not integrated into the feeder housing. (*See generally* EX1005 ¶¶ 7, 8).

91. Bennett is configured to provide detailed images over a wireless network because, as Bennett explains, images from the camera can be transmitted to other devices wirelessly: "Any number of imaging or audio sensors may be used in an embodiment, and may be located near the feeding ports… to optimize animal or station area viewing…" and "Live video and audio sensor feeds may be presented through image panes such as those shown as camera 1 and camera 2, with audio being routed through the user device audio system." (EX1005 ¶ 49).

ii. Claim 1(a)

1(a)	a bird feeder with a built in camera, computer, and internet connection, the bird feeder comprising:

92. Bennett is a bird feeder that includes a built-in camera (the image sensors), computer (the controller) and internet connection (facilitated by the antenna). (EX1005 ¶¶41, 51, 78).

93. As Bennett explains with respect to cameras, “Any number of imaging or audio sensors may be used in an embodiment, and may be located near feeding ports as shown in FIG. 1A, or on the underside of the cap as depicted in FIG. 3A, or anywhere as required… ” (EX1005 ¶49).

94. An image sensor is a camera.

95. Bennett also provides a computer—the controller (e.g., controller 105) is a computer because it is capable of executing software: “data from sensors… may be processed by software executing in the controller to determine the presence of an animal at the station and apply power to the UV emitters only when no animals are present.” (EX1005 ¶47).

96. Bennett provides an internet connection. Specifically, the controller is capable of communicating wirelessly using communication protocols such as the 802.11 WiFi protocol. (EX1005 ¶51).

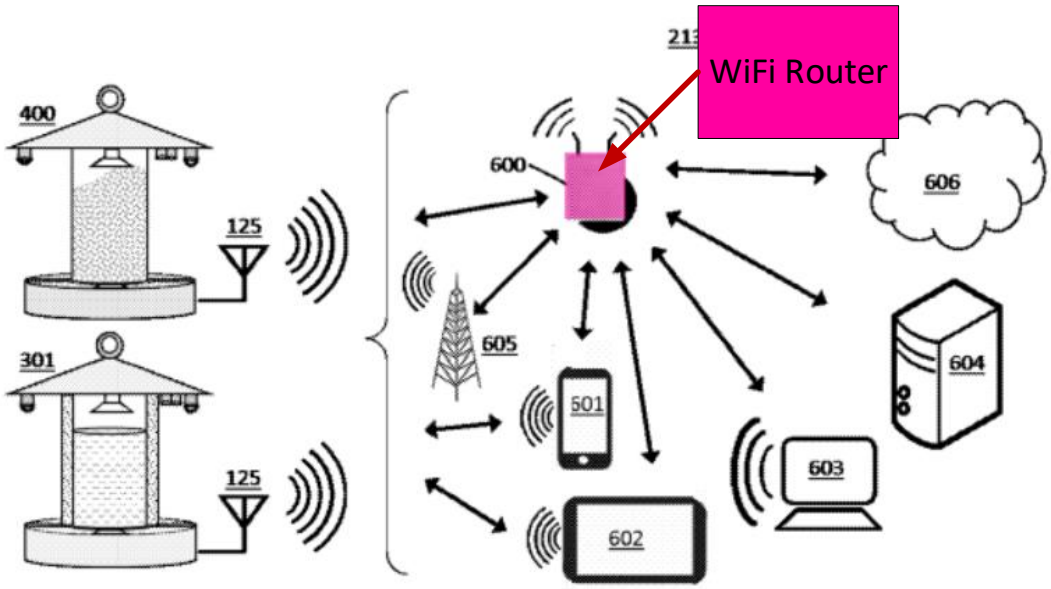
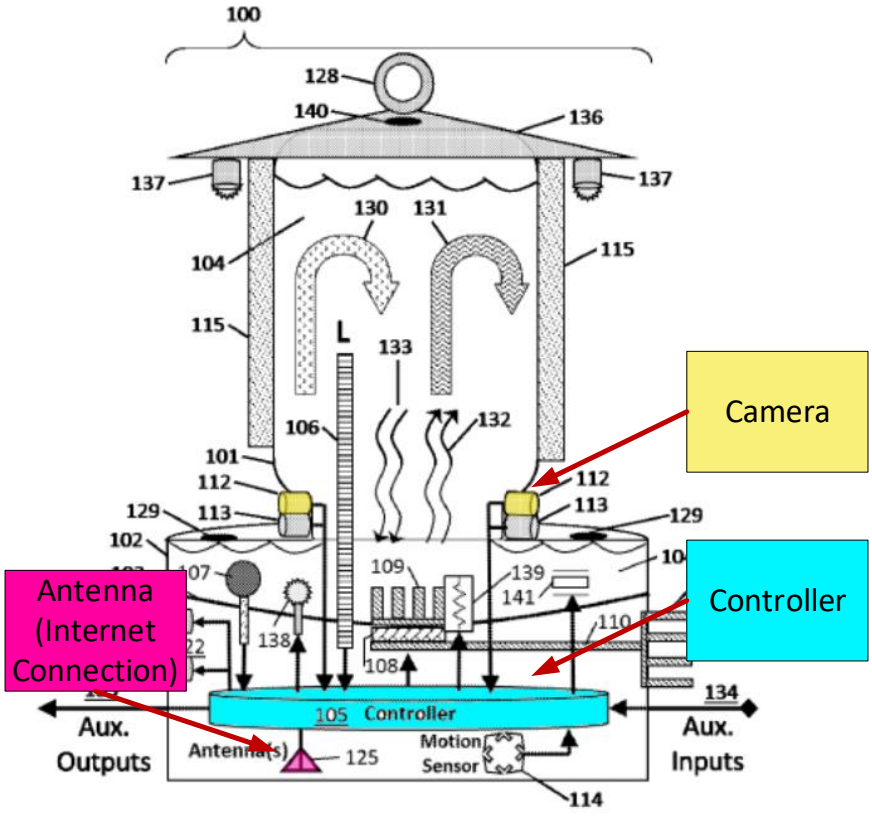

WiFi Router
400
125
301
125
600
606
605
604
501
603
602

FIG. 6


100
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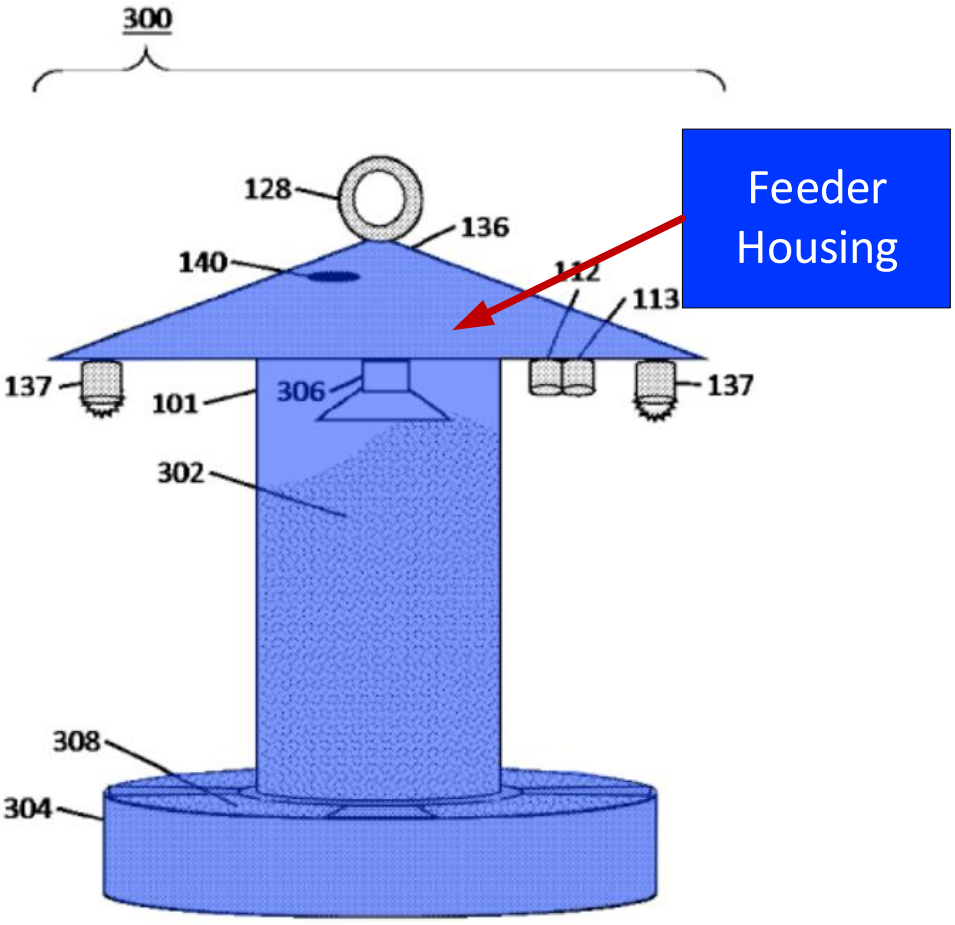
113
129
102
107
109
139
141
138
108
110
134
105 Controller
Aux. Outputs
Antenna(s)
125
Motion Sensor
114
Aux. Inputs
Camera
Controller
Antenna (Internet Connection)

FIG. 1A

iii. Claim 1(b)

1(b)	a. a feeder housing;

97. Bennett has a feeder housing. The feeder housing is the exterior shell of Bennett. As Bennett explains, "The storage vessel 101 of station 400 stores solid sustenance 302… and attached to the bottom of storage vessel 101 is the sustenance dispensing tray 401 into which solid sustenance 302 from the storage vessel 101 is dispensed. The feeding tray 401 is removably attached to the storage vessel 101… to facilitate cleaning and solid sustenance 302 replacement, and has one or more openings 308 positioned around the top surface from which the animals access the sustenance 302 for consumption." (EX1005 ¶¶81, 39, 73, 74).

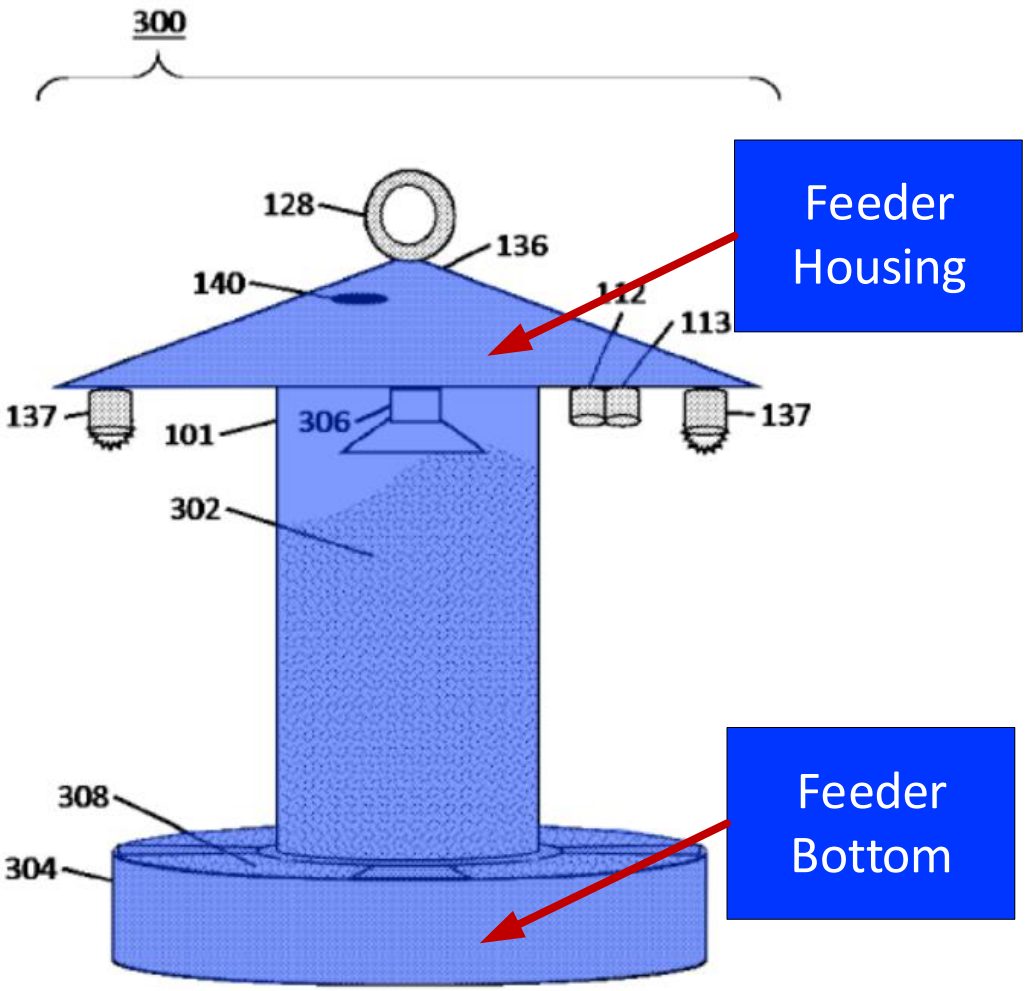


(EX1005 at FIG. 3A).

iv. Claim 1(c)

1(c)	b. a feeder bottom;

98. The feeder of Bennett has a bottom, characterized as the lower, wider disk portion of the feeder housing.



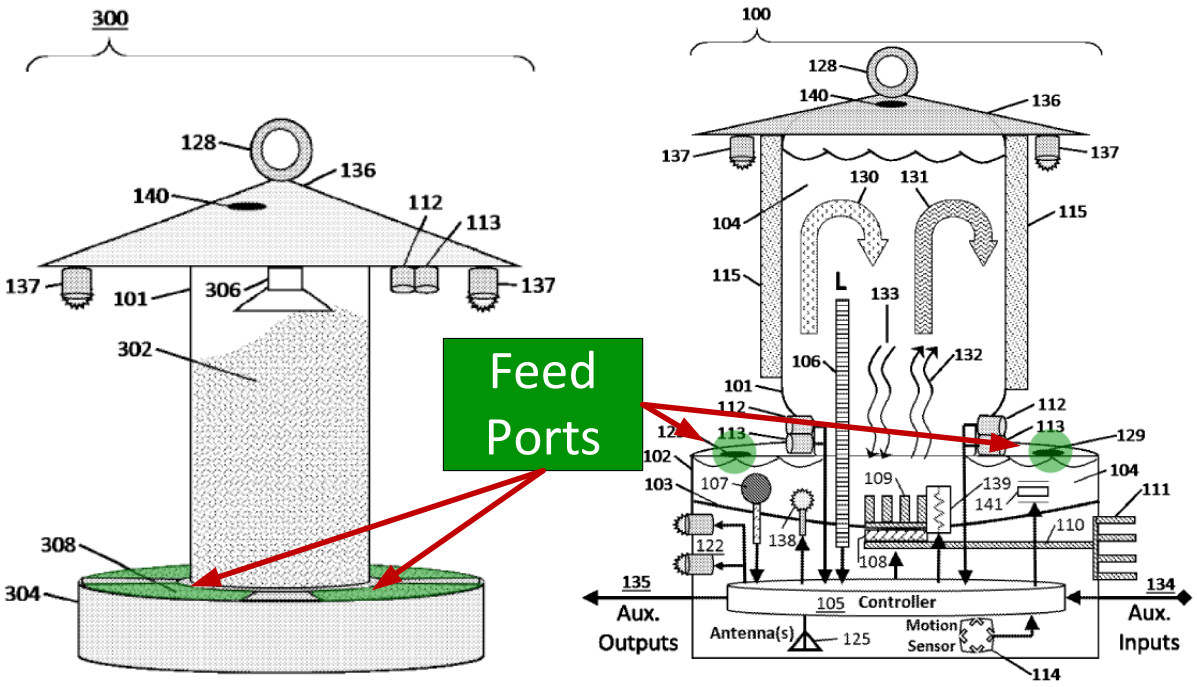
(EX1005 at FIG. 3A).

v. Claim 1(d)

1(d)	c. a feed port disposed on the feeder bottom;

99. Bennett incorporates numerous feed ports into its design. The feed ports are built into the "feeding tray" element of Bennett: "The feeding tray 401 is removably attached to the storage vessel 101… and has one or more openings 308 positioned around the top surface from which the animals

access the sustenance 302 for consumption." (EX1005 ¶¶73, 81). Likewise, "Flying animals… may leave infectious agents transmitted through direct contact with the liquid 104 in the feeder as they draw sustenance through feeding station ports 129, or by other means." (1005 ¶46).



vi. Claim 1(e)

1(e)	d. the camera internally mounted to the bird feeder such that the camera is aligned with the feed port to observe feeding birds;

100. The cameras of Bennett are visibly aligned with the feeding ports to observe feeding birds. (EX1005 ¶¶8, 38). Bennett is clear that "[a]ny number of imaging or audio sensors may be used in an embodiment, and may be

located near feeding ports as shown in FIG. 1A, or on the underside of the cap as depicted in FIG. 3A, or anywhere as required… to optimize animal or station area viewing…" (EX1005 ¶49).

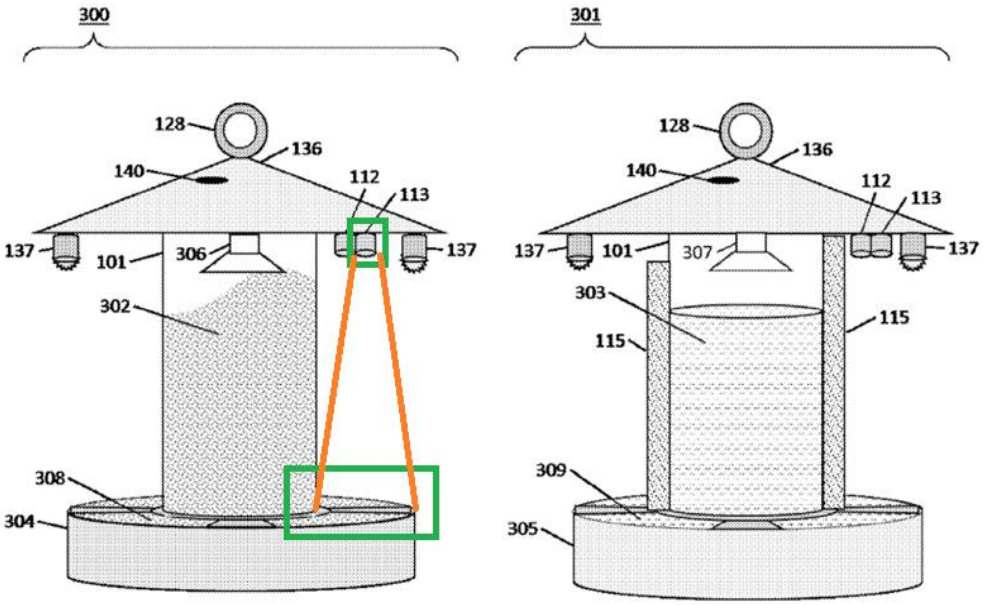


FIG. 3A

(EX1005 at FIG. 3A).

101. Furthermore, the cameras are internally mounted. POSITA would have been able to tell the cameras were internally mounted because the cameras that are mounted in the caps are mounted inside the caps and protrude outward, and because black arrows are shown connecting the cameras to the controller, which requires that the camera be mounted (e.g., tethered) by a connection between it and the controller.

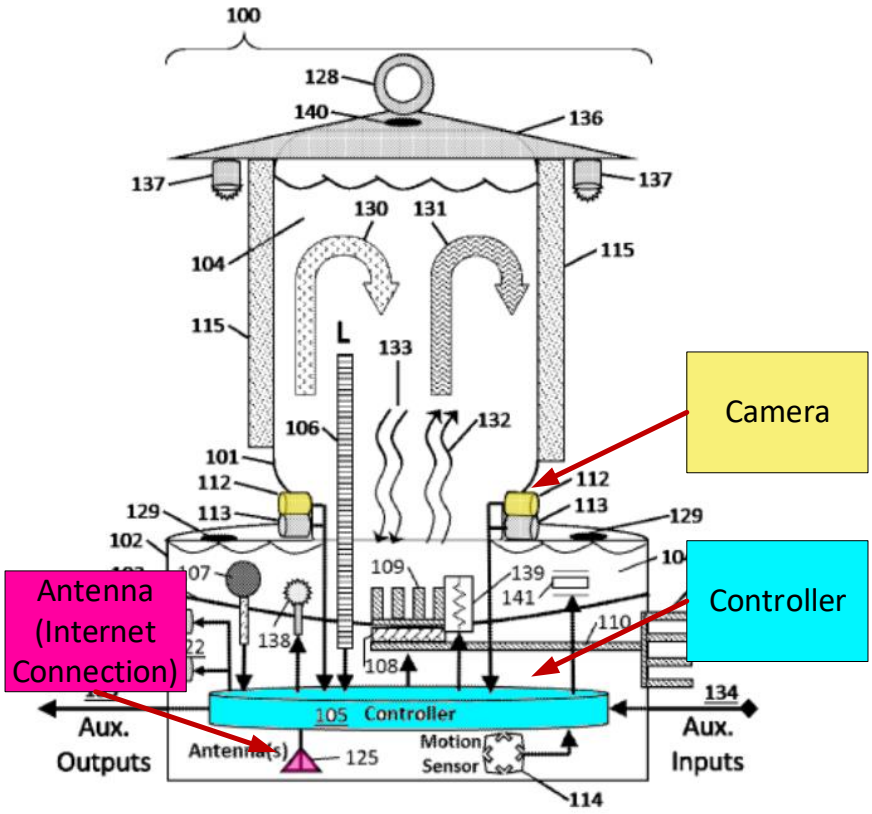


FIG. 1A

(EX1005 at FIG. 1A).

102. Furthermore, it would have been obvious to POSITA to mount the cameras internally. POSITA would have known that bird feeders are typically left outdoors and would have sought to weatherproof the bird feeder as well as to protect bird feeder components from animals or other objects (e.g., hail) that might damage them. POSITA would have known that mounting the camera literally inside the bird feeder would have minimized the risk of such damage. POSITA would have reasonably expected success

because mounting a camera internally is easy, straightforward, and relatively standard.

103. Furthermore, it would have been obvious to POSITA to use an internal bracket or similar element to provide stability to the camera and to keep the wires attached. Therefore, POSITA would have internally mounted a support bracket or similar component. POSITA would have reasonably expected success because internal mounting is a standard method of providing stability to parts and was readily and easily achievable by POSITA.

vii. Claim 1(f)

1(f)	e. the computer located within the feeder housing;

104. Bennett discloses a computer located within the feeder housing. Specifically, Bennett discloses a controller located in the sustenance tray. "FIG. 4B depicts the solid sustenance dispensing tray 401 that attaches to the station 400. It [the tray] comprises the controller 105 discussed in the description of FIG. 2C, and the same sensors and electrical loads discussed in the description of FIG. 3C, and reproduced schematically in FIG. 4B for convenient reference." (EX1005 ¶82).

105. The controller is a computer because it can execute software: "data from the sensors such as, but not limited to imaging 112, audio 113, or motion 114 sensors, may be processed by software executing in the controller 105 to determine the presence of an animal at the station and apply power to the UV emitters 138 only when no animals are present." (EX1005 ¶47).

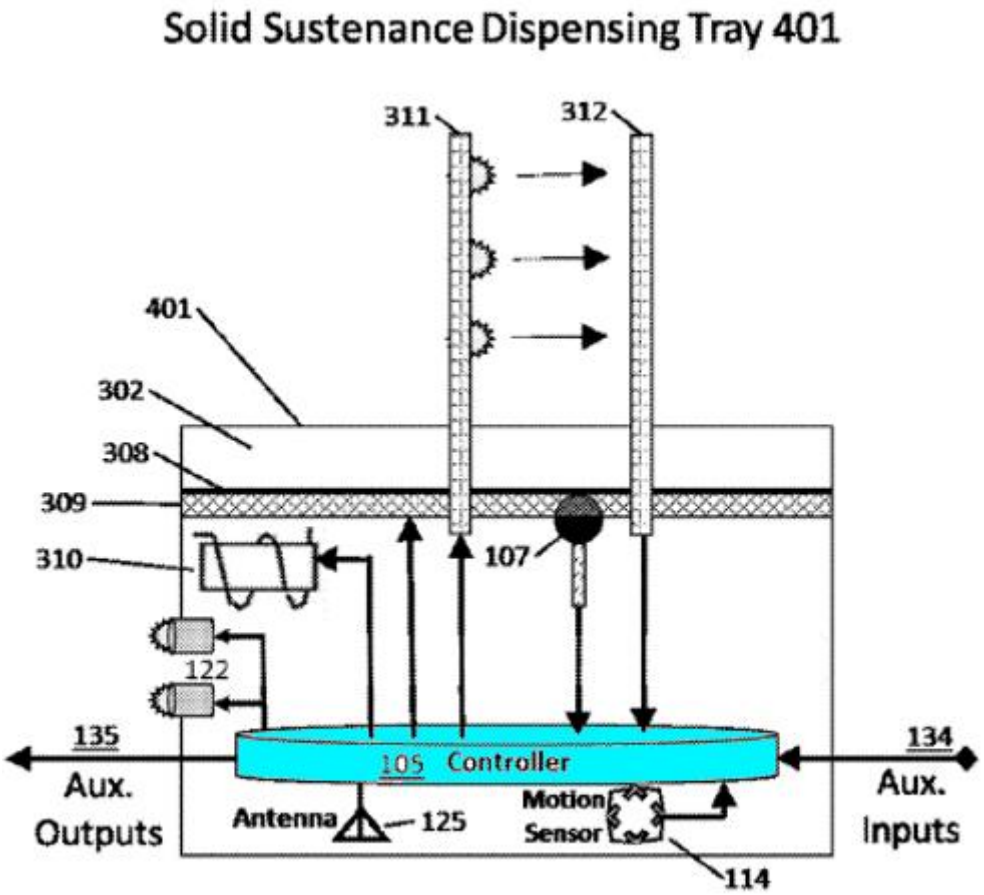


FIG. 4B

(EX1005 at FIG. 4B).

viii. Claim 1(g)

1(g)	f. an internal power source; and

106. Bennett discloses an internal power source. Bennett's power management module can be connected to a battery. (EX1005 ¶58). "The power management module 203 receives power from… a connection to a stored 217 power source (e.g., battery, supercapacitor), and conditions and transforms it to supply the voltages and currents required by the modules comprising the controller 105. With the variety of power management integrated circuits currently marketed… that can operate from input voltages ranging from 2.4 to 28 volts at currents from 2 to 12 amperes, the designer of a given embodiment may choose from a variety of power converters for supplying generated 216 power." (*Id*).

107. Furthermore, it would have been obvious to POSITA to place the battery inside the feeder housing to weatherproof the battery and to protect the battery from external forces.

ix. Claim 1(h)

1(h)	g. a WiFi adapter located within the feeder housing.

108. Bennett discloses a WiFi adapter located within the feeder housing. Bennett's controller is capable of communicating wirelessly using standard

protocols, including the 802.11 (WiFi) protocol: "Located in the lower part of feeding tray 102 beneath the sealing barrier 103, the station controller 105… is capable of communicating wirelessly using one or more standard communication protocols such as, but not limited to, 802.11… through the use of one or more antennas 125." (EX1005 ¶51).

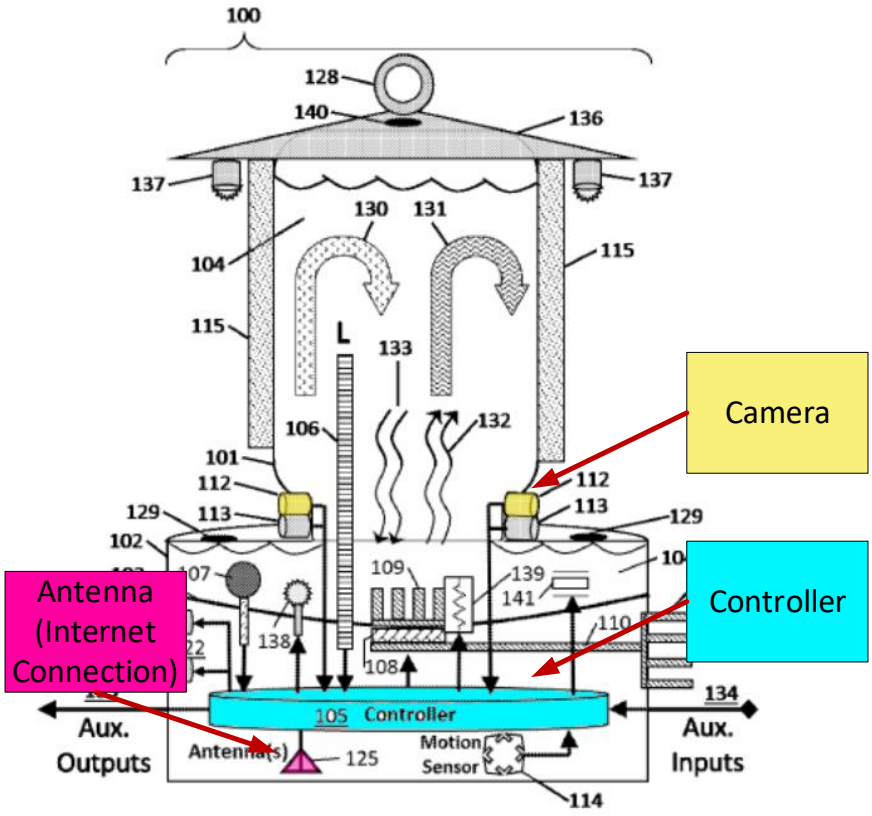


FIG. 1A

(EX1005 at FIG. 1A).

B. Claim 3

3	The self-contained bird feeder of claim 1 further comprising a feed compartment disposed in the feeder housing and a feed compartment separator disposed in the feed compartment, whereby feed is fed by gravity from the feed compartment through the feeder housing, to the feeder bottom, and then to the feed port.

109. Bennett discloses a feed compartment disposed in the feeder housing, wherein the feed compartment includes a feed compartment separator and wherein the feed is fed by gravity from the feed compartment through the feeder housing to the feeder bottom, and then to a feed port. (EX1005 ¶73).

110. Bennett is gravity fed, this is clearly apparent from visual inspection of both liquid and physical embodiments of Bennett. Bennett also states that "The storage vessel 101 of station 300 stores solid sustenance 302 (e.g., seeds, nuts) and attached to the bottom of storage vessel is the feeding tray 304 into which solid sustenance 302 from the storage vessel 101 is dispensed." (EX1005 ¶73). Food in Bennett therefore travels from the primary reservoir (101) into the feeding tray (304) and then to the feed ports (129, 308).

111. Bennett discloses a separator that separates the feed compartment into two parts: "As further illustrated in FIG. 1A, the feeding tray 102 comprises

two main chambers, upper and lower, divided substantially horizontally by a sealing barrier 103 that prevents the liquid 104 in the upper chamber from escaping into the lower chamber containing the station controller 105 and other electrical components and associated circuitry." (EX1005 ¶41).

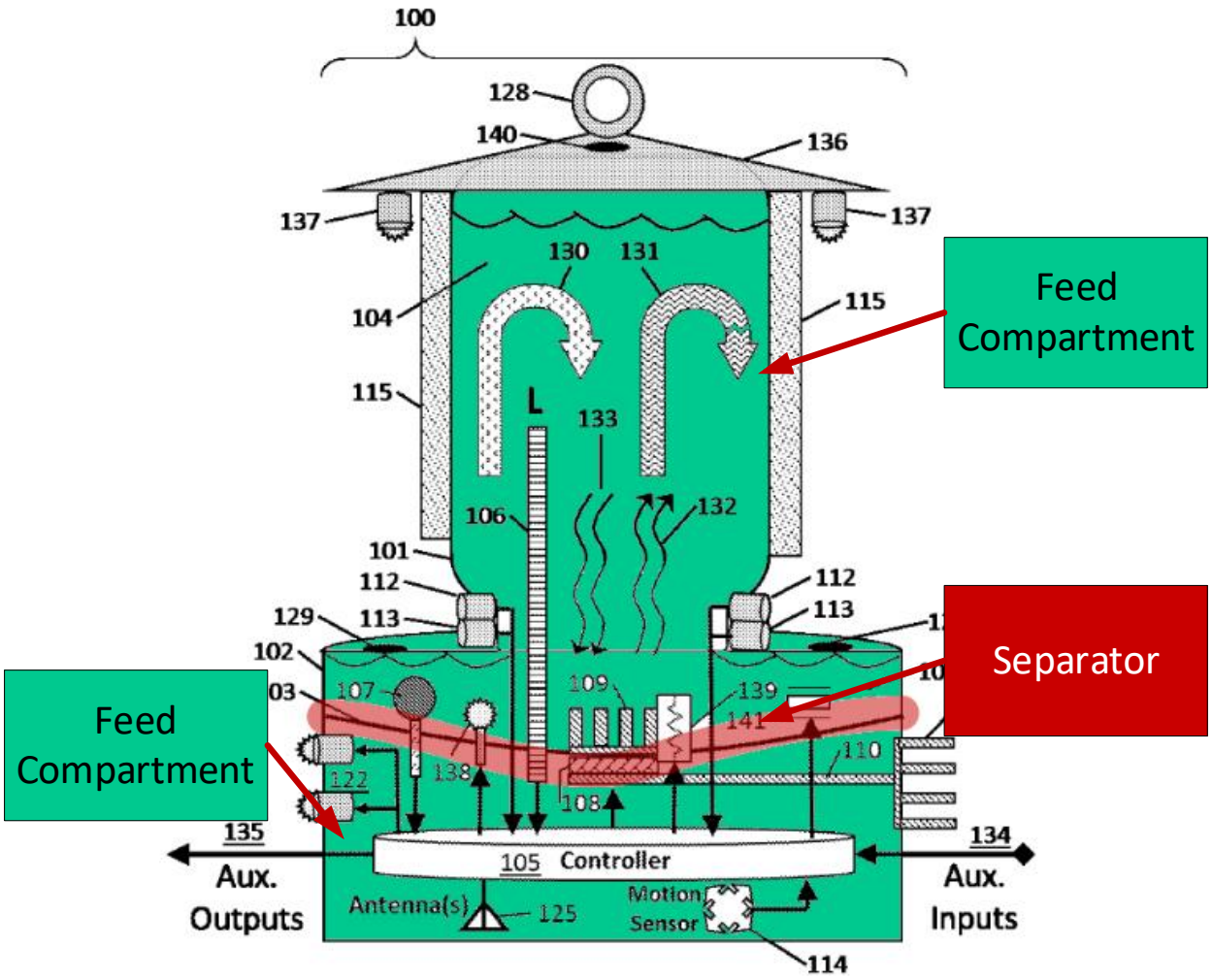


FIG. 1A

(EX1005 at FIG. 1A).

VIII. Ground 1A | Bennett in view of Rofougaran

A. Claim 2

2	The self-contained bird feeder of claim 1 wherein the WiFi adapter is a WiFi dongle.

112. WiFi dongles were well-known to POSITA in and before 2015. Rofougaran is one example of a WiFi dongle that is configured to plug into a USB port and provides a WiFi antenna (and other functionality) for the device it is plugged into. (EX1009 ¶¶76, 107, 112). It would have been obvious to POSITA to combine Rofougaran with Bennett for the reasons described below.

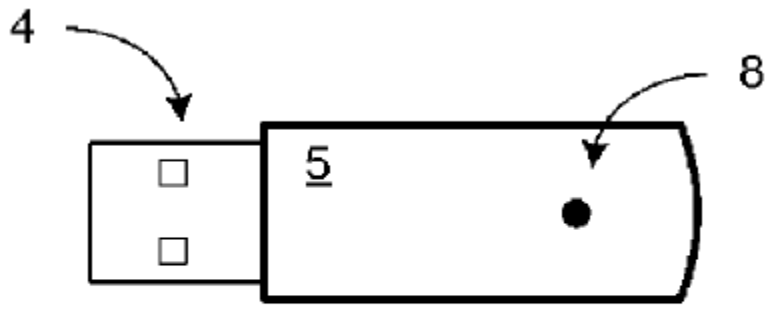


FIG. 3

(EX1009 at FIG. 3).

113. It would have been obvious to POSITA to use a WiFi dongle as a WiFi adapter. USB dongles provide many well-known advantages which POSITA would have been aware of prior to 2015, including a uniform connector type,

hot-plug/plug-and-play support, USB dongles were generally low cost, and USB was an easily supported standard.

114. The use of USB WiFi dongles was a known technique for enabling WiFi connectivity and its use yields a predictable result (enabling WiFi connectivity). Thus, it would have been obvious to a POSITA to use a WiFi dongle, and POSITA would have reasonably expected success, because using WiFi dongles with USB connectors was a well-known technique for enabling WiFi, and because POSITA would have been using the WiFi dongle for its intended purpose (enabling WiFi).

115. The use of a USB WiFi dongle would have been obvious to try because there are a finite number of potential types of WiFi adapters to use, and a USB dongle was a well-known type of WiFi adapter. POSITA would have reasonably expected success because POSITA would have used the WiFi dongle for its intended purpose of enabling WiFi

116. Likewise, use of a WiFi dongle in lieu of a different type of WiFi adapter is merely the simple substitution of one known element (from the class of WiFi adapters) for another known element (from the class of WiFi dongle adapters) to obtain a predictable result (access to WiFi).

117. Therefore, there would have been a reasonable expectation of success using a USB WiFi dongle because USB WiFi dongles are well-known, well-understood, and easy for POSITA to implement.

IX. Ground 1B | Bennett in view of Bevan and Raspberry Pi 2 Model B

A. Claim 4

4	The self-contained bird feeder of claim 1 wherein the computer comprises: a processor; a display connector; a multi-media interface; an audio/video jack; and an ethernet socket.

118. Bennett discloses a processor because Bennett is capable of executing software, and the ability to execute software requires at least a simple processor: "data from sensors such as, but not limited to imaging 112, audio 113, or motion 114 sensors may be processed by software executing on the controller 105 to determine the presence of an animal and the station and to apply power to the UV emitters 138 only when no animals are present." (EX1005 ¶47).

119. Nevertheless, Bennett is silent as to the type of controller it uses. Bennett requires some kind of controller capable of performing the various functions performed by its controller. It would therefore have been obvious to POSITA to use the Raspberry Pi 2 Model B as the controller for Bennett

because Bevan teaches that Raspberry Pi devices are effective controllers for cameras in bird feeder systems. (EX1010 at 5-9). Bevan teaches using a Raspberry Pi as the controller for a wildlife camera that detects motion and takes pictures when birds are present at a bird table (a type of flat bird feeder). (*Id*). It would therefore have been obvious to POSITA to use a Raspberry Pi to control the capture of images and video of birds when the birds were present at a bird feeder. (*Id*).

120. Furthermore, the Raspberry Pi 2 Model B has other features that make it attractive to POSITA. The Raspbian Linux Distribution was known prior to the effective filing date of the '242 Patent—PO admits using the publicly available Raspbian Linux Distribution to program their own Raspberry Pi controller. (EX1003 at col. 3:27-39). Accordingly, POSITA would have been motivated to save time, effort (in both coding and debugging), and resources by using the Raspbian Linux Distribution and its prewritten software as the operating system for the controller, which would necessitate using a Raspberry Pi Device.

121. The Raspberry Pi 2 Model B was one of a finite number of microcontroller boards available prior to the effective filing date of the '242 Patent. The Raspberry Pi 2 Model B includes an HDMI port, a Camera Serial Interface, a Display Serial Interface, an ethernet port, micro-USB

socket, multiple USB ports, and a combined 3.5mm audio jack with composite video. (EX1010 at 12). In short, the Raspberry Pi 2 Model B includes all of the elements of claim 4.

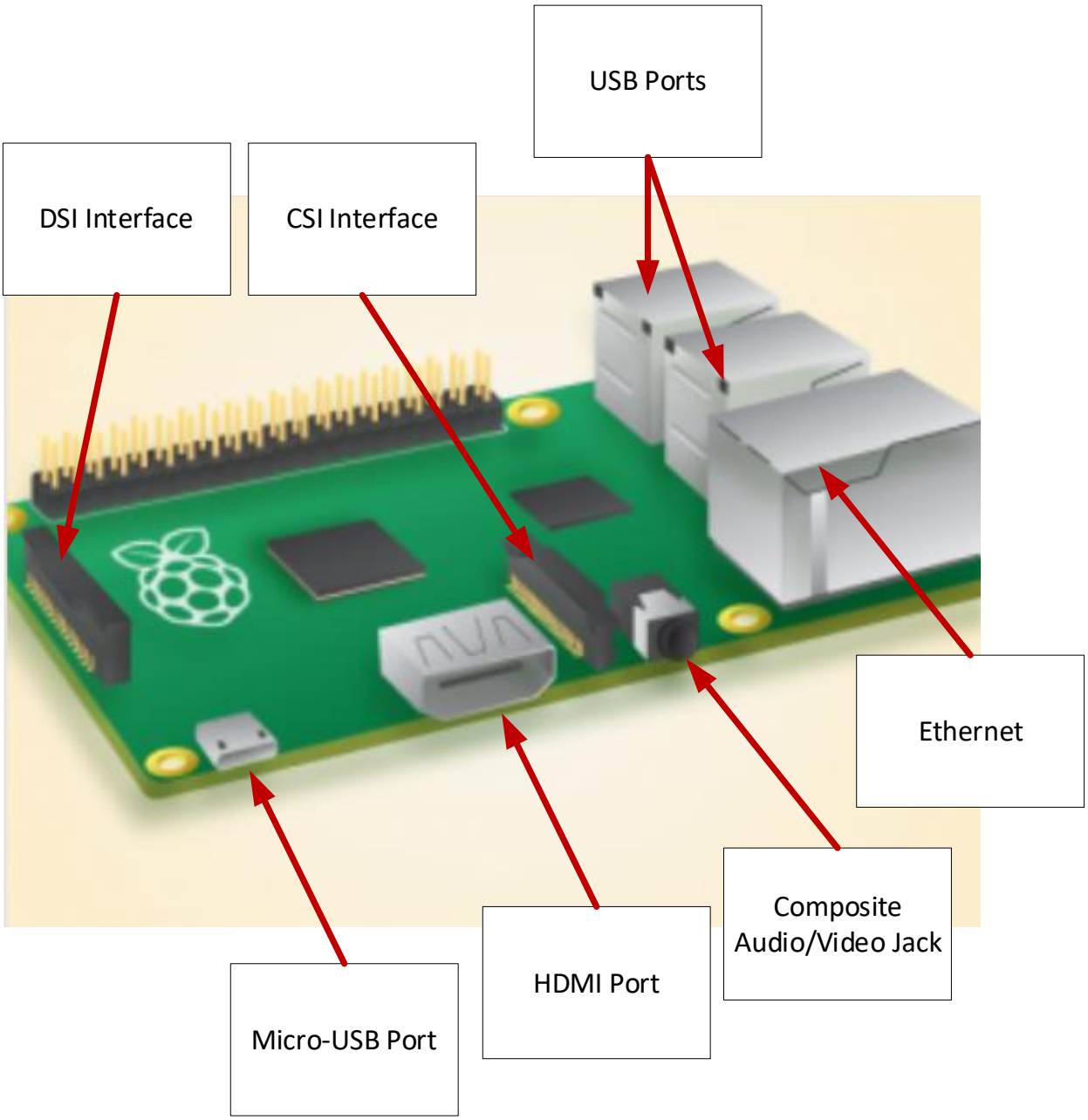
122. Because the Raspberry Pi 2 Model B provides connections for all of the different types of sensors used in Bennett, and because it was well-known and well-understood to use Raspberry Pi devices to control cameras, such as those in Bennett, it would have been obvious to POSITA to use the Raspberry Pi 2 Model B as the microcontroller board in Bennett.

123. POSITA would have reasonably expected success using the Raspberry Pi 2 Model B because Bevan teaches how to capture and transmit images of birds using a Raspberry Pi and a camera, indicating that the desired functionality was possible and readily achievable.

124. Furthermore, using a Raspberry Pi device as a driver for a camera was a known technique, as indicated in Bevan, that yielded predictable results (controlling the camera system), and would do so in this context as well.

125. Likewise, use of a Raspberry Pi 2 Model B in lieu of a different type of controller is merely the simple substitution of one known element (a controller) for another known element (a Raspberry Pi 2 Model B, a type of controller) to obtain a predictable result (control over the hardware elements of the system as a whole).

126. Finally, it would be obvious to try the Raspberry Pi 2 Model B because there were a finite number of control circuits and microcontrollers capable of performing the functions described in Bennett that are performed by the controller. The Raspberry Pi 2 Model B was one such device and using it as the controller would be using it for one of its intended purposes (as a controller for simple electronic devices). POSITA would reasonably expect this to result in a suitable controller, especially in view of the fact that it was known to use Raspberry Pi devices as controllers for bird feeder cameras.



B. Claim 5

5	The self-contained bird feeder of claim 1 wherein the computer comprises a micro USB socket and a USB port.

127. The combination of Bennett with Bevan and the Raspberry Pi 2 Model B includes the features of the Raspberry Pi 2 Model B, including a micro-USB socket and a USB port. (EX1010 at 12). Thus, the combination of claim 4, which is motivated for the same reasons as described in claim 4, discloses all elements of claim 5.

C. Claim 6

6	The self-contained bird feeder of claim 4 wherein the multi-media interface comprises an HDMI port.

128. The combination of Bennett with Bevan and the Raspberry Pi 2 Model B includes the features of the Raspberry Pi 2 Model B, including an HDMI port. (EX1010 at 12). Thus, the combination of claim 4, which is motivated for the same reasons as described in claim 4, discloses all elements of claim 6.

X. Ground 2 | Bonham

A. Claim 1

i. Claim 1(pre)

1(pre)	A self-contained bird feeder configured to provide detailed images over a wireless network, comprising:

129. Bonham discloses a self-contained bird house configured to provide detailed images over a wireless network. (EX1006 ¶¶12-14). All components of Bonham—cameras, batteries, and controller—are part of Bonham and are not OEM or stand-alone components. (*Id*). Bonham can function as a bird feeder by placing food inside of the bird house housing.

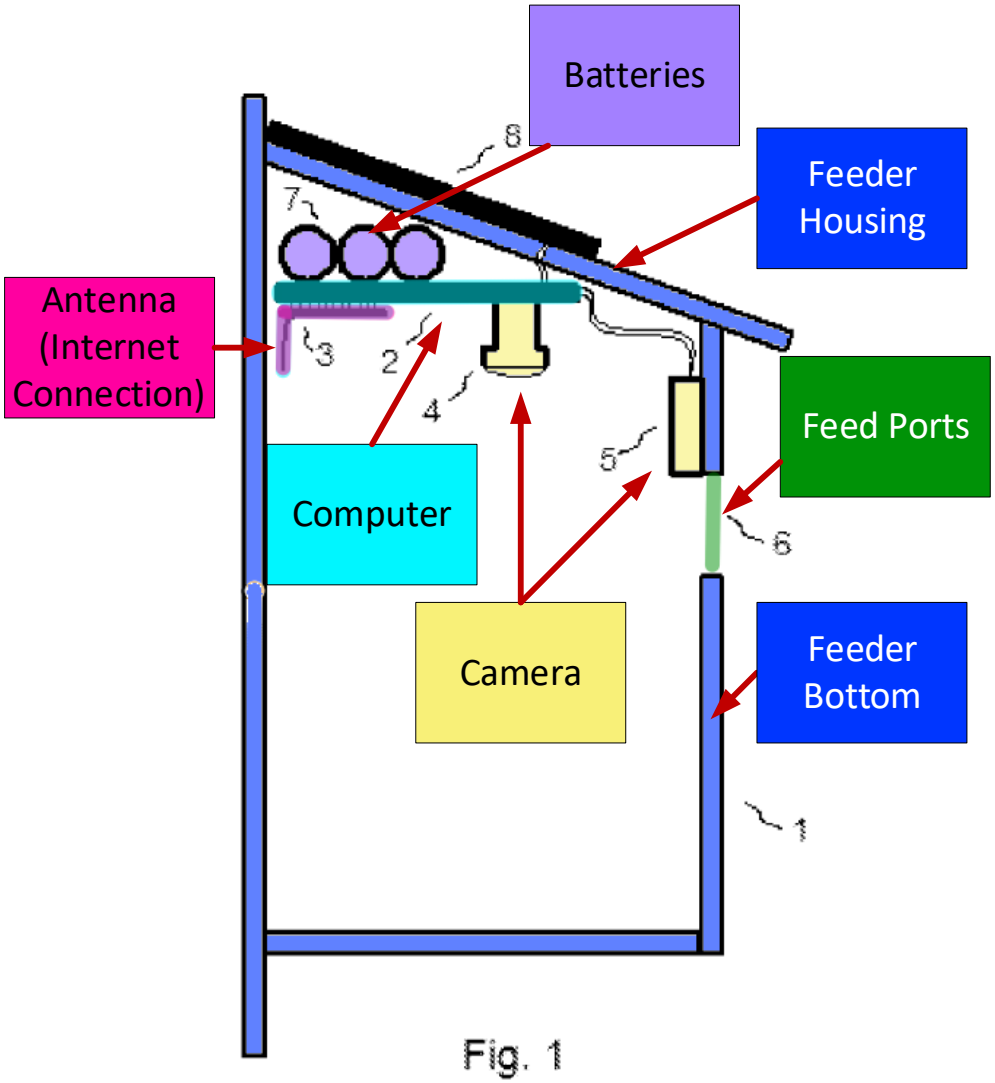


Fig. 1

ii. Claim 1(a)

1(a)	a bird feeder with a built in camera, computer, and internet connection, the bird feeder comprising:

130. Bonham has a built-in camera, computer, and internet connection.

131. The bird house of Bonham is the bird feeder. As Bonham explains, it is possible to use cameras inside bird houses to monitor feeding rates, and this has been known since at least 2010. (EX1006 ¶4). Bonham includes an "internet-connected computer in the form of the microcontroller (2) where the data can be uploaded and added to centralized databases". (EX1106 ¶¶13-14). The camera is the image sensor built into the bird house. (*Id*).

132. Furthermore, it would have been obvious to POSITA to include bird feed in the bird house because bird feed could be easily placed in the feeder bottom and on the base of the bird house, which would attract birds to the bird house and allow the bird house to function as a feeder. POSITA would have a reasonable expectation of success because placing bird food in a bird house is not complicated and is easy to accomplish. Furthermore, Bonham mentions that it is possible to track feeding rates of birds using the camera and motion detector, which would be possible if food were inside the bird house. (EX1006 ¶6).

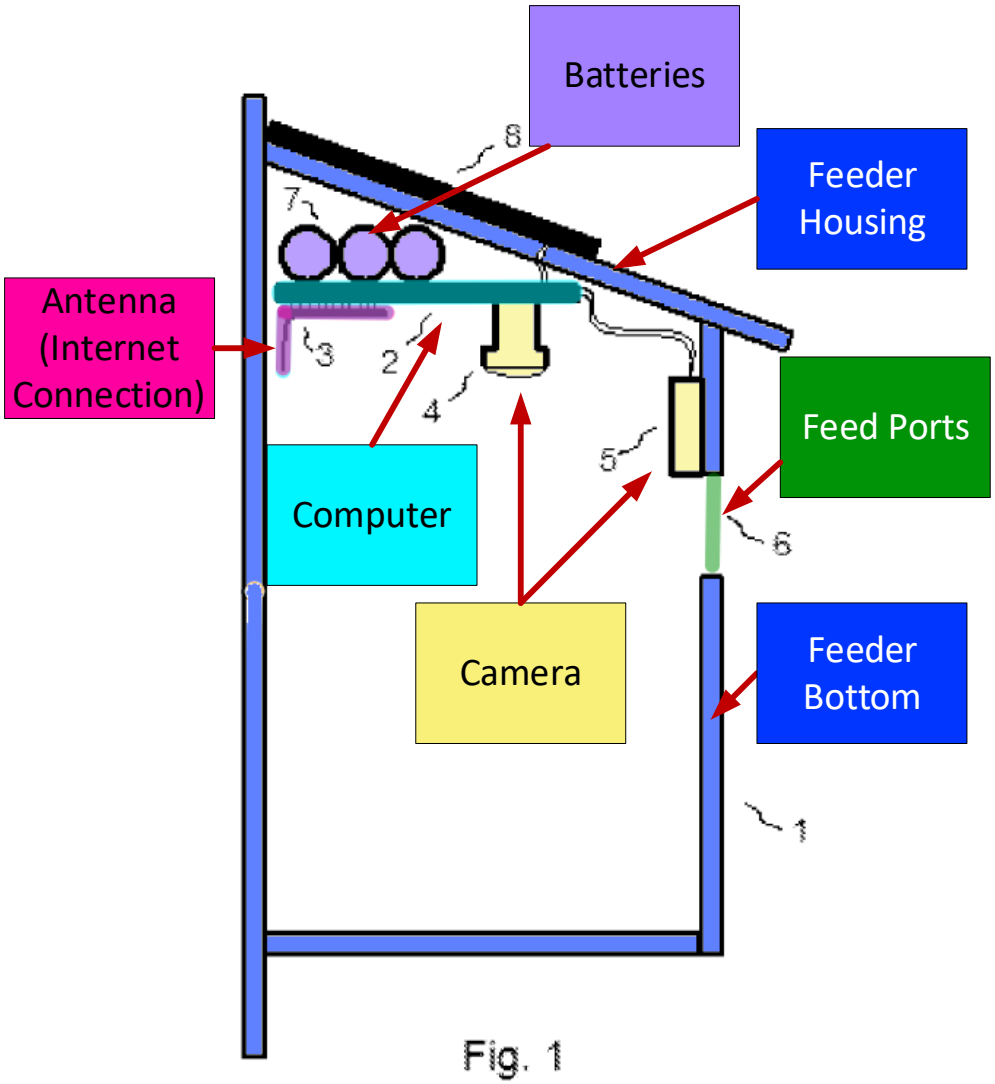


Fig. 1

(EX1006 at FIG. 1).

iii. Claim 1(b)

1(b)	a. a feeder housing;

133. Bonham discloses a feeder housing, which is the housing of the bird house. (EX1006 ¶¶7-9, 13-14).

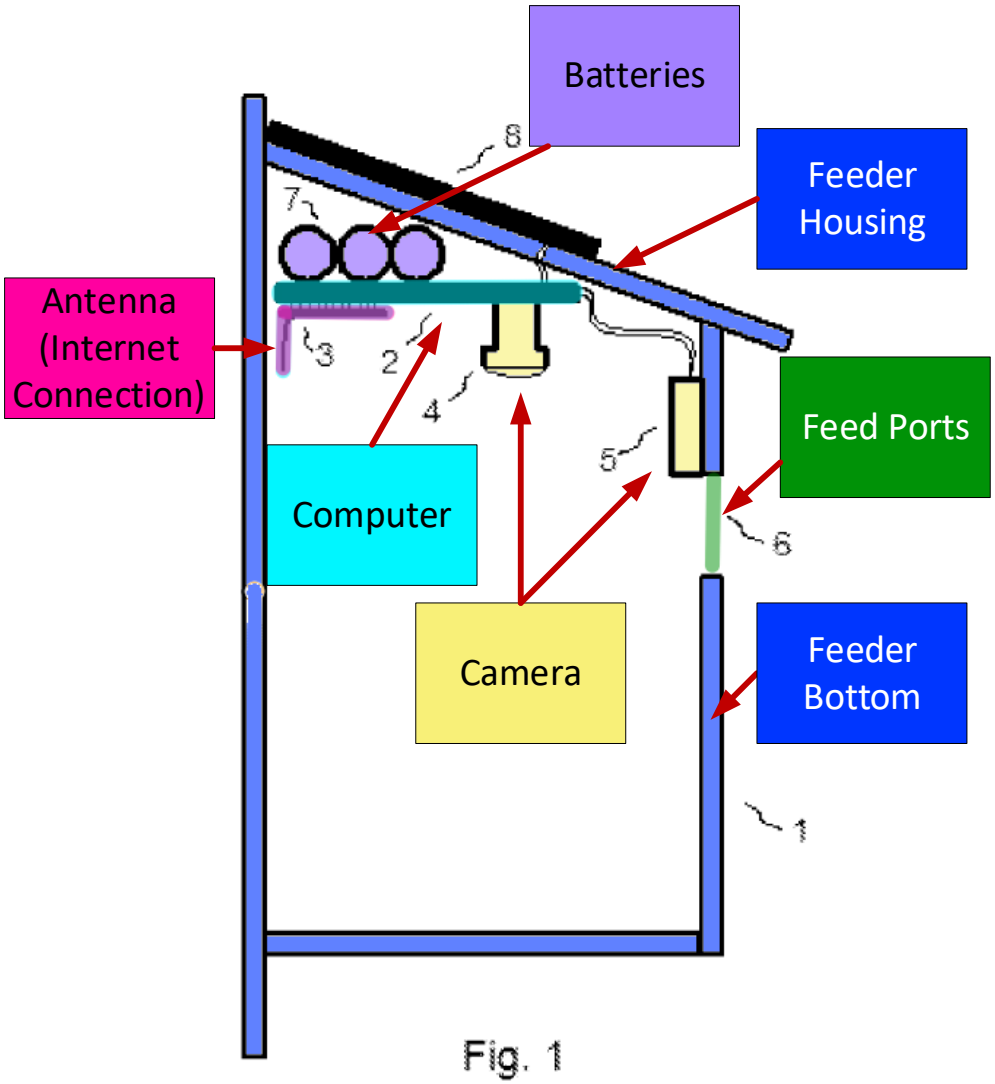


Fig. 1

(EX1006 at FIG. 1).

iv. Claim 1(c)

1(c)	b. a feeder bottom;

134. Bonham discloses a feeder bottom, which is the bottom and sides of the bird house. (EX1006 ¶¶13-14).

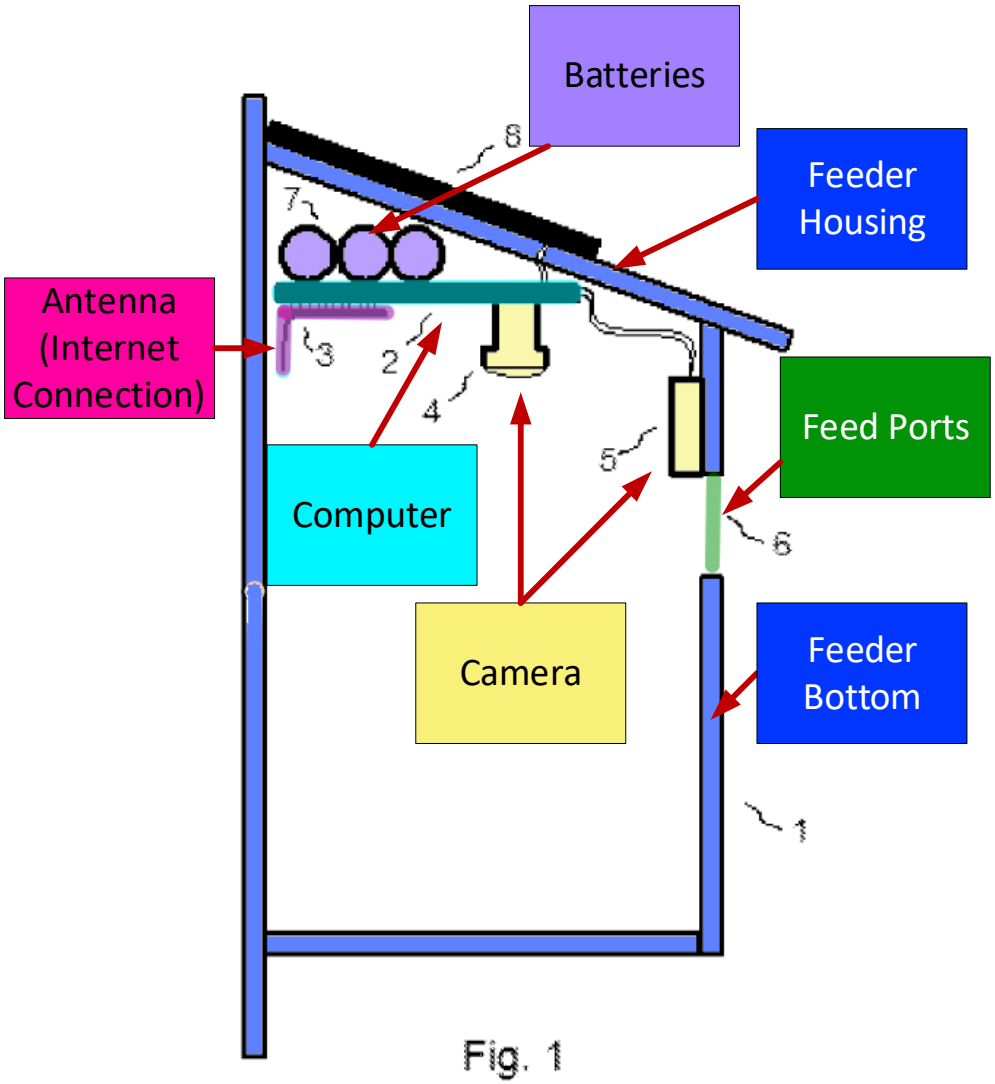


Fig. 1

(EX1006 at FIG. 1).

v. Claim 1(d)

1(d)	c. a feed port disposed on the feeder bottom;

135. Bonham discloses a feed port which is the entrance hole (6) of the bird house. (EX1006 ¶¶13-14). When the bird house is filled with food, a bird can perch on the lip of the entrance hole to access the food or can pass

through the entrance hole into the bird house to access food. Either way, the bird accesses food through the circular entrance hole.

136. It would have been obvious to POSITA to place the feed port at a lower position as well. It would also have been obvious to move the feed port closer to the floor of Bonham. It would also have been obvious to POSITA to move the feed port down because the location of the feed port is obvious to try as one of a finite number of possible positions of the feed port, and POSITA would have reasonably expected success because moving the feed port is as simple as drilling through the wood of the bird feeder at a lower location. It would also have been obvious to POSITA to move the feed port because moving the feed port location is simple substitution of one location for another, and POSITA would reasonably expect success because moving the feed port is as simple as drilling through the wood at the substitute location.

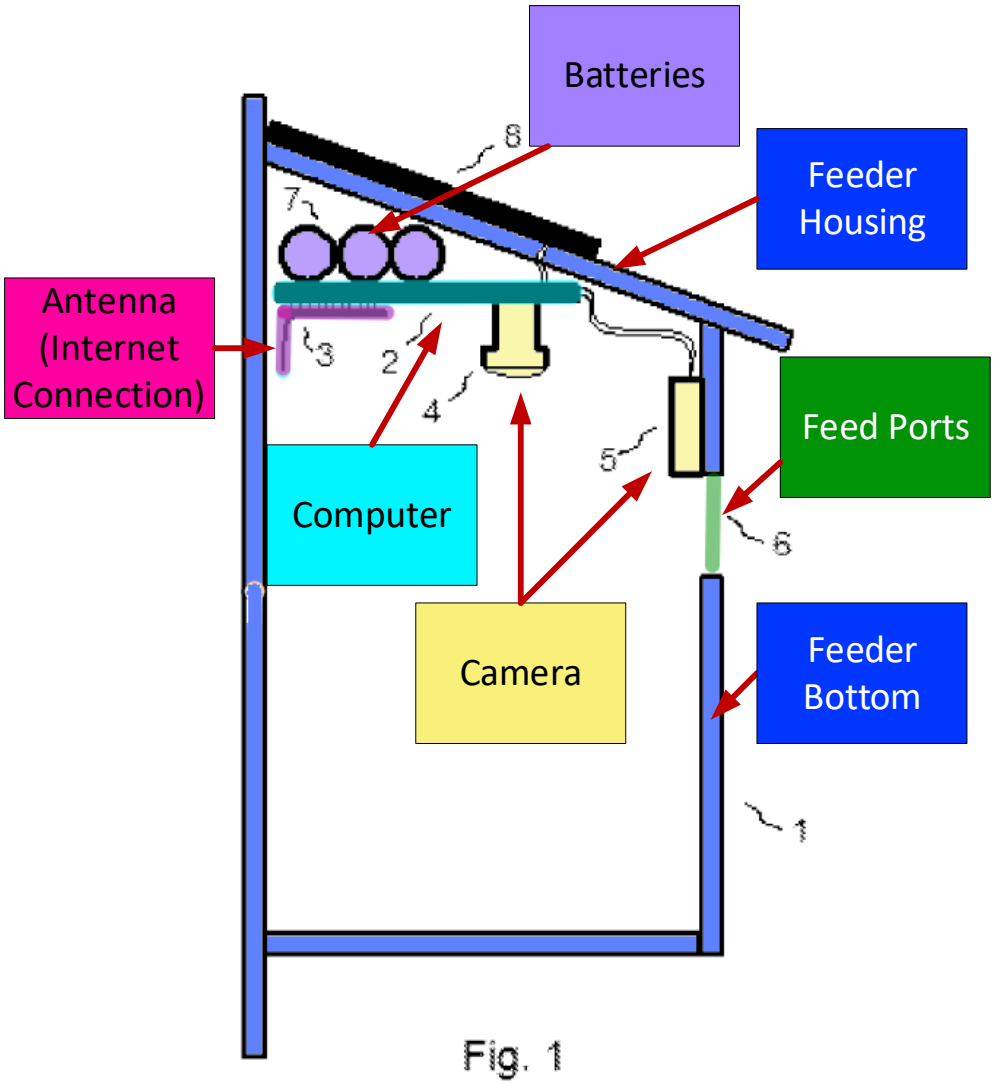


Fig. 1

(EX1006 at FIG. 1).

vi. Claim 1(e)

1(e)	d. the camera internally mounted to the bird feeder such that the camera is aligned with the feed port to observe feeding birds;

137. Bonham discloses an internally mounted camera aligned with the feed port to observe feeding birds. Specifically, the internally mounted camera is

the image sensor and lens (4) that is mounted inside and to the ceiling of the bird house. (EX1006 ¶¶13-14). The sensor "provides for still pictures or video to be taken of activity inside the bird house." (*Id*).

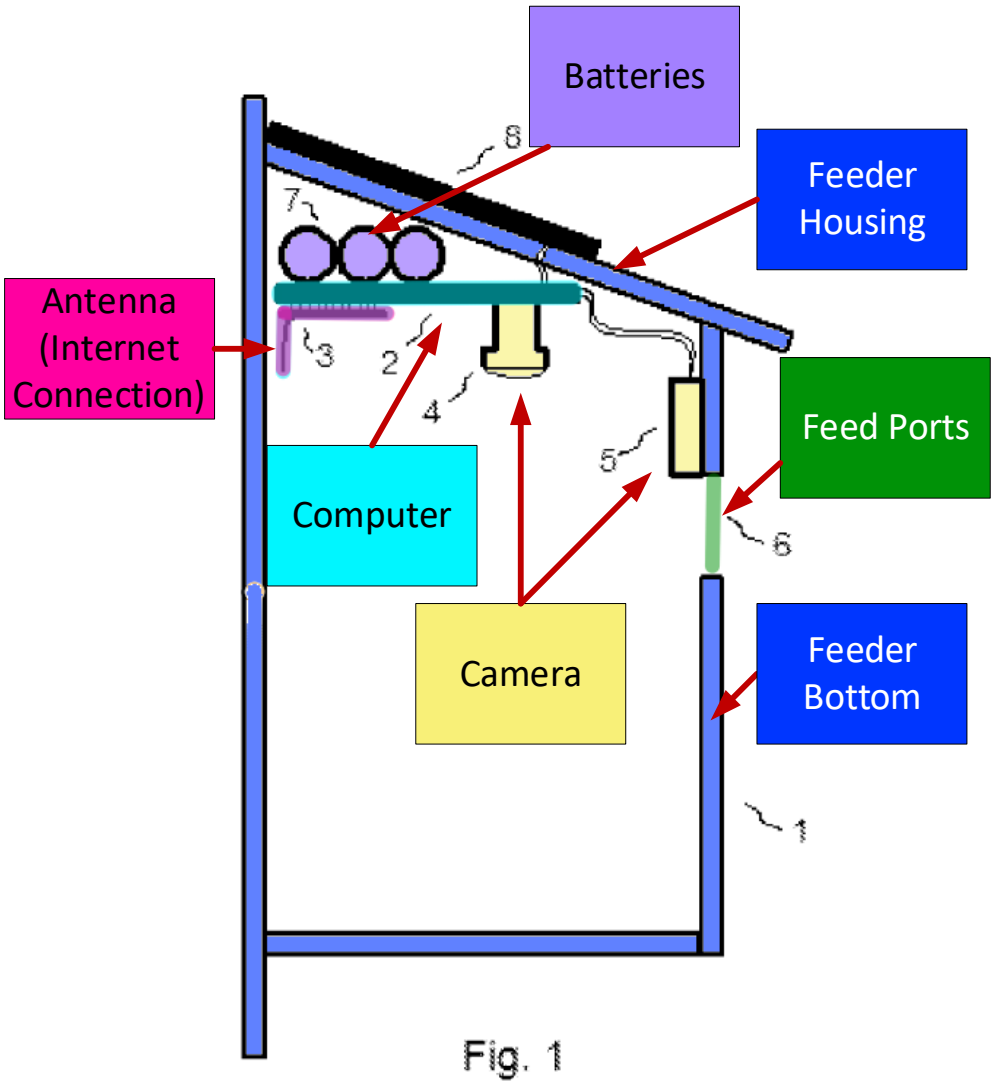


Fig. 1

vii. Claim 1(f)

1(f)	e. the computer located within the feeder housing;

138. Bonham discloses a computer ("controller") located in the feeder housing. The computer is the electronic circuit board (2) that includes "a central processing unit [CPU], memory, clock, and embedded software that controls the other elements of the invention." (EX1006 ¶¶13-14). These are the essential elements of a computer, thus Bonham discloses a computer. The electronic circuit board (the computer) is "fitted and installed inside of the bird-house." (*Id*).

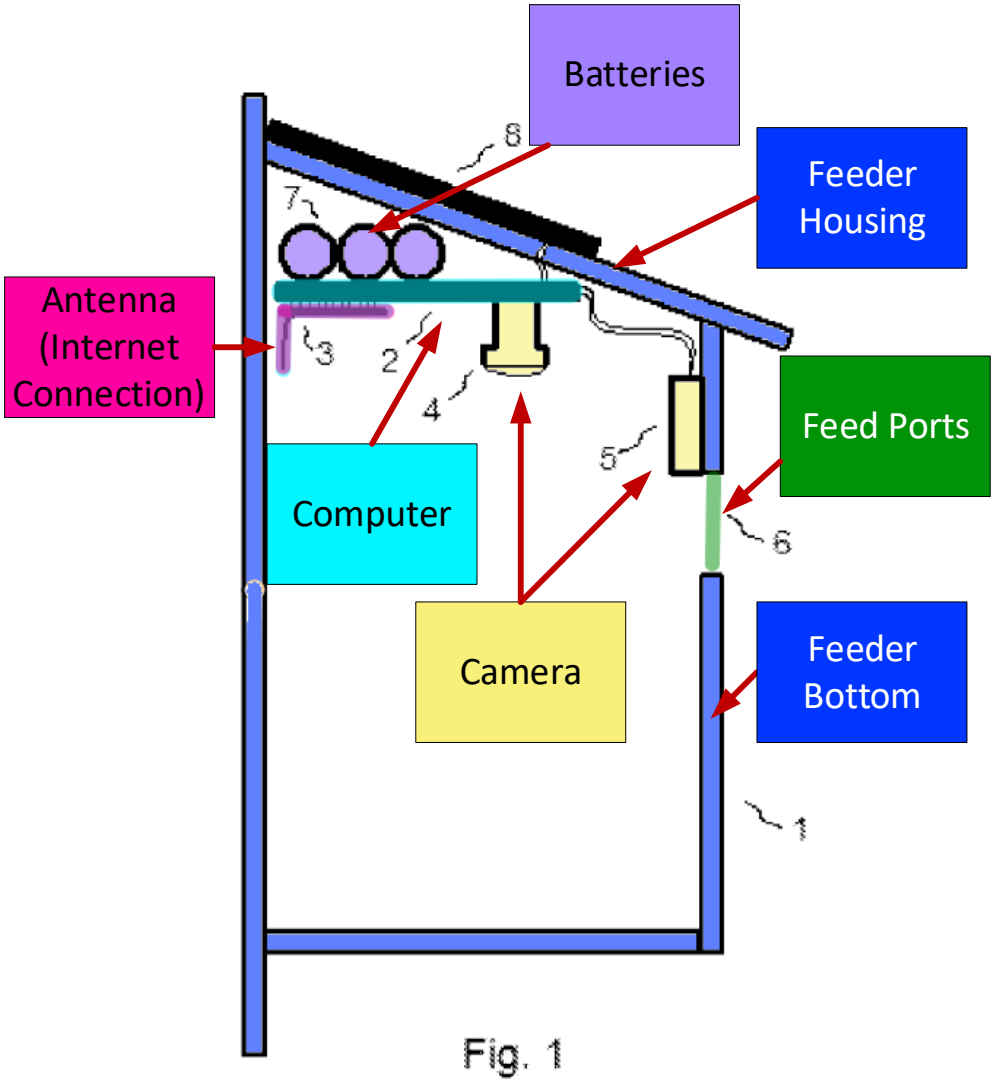


Fig. 1

(EX1006 at FIG. 1).

viii. Claim 1(g)

1(g)	f. an internal power source; and

139. Bonham discloses an internal power source. The internal power source is a set of rechargeable batteries (7) that are "fitted and installed inside the bird-house." (EX1006 ¶¶13-14).

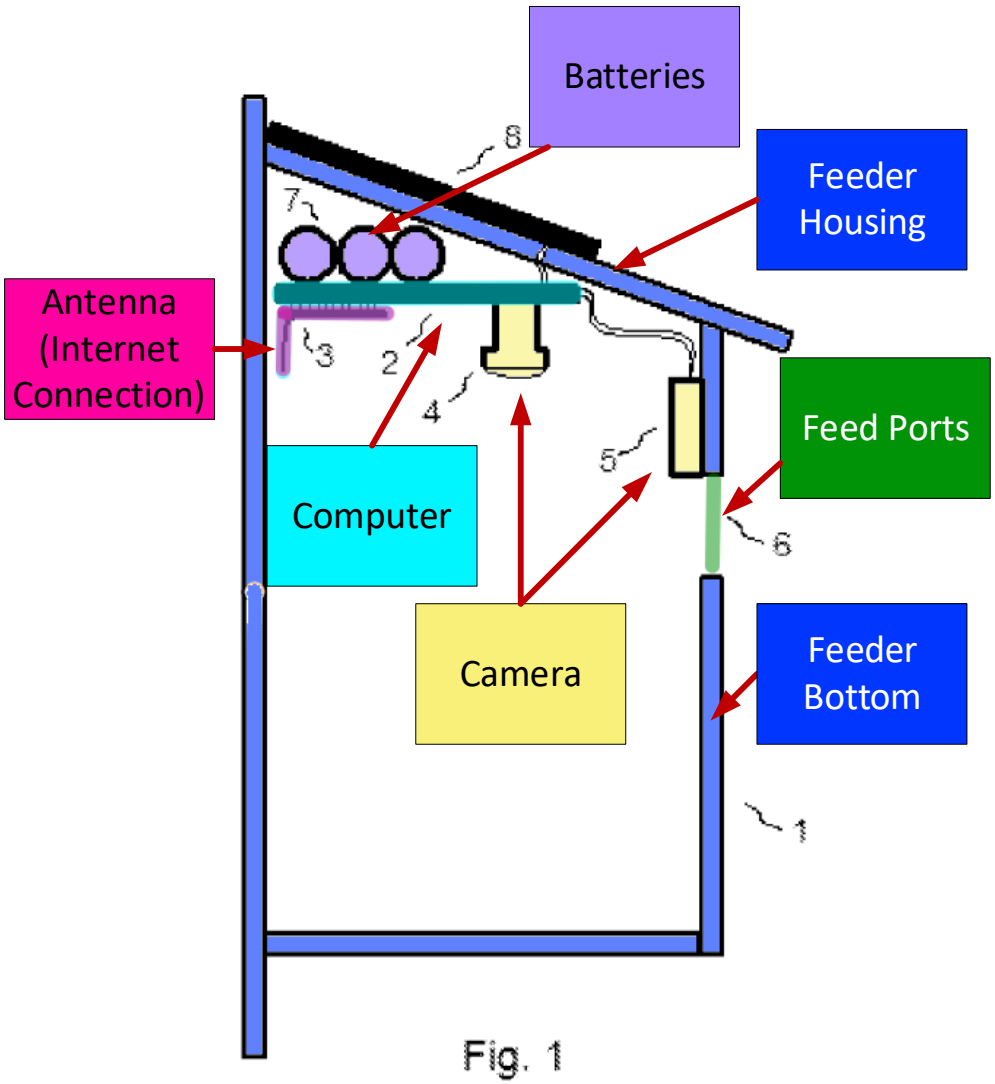


Fig. 1

ix. Claim 1(h)

1(h)	g. a WiFi adapter located within the feeder housing.

140. Bonham discloses a WiFi adapter located within the feeder housing. Specifically, Bonham discloses a two-way wireless transceiver (3) that is "fitted and installed inside the bird-house." (EX1006 ¶¶13-14). This transceiver must be internet-connected because Bonham includes an internet-connected computer. (*Id*). Internet connectivity for a wireless device can be provided by the 802.11 (WiFi) protocol. It would therefore have been obvious to POSITA to use WiFi because WiFi is a well-understood, easy to implement protocol for internet connectivity with substantial third-party support. Furthermore, WiFi is commonly used in homes and would be available to an outdoor bird house as in Bonham that may be nearby a home. Therefore, POSITA would have a reasonable expectation of success using WiFi as the protocol for the wireless transceiver.

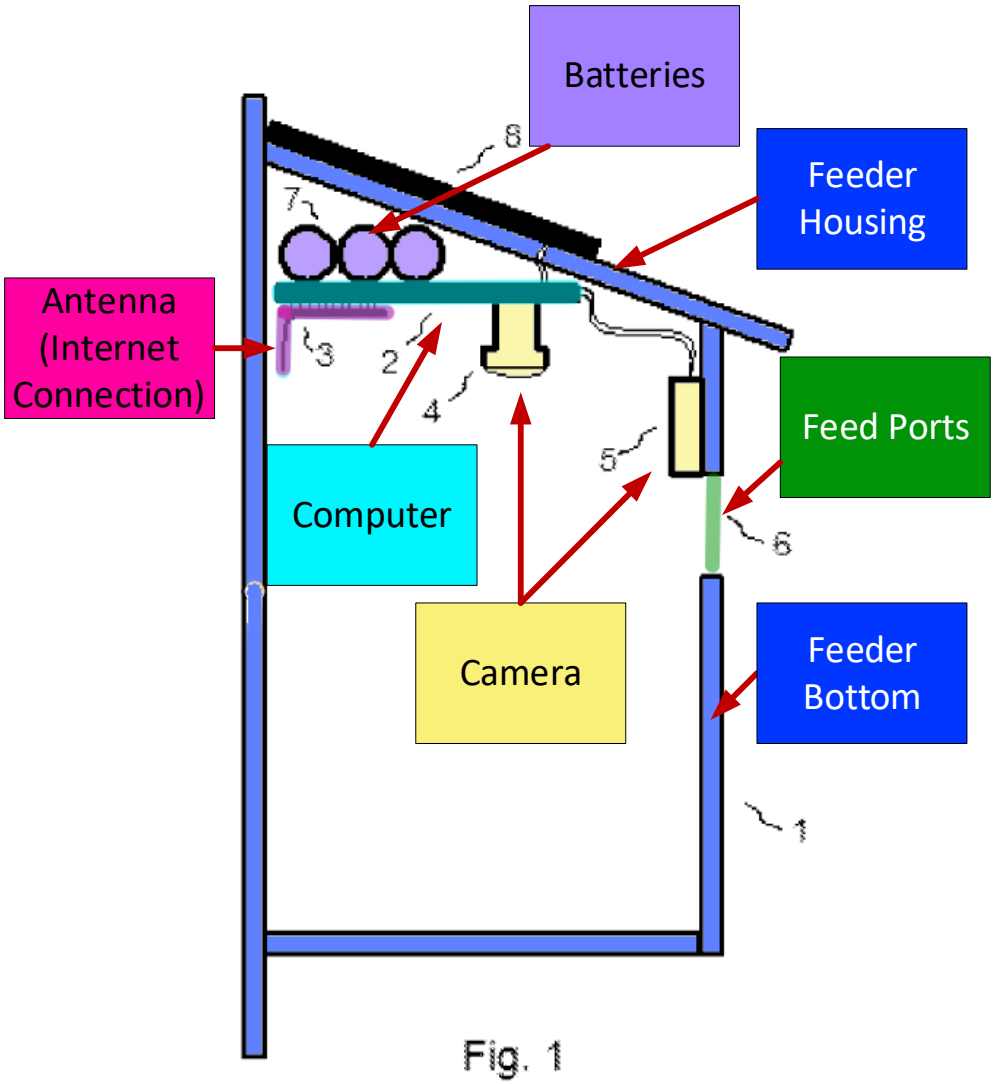


Fig. 1

(EX1006 at FIG. 1).

XI. Ground 2A | Bonham in view of Rofougaran

A. Claim 2

2	The self-contained bird feeder of claim 1 wherein the WiFi adapter is a WiFi dongle.

141. WiFi dongles were well-known to POSITA in and before 2015. Rofogouran is one example of a WiFi dongle that is configured to plug into a USB port and provides a WiFi antenna (and other functionality) for the device it is plugged into. (EX1009 ¶¶76, 107, 112). As explained below, it would have been obvious to POSITA to combine Rofougaran with Bonham.

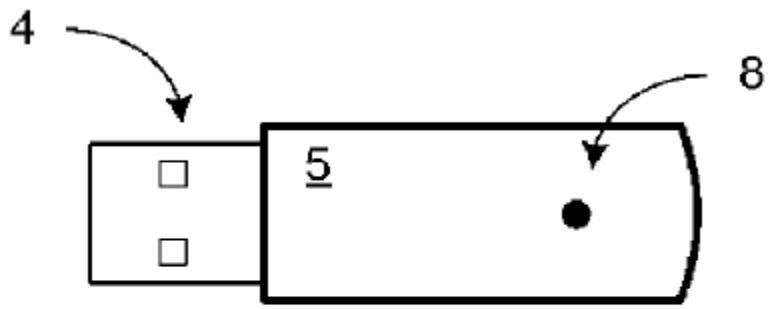


FIG. 3

(EX1009 at FIG. 3).

142. It would have been obvious to POSITA to use a WiFi dongle as a WiFi adapter. USB dongles provide many well-known advantages which POSITA would have been aware of prior to 2015, including a uniform connector type, hot-plug/plug-and-play support, USB dongles were generally low cost, and USB was an easily supported standard.

143. The use of USB WiFi dongles was a known technique for enabling WiFi connectivity and its use yields a predictable result (enabling WiFi

connectivity). Thus, it would have been obvious to a POSITA to use a WiFi dongle, and POSITA would have reasonably expected success, because using WiFi dongles with USB connectors was a well-known technique for enabling WiFi, and because POSITA would have been using the WiFi dongle for its intended purpose (enabling WiFi).

144. The use of a USB WiFi dongle would have been obvious to try because there are a finite number of potential types of WiFi adapters to use, and a USB dongle was a well-known type of WiFi adapter. POSITA would have reasonably expected success because POSITA would have used the WiFi dongle for its intended purpose of enabling WiFi

145. Likewise, use of a WiFi dongle in lieu of a different type of WiFi adapter is merely the simple substitution of one known element (from the class of WiFi adapters) for another known element (from the class of WiFi dongle adapters) to obtain a predictable result (access to WiFi).

146. Therefore, there would have been a reasonable expectation of success using a USB WiFi dongle because USB WiFi dongles are well-known, well-understood, and easy for POSITA to implement.

XII. Ground 2B | Bonham in view of Bennett and Humphries

A. Claim 3

3	The self-contained bird feeder of claim 1 further comprising a feed compartment disposed in the feeder housing and a feed compartment separator disposed in the feed compartment, whereby feed is fed by gravity from the feed compartment through the feeder housing, to the feeder bottom, and then to the feed port.

147. Bonham in view of Bennett discloses the claimed separator in the feed compartment. It would have been obvious, as explained below, to combine Bonham and Bennett and Humphries.

148. Bennett discloses a "sealing barrier" that "prevents the liquid in the upper chamber from escaping into the lower chamber containing the station controller and other electrical components and associated circuitry. The sealing barrier may be curved, flat, other otherwise shaped to accommodate the attachment of sensors and electrical loads at various locations to optimize their respective functions." (EX1005 ¶41).

149. POSITA would have been motivated to protect the electronics inside Bonham from the feed and from other things inside the feeder (e.g., birds flapping against the roof), and would have installed the sealing barrier as a means of protecting the electronics. POSITA would have had a reasonable expectation of success because insulating the electronics from the feed is

easy to accomplish and well-within POSITA's skill. Furthermore, POSITA would have known that insulating electronics from the animal feed is a known technique that will yield predictable results (of protecting the electronics).

150. Bonham and Bennett may be further combined with Humphries to add the hopper of Humphries to the interior of Bennett. POSITA would be motivated to place the hopper of Humphries inside Bonham because, as Humphries explains, "[p]rotecting the food from the weather helps maintain the freshness of the food and helps keep the food dry so that seed is permitted to continually flow from within birdseed reservoir 16 to the bays 36." (EX1008 at col. 6:37-44). The combination of Humphries with Bonham and Bennett would be gravity fed because Humphries uses gravity to permit feed to flow from the birdseed reservoir to the bays where the feed can be accessed.

151. POSITA would have reasonably expected success because adding a hopper to a box-type bird house is easily accomplished given that hoppers are well known and well understood and easy to add to hardware.

XIII. Ground 2C | Bonham in view of Bevan and Raspberry Pi 2 Model B

A. Claim 4

4	The self-contained bird feeder of claim 1 wherein the computer comprises: a processor; a display connector; a multi-media interface; an audio/video jack; and an ethernet socket.

152. Bonham is silent as to the type of controller it uses. Bonham requires some kind of controller capable of performing the various functions performed by its controller. It would therefore have been obvious to POSITA to use the Raspberry Pi 2 Model B as the controller for Bonham because Bevan teaches that Raspberry Pi devices are effective controllers for cameras in bird feeder systems. (EX1010 at 5-9). Bevan teaches using a Raspberry Pi as the controller for a wildlife camera that detects motion and takes pictures when birds are present at a bird table (a type of flat bird feeder). (EX1010 at 5-9). It would therefore have been obvious to POSITA to use a Raspberry Pi to control the capture of images and video of birds when the birds were present at a bird feeder.

153. Furthermore, the Raspberry Pi 2 Model B has other features that make it attractive to POSITA. The Raspbian Linux Distribution was known prior to the effective filing date of the '242 Patent—PO admits using the publicly available Raspbian Linux Distribution to program their own Raspberry Pi controller. (EX1003 at col. 3:27-39). Accordingly, POSITA would have been

motivated to save time, effort (in both coding and debugging), and resources by using the Raspbian Linux Distribution and its prewritten software as the operating system for the controller, which would necessitate using a Raspberry Pi Device.

154. The Raspberry Pi 2 Model B was one of a finite number of microcontroller boards available prior to the effective filing date of the '242 Patent. The Raspberry Pi 2 Model B includes an HDMI port, a Camera Serial Interface, a Display Serial Interface, an ethernet port, micro-USB socket, multiple USB ports, and a combined 3.5mm audio jack with composite video. (EX1010 at 12). In short, the Raspberry Pi 2 Model B includes all of the elements of claim 4.

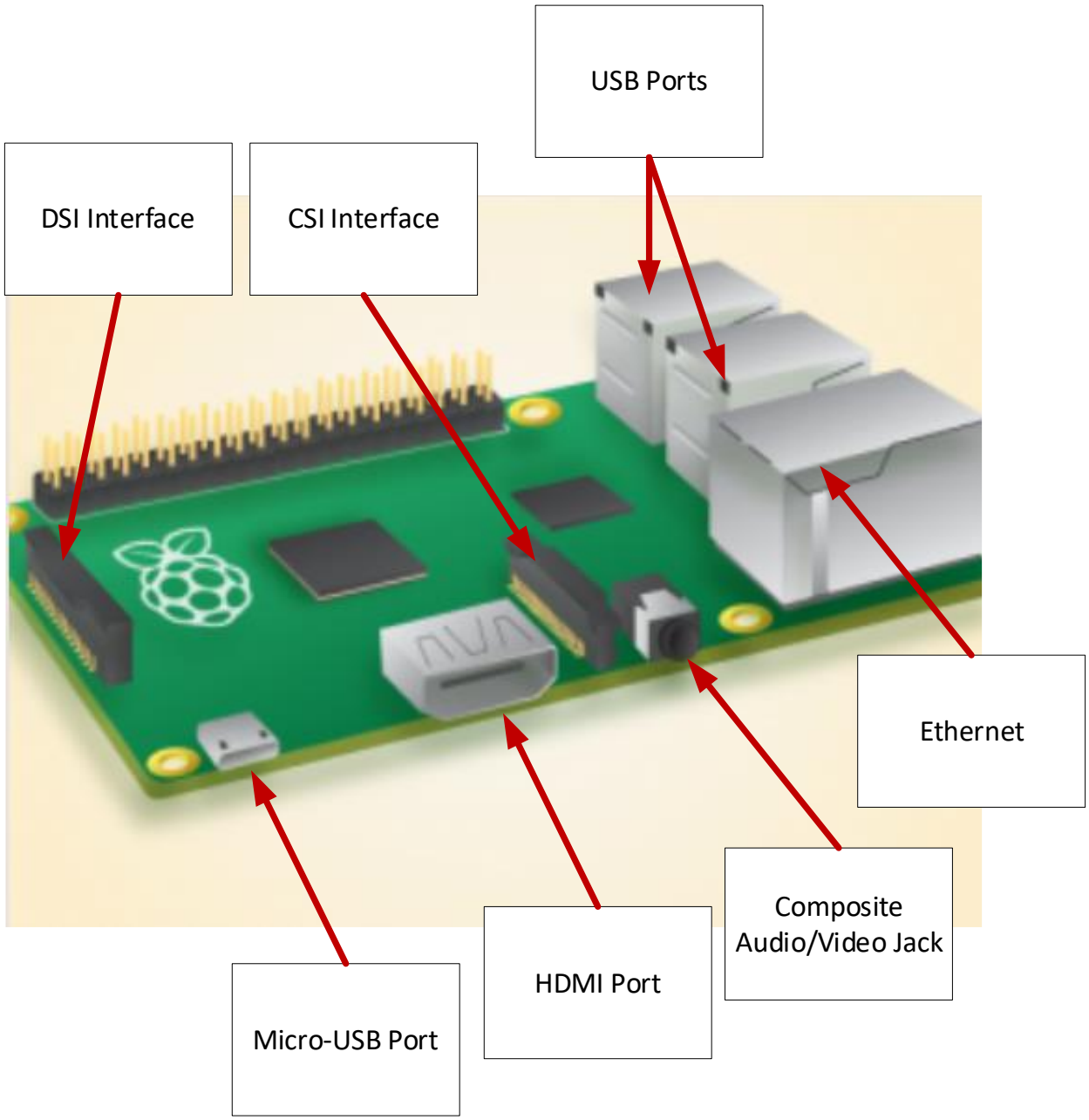
155. Because the Raspberry Pi 2 Model B provides connections for all of the different types of sensors used in Bonham, and because it was well-known and well-understood to use Raspberry Pi devices to control cameras, such as those in Bonham, it would have been obvious to POSITA to use the Raspberry Pi 2 Model B as the microcontroller board in Bonham.

156. POSITA would have reasonably expected success using the Raspberry Pi 2 Model B because Bevan teaches how to capture and transmit images of birds using a Raspberry Pi and a camera, indicating that the desired functionality was possible and readily achievable.

157. Furthermore, using a Raspberry Pi device as a driver for a camera was a known technique, as indicated in Bevan, that yielded predictable results (controlling the camera system), and would do so in this context as well.

158. Likewise, use of a Raspberry Pi 2 Model B in lieu of a different type of controller is merely the simple substitution of one known element (a controller) for another known element (a Raspberry Pi 2 Model B, a type of controller) to obtain a predictable result (control over the hardware elements of the system as a whole).

159. Finally, it would be obvious to try the Raspberry Pi 2 Model B because there were a finite number of control circuits and microcontrollers capable of performing the functions described in Bonham that are performed by the controller. The Raspberry Pi 2 Model B was one such device and using it as the controller would be using it for one of its intended purposes (as a controller for simple electronic devices). POSITA would reasonably expect this to result in a suitable controller, especially in view of the fact that it was known to use Raspberry Pi devices as controllers for bird feeder cameras.



(EX1010 at 12).

B. Claim 5

5	The self-contained bird feeder of claim 1 wherein the computer comprises a micro USB socket and a USB port.

160. The combination of Bonham with Bevan and the Raspberry Pi 2 Model B includes the features of the Raspberry Pi 2 Model B, including a micro-USB socket and a USB port. (EX1010 at 12). Thus, the combination of claim 4, which is motivated for the same reasons as described in claim 4, discloses all elements of claim 5.

C. Claim 6

6	The self-contained bird feeder of claim 4 wherein the multi-media interface comprises an HDMI port.

161. The combination of Bonham with Bevan and the Raspberry Pi 2 Model B includes the features of the Raspberry Pi 2 Model B, including an HDMI port. (EX1010 at 12). Thus, the combination of claim 4, which is motivated for the same reasons as described in claim 4, discloses all elements of claim 6.

XIV. Ground 3 | Kin

A. Claim 1

i. Claim 1(pre)

1(pre)	A self-contained bird feeder configured to provide detailed images over a wireless network, comprising:

162. Kin discloses a self-contained bird feeder configured to provide detailed images over a wireless network.

163. The pet feeder of Kin includes a feeding device (3). The feeding device uses an image acquisition device (321) to capture images and transmit at a high rate, and transmits the images by a processor (31) to a server (2), which then relays the images to an end-user device (1): "The feeding device 3 comprises a processor 31, an input unit 32, an output unit 33, a fixed-feed supplier 34, a base 35, and a water supplier 36, where the processor 31, the input unit 32, the output unit 33, and the fixed-feed supplier 34 is [sic] located in the case 37… The operating device 1 and the feeding device 3 are connected to the web server 2 through a wiring connection, or through a wireless connection by using a Bluetooth protocol or a WiFi protocol, so that a control signal from the operating device 1 is received for operating an interactive feeding. Thus, a novel remote interactive feeder is obtained." (EX1007 ¶15).

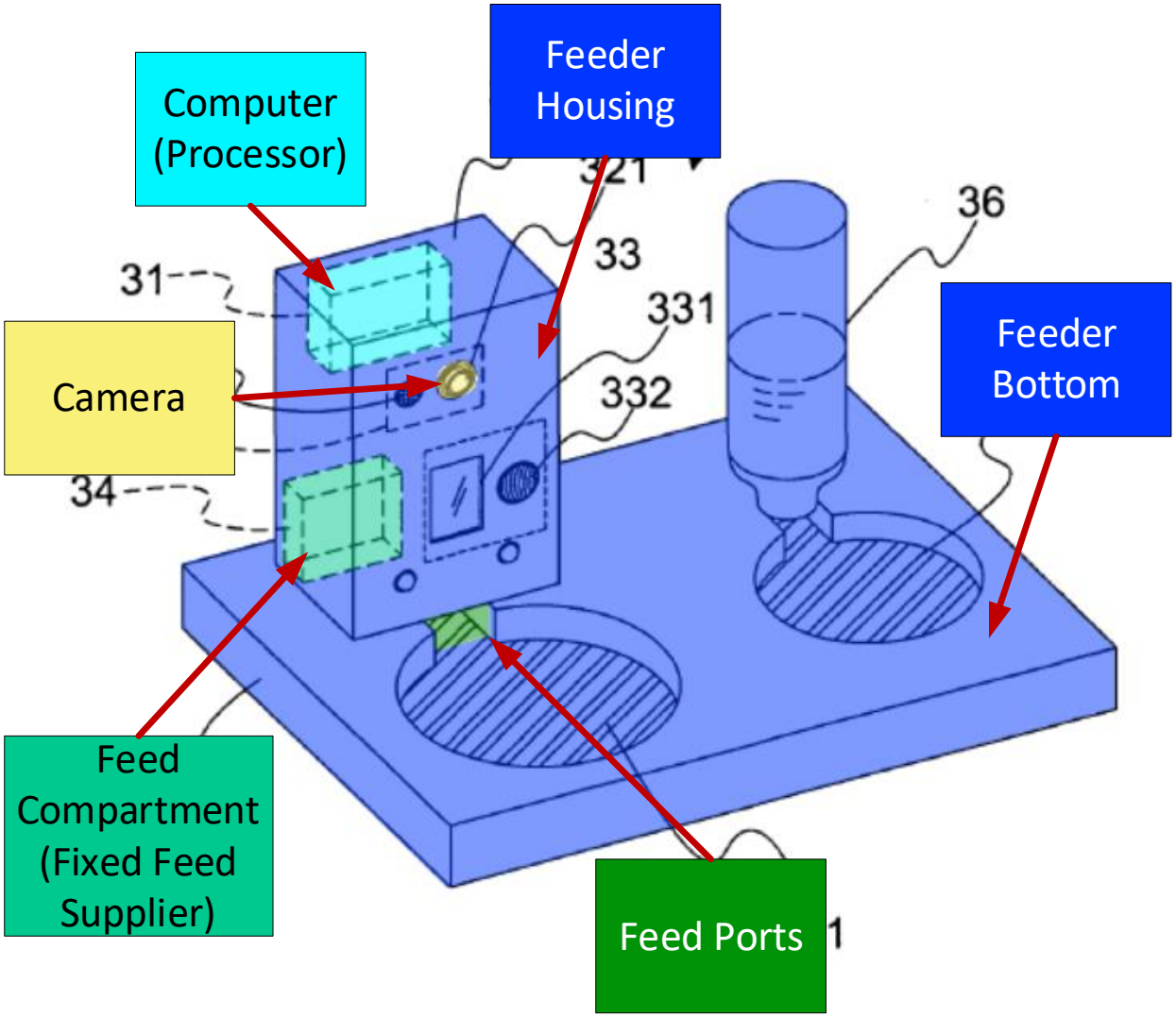


FIG.2

(EX1007 at FIG. 2).

ii. Claim 1(a)

1(a)	a bird feeder with a built in camera, computer, and internet connection, the bird feeder comprising:

164. Kin discloses a bird feeder with a built in camera, computer, and internet connection.

165. Kin is a bird feeder because it discloses a pet feeder for any pet and POSITA would have known that pets include birds. As a result, it would have been obvious to POSITA to use Kin as a bird feeder.

166. Kin includes a built in camera: "a 3G (third-generation) image acquisition device 321 having a high transmission rate; and, an output unit 33 of the feeding device 3 is a set of 3G AV (audio-video) devices including a screen 331 and a loudspeaker 332." (EX1007 ¶16). It is readily apparent from the figures of Kin that the camera is built in. (*Id*. at FIG. 2).

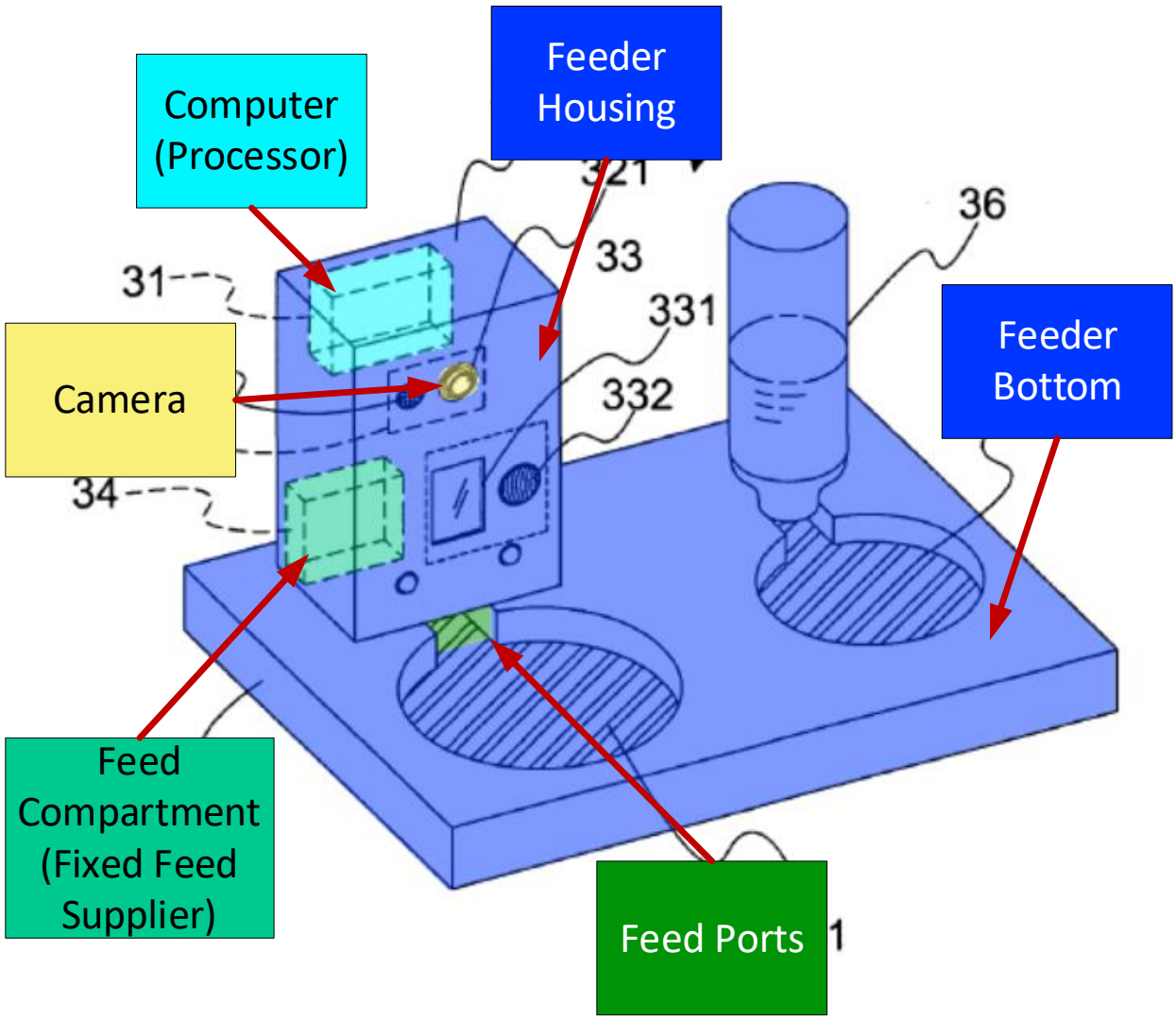


FIG.2

(EX1007 at FIG. 2).

167. Kin discloses a computer because the processor is a computer. Furthermore, Kin makes it clear that the processor controls the fixed-feed supplier (34) and manages incoming and outgoing data transmission (e.g., incoming instructions, outgoing video or audio), all of which would require the processor to at least have all the functions required for a computer

(memory, an internal clock, an instruction register, and so forth). (EX1007 ¶¶17, 18).

168. Kin discloses an internet connection because Kin states that "[w]hen using the present invention, a pet raiser dials a number through the key set 11 of the operating device 1 to connect to the web server 2 so that the feeding device 3 is linked. The feeding device 3 sends a photo of the specific environment and a sound of a pet to the display 13 and the speaker 15 of the operating device 1 through the image acquisition device 321 and the microphone 322 of the input unit 32." (EX1007 ¶17). Thus, Kin is using a "web" (e.g., internet) connection.

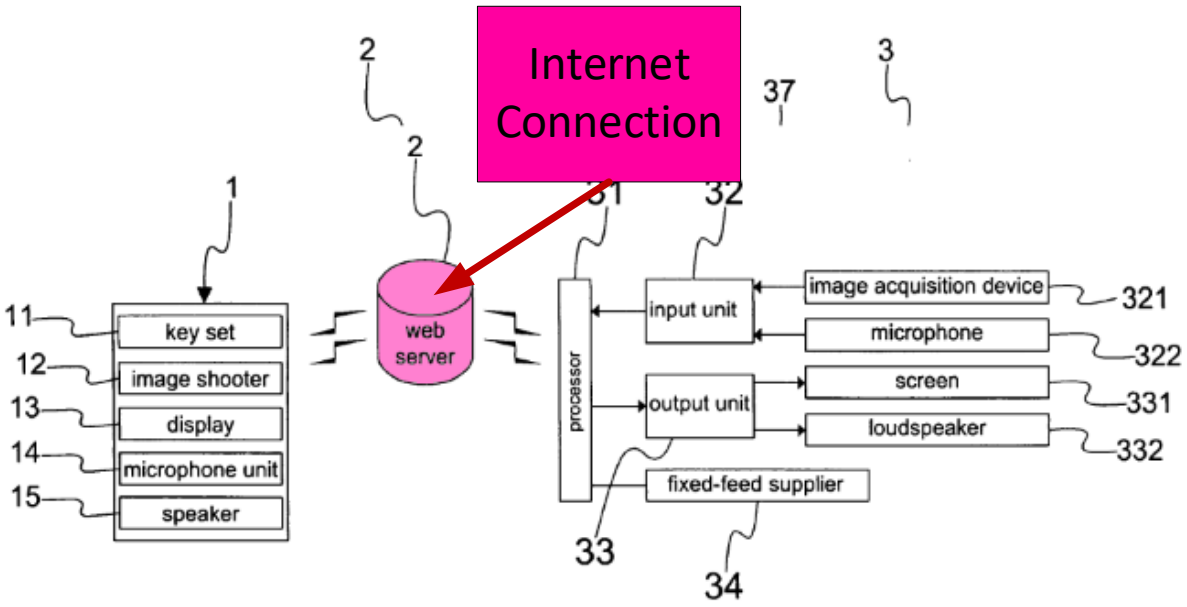


FIG.4

(EX1007 at FIG. 4).

iii. Claim 1(b)

1(b)	a. a feeder housing;

169. Kin discloses a feeder housing. The feeder housing includes at least the case (37), and the base (35): "[w]hen feeding the pet, the pet raiser uses the operating device 1 coordinated with the web server 2 to sent [sic] a control signal to the processor 31 of the feeding device 3. The processor 31 activates the fixed-feed supplier 34 to supply a feeding in a first containing area 351 of a base 35 for the pet to eat. At the same time, some water is supplied by a water supplier 36 into a second containing area 351 of the base 35…." (EX1007 ¶18).

iv. Claim 1(c)

1(c)	b. a feeder bottom;

170. As shown in FIGS. 2 and 3 of Kin, the feeding device (3) has a feeder bottom, which is the base (35) of the feeder housing. "When feeding the pet, the pet raiser uses the operating device 1 coordinated with the web server 2 to sent [sic, send] a control signal to the processor 31 of the feeding device 3. The processor 31 activates the fixed-feed supplier 34 to supply a feeding in a first containing area 351 of a base 35 for the pet to eat. At the same time,

some water is supplied by a water supplier 36 into a second containing area 351 of the base 35…." (EX1007 ¶18).

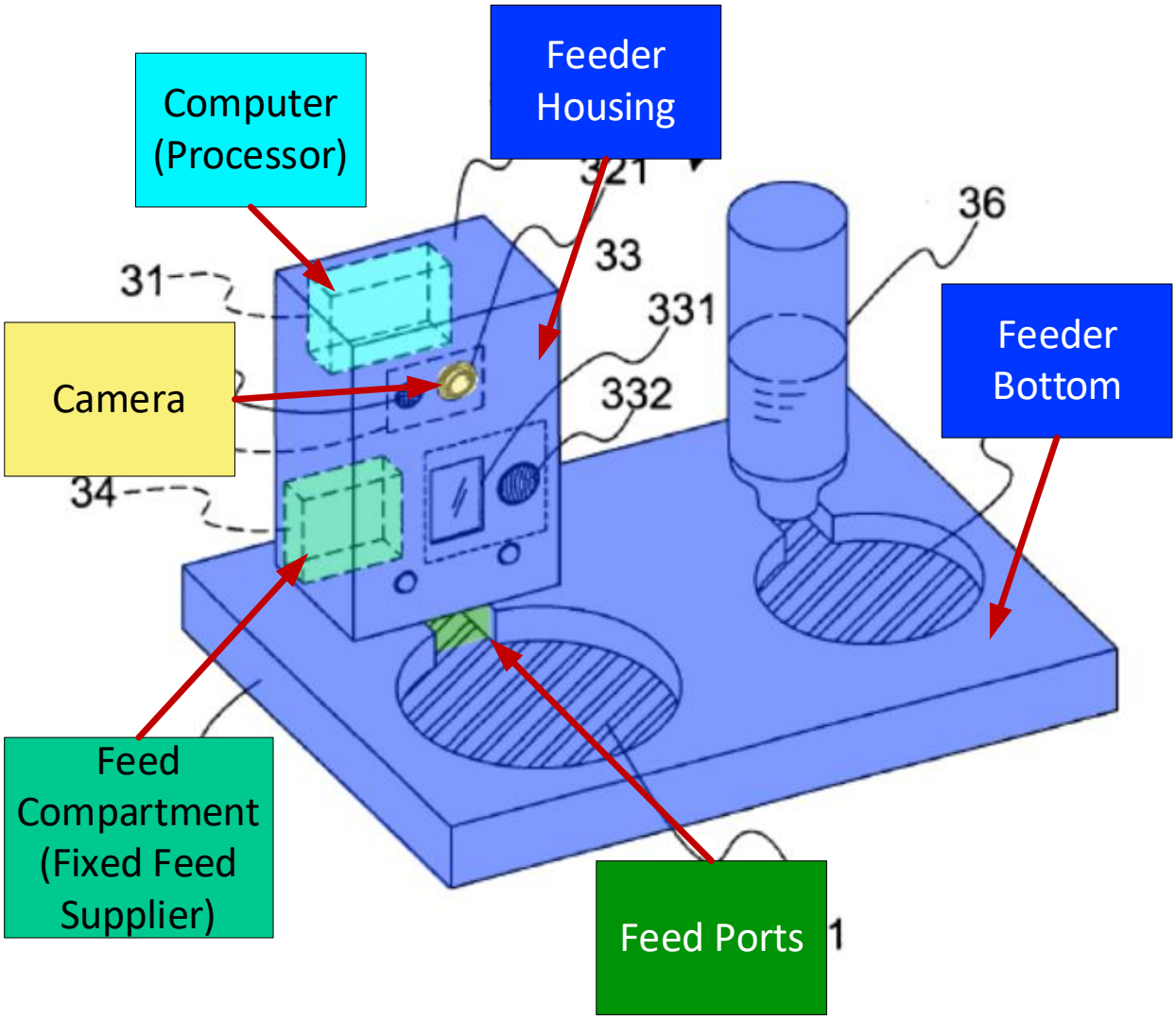


FIG.2

v. Claim 1(d)

1(d)	c. a feed port disposed on the feeder bottom;

171. Kin discloses a feed port on the feeder bottom. The feed port is the aperture (not labeled) between the feed supplier (34) and the containing area (351).

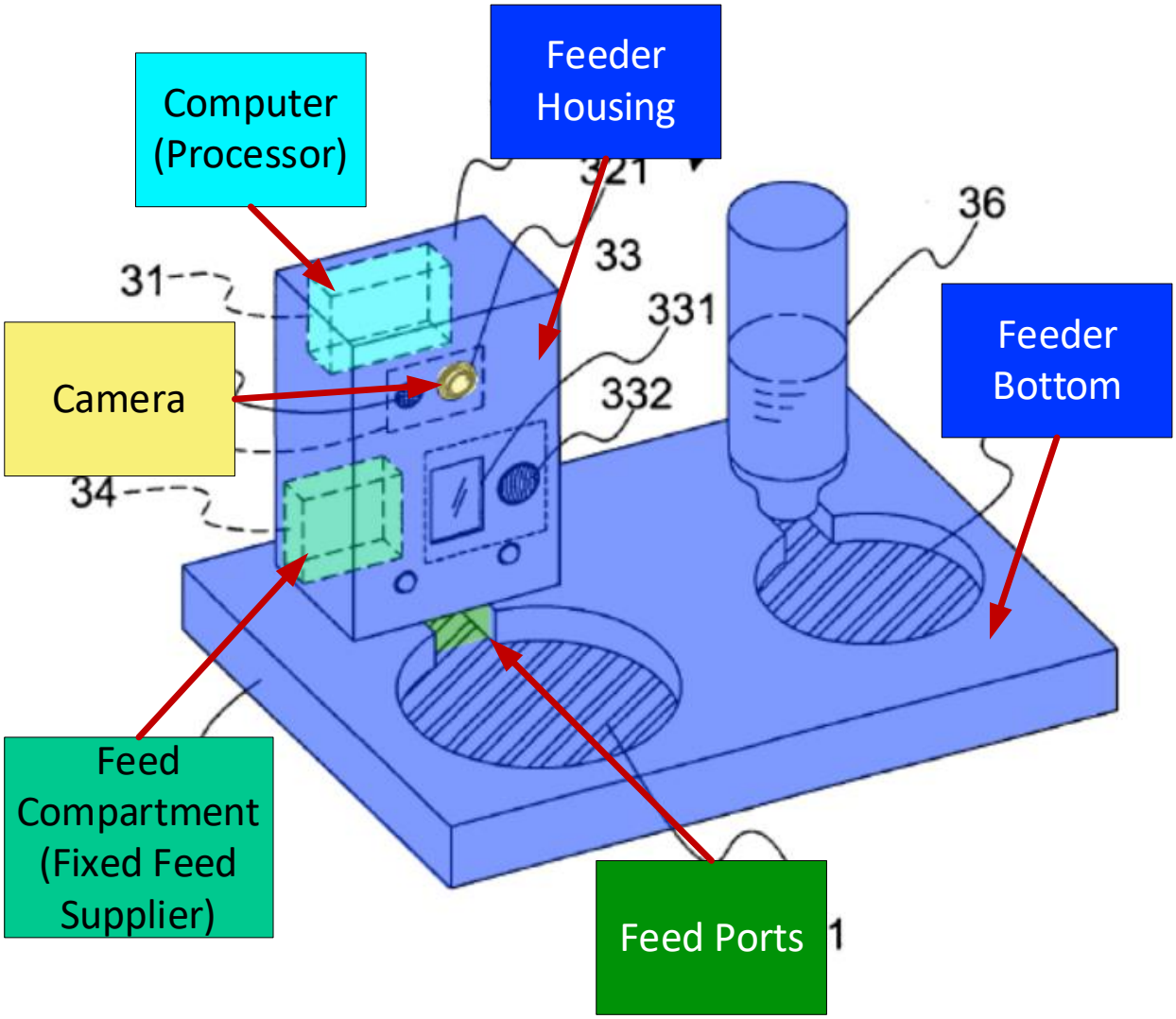


FIG.2

vi. Claim 1(e)

1(e)	d. the camera internally mounted to the bird feeder such that the camera is aligned with the feed port to observe feeding birds;

172. The camera in Kin is positioned above and in line with the feed ports, such that it is possible with Kin to observe feeding birds through the feed port. The camera is also internally mounted. (EX1007 at FIG. 2, ¶¶15-17).

173. The camera is internally mounted as can be seen in FIG. 2. Furthermore, it would have been obvious to POSITA to mount the camera internally as this a common method of mounting that is easily accomplished. POSITA would therefore have reasonably expected success.

174. The camera is aligned with the feed port to view animals because the camera is in line with and above the feed port. Furthermore, Kin states that "[t]he feeding device 3 sends a photo of the specific environment and sound of a pet to the display 13 and the speaker 15 of the operating device 1 through the image acquisition device 321 and microphone 322 of the input unit 32." (EX1007 ¶17).

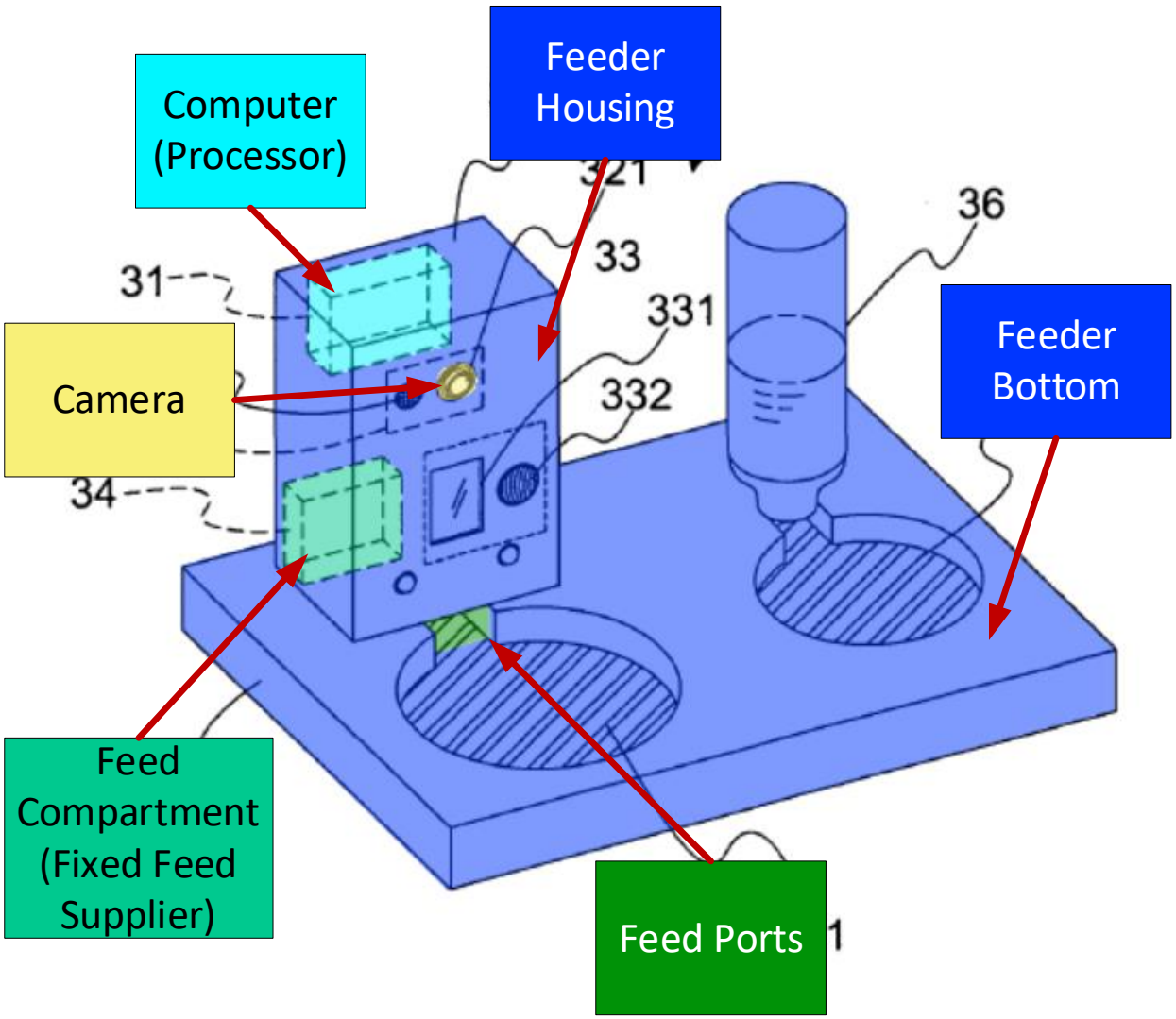


FIG.2

vii. Claim 1(f)

1(f)	e. the computer located within the feeder housing;

175. The processor (31) in Kin is the computer, and is located within the feeder housing, as indicated by FIG. 2. (EX1007 ¶¶15, 18).

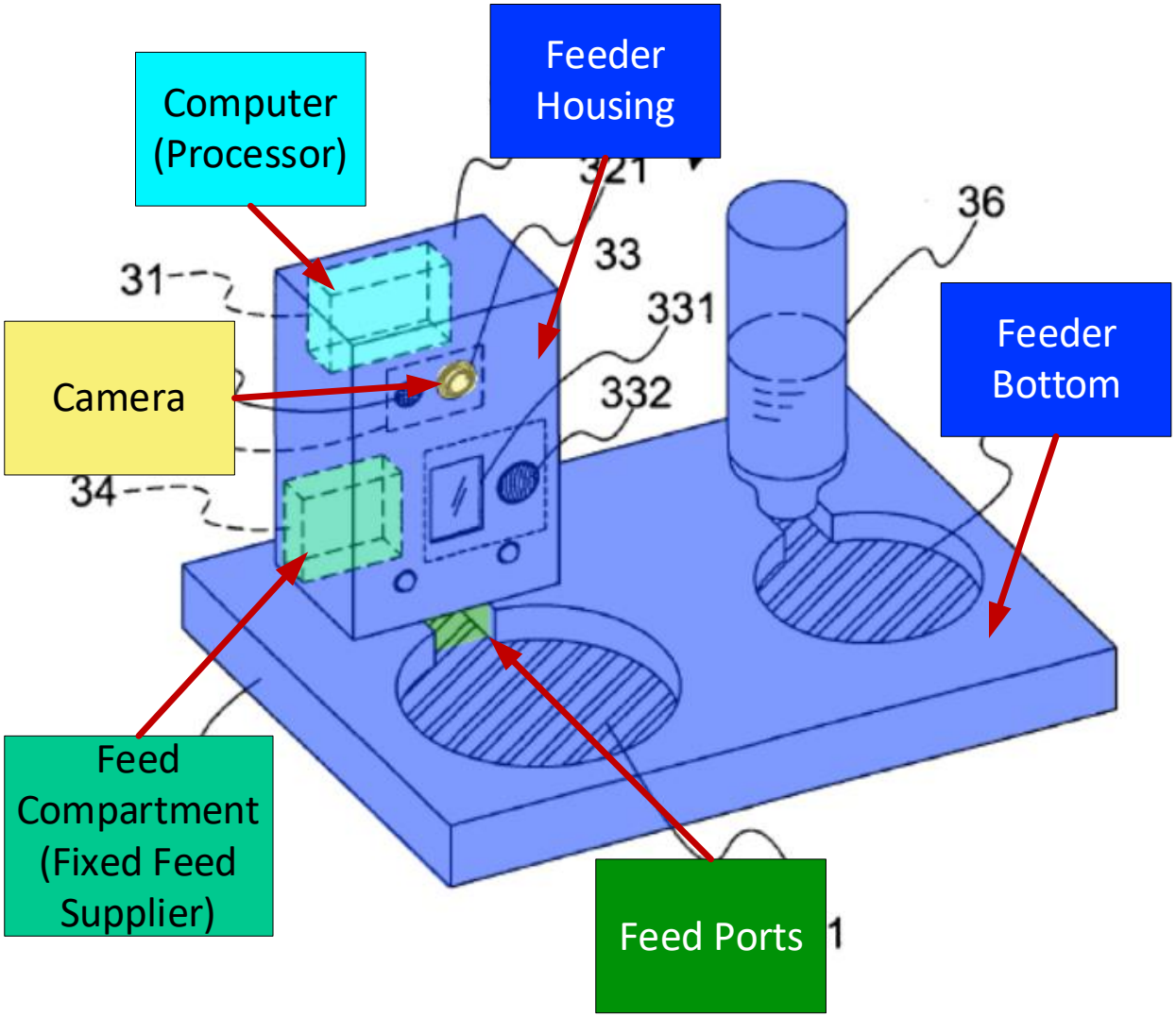


FIG.2

(EX1007 at FIG. 2).

viii. Claim 1(g)

1(g)	f. an internal power source; and

176. Kin does not disclose a power source. However, it is implicit that the feeder would have a power source such as a battery. Furthermore, it would

have been obvious to POSITA to include an internal power source to provide power to the electronics in Kin. Among other things, an internal power source (such as a battery) would be obvious to include because such power sources are resilient against power outages (ensuring the pet can be fed even in the event of a power outage), are well-known, and are easy to implement. POSITA would therefore have reasonably expected success incorporating an internal power source into Kin.

ix. Claim 1(h)

1(h)	g. a WiFi adapter located within the feeder housing.

177. Kin includes a WiFi adapter: "The operating device 1 and the feeding device 3 are connected to the web server 2 through a wiring connection, or through a wireless connection by using a Bluetooth protocol or a WiFi protocol, so that a control signal from the operating device 1 is received for operating an interactive feeding. Thus, a novel remote interactive feeder is obtained." (EX1007 ¶15). Therefore, to connect using WiFi requires a device capable of connecting via WiFi, and that device is the WiFi adapter.

178. It would have been obvious to place the WiFi adapter inside the housing of the feeder. The other electronics are all located within the feeder housing, and so POSITA would have been motivated to place the WiFi

adapter with the other electronics to minimize space used and to keep the system compact. Furthermore, POSITA would have known that placing the WiFi adapter inside the feeder housing would help protect the WiFi adapter from external forces, and would thus have been motivated to place the WiFi adapter inside the feeder housing. POSITA would have reasonably expected success placing the WiFi adapter inside the feeder housing because placing an electronic component inside a shroud, shell, or other container is a well-known technique that is easy for POSITA to achieve.

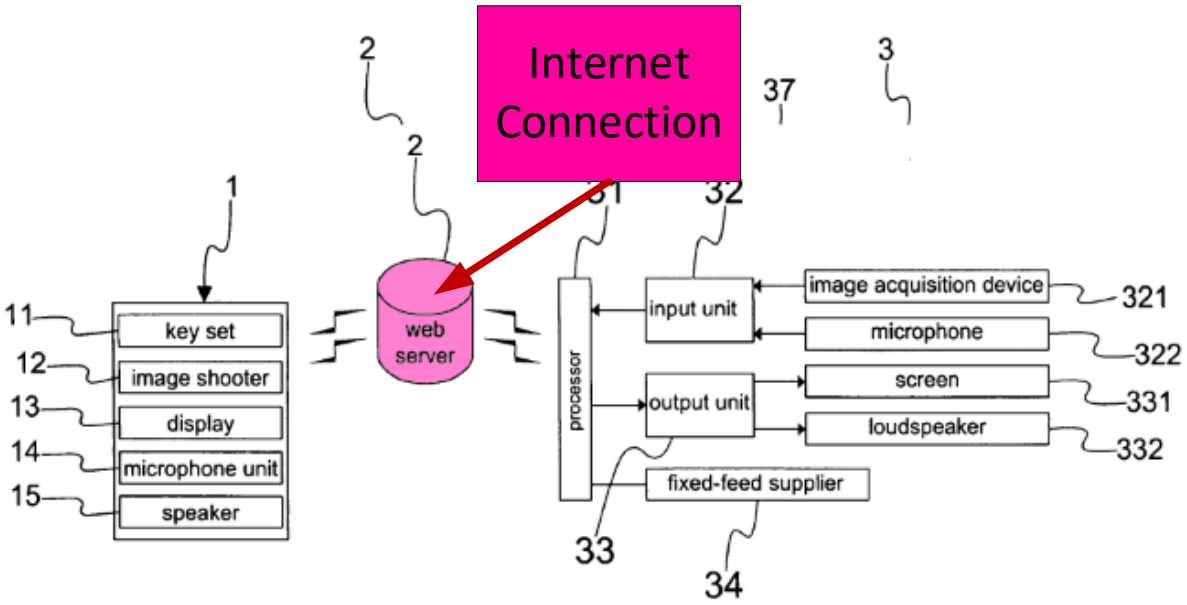


FIG.4

(EX1007 at FIG. 4).

XV. Ground 3A | Kin in view of Rofougaran

A. Claim 2

2	The self-contained bird feeder of claim 1 wherein the WiFi adapter is a WiFi dongle.

179. The combination of Kin with Rofougaran discloses a WiFi dongle as the WiFi adapter, and it would have been obvious to combine Kin with Rofougaran as explained below.

180. Rofougaran discloses a USB (WiFi) dongle configured to facilitate wireless communications using the 802.11 (WiFi) standard. It would have been obvious to use the WiFi dongle of Rofougaran as the wireless transmitter of Kin because of the many well-known advantages that USB offered prior to the priority date of the '242 Patent, including a single connector type to connect any PC peripheral, hot plug support, low-cost solution for both system and peripheral implementations, enhanced performance capability, support for legacy hardware and software, and low power implementation.

181. Furthermore, the use of USB WiFi dongles was a known technique for enabling WiFi connectivity and its use yields a predictable result (enabling WiFi connectivity). Thus, it would have been obvious to POSITA to use a WiFi dongle, and POSITA would have reasonably expected success, because using WiFi dongles with USB connectors was a well-known technique for

enabling WiFi, and because POSITA would have been using the WiFi dongle for its intended purpose (enabling WiFi).

182. Likewise, the use of a USB WiFi dongle would have been obvious to try because there are a finite number of potential types of WiFi adapter to use, and a USB dongle was a well-known type of WiFi adapter. POSITA would have reasonably expected success because POSITA would have used the WiFi dongle for its intended purpose of enabling WiFi.

183. Likewise, use of a WiFi dongle in lieu of a different type of WiFi adapter is merely the simple substitution of one known element (from the class of WiFi adapters) for another known element (from the class of WiFi dongle adapters) to obtain a predictable result (access to WiFi).

184. Therefore, there would have been a reasonable expectation of success using a USB WiFi dongle because USB WiFi dongles are well-known, well-understood, and easy for POSITA to implement.

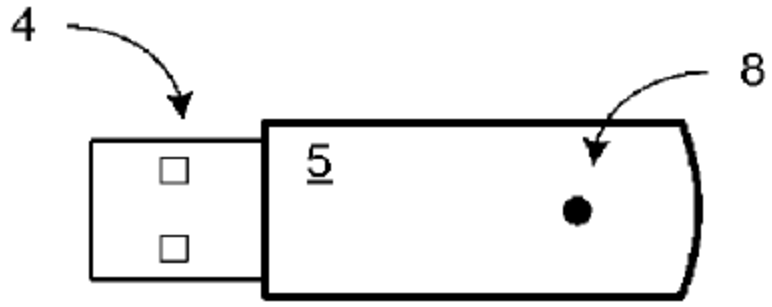


FIG. 3

(EX1009 at FIG. 3).

XVI. Ground 3B | Kin in view of Bennett

A. Claim 3

3	The self-contained bird feeder of claim 1 further comprising a feed compartment disposed in the feeder housing and a feed compartment separator disposed in the feed compartment, whereby feed is fed by gravity from the feed compartment through the feeder housing, to the feeder bottom, and then to the feed port.

185. Kin in view of Bennett discloses a feed compartment separator in a feed compartment, where feed is gravity fed from the feed compartment through the feeder housing to the feeder bottom and then to the feed port. As explained below, it would have been obvious to POSITA to combine Kin and Bennett.

186. Kin features a feed compartment separator. Specifically, Kin discloses a fixed-feed supplier (34) located in the feeder housing (case 37), which demarcates a space for feed to occupy. (EX1007 ¶15). As a result, a separator must be present at least to separate feed in the fixed-feed supplier 34 from the rest of the feed compartment (i.e., the rest of the inside of the case 37).

187. Kin is gravity fed at least in part because it is a vertical design for both water and physical feed. However, it would also have been obvious to POSITA to make Kin operate on a gravity fed principle in which the fixed-feed supplier could be an actuated valve that allows feed to flow to the feed port when the valve is open, or the fixed-feed supplier may be a prime mover (e.g. a conveyor or rotating paddle wheel) that moves feed to the feed port. Such devices would be simple and cost-effective to operate because they rely on gravity to provide a constant supply of feed. Thus, it would have been obvious to POSITA to use a simple system where gravity causes the feed to move.

188. Bennett discloses a separator, a "sealing barrier," that "prevents the liquid in the upper chamber from escaping into the lower chamber containing the station controller and other electrical components and associated circuitry. The sealing barrier may be curved, flat, other otherwise

shaped to accommodate the attachment of sensors and electrical loads at various locations to optimize their respective functions." (EX1005 ¶41).

189. It would have been obvious to POSITA to use a barrier as a separator in Kin, such as the barrier in Bennett, to separate the feed from the electrical components to protect the electrical components, as taught by Bennett. (*Id*). POSITA would have had a reasonable expectation of success because insulating the electronics from the feed is easy to accomplish and well-within POSITA's skill. Furthermore, POSITA would have known that insulating electronics from the animal feed is a known technique that will yield predictable results (of protecting the electronics).

XVII. Ground 3C | Kin in view of Bevan and Raspberry Pi 2 Model B

A. Claim 4

4	The self-contained bird feeder of claim 1 wherein the computer comprises: a processor; a display connector; a multi-media interface; an audio/video jack; and an ethernet socket.

190. Kin discloses a processor (31). It would also have been obvious to use the Raspberry Pi 2 Model B as the controller of Kin for the reasons laid out below. As a result, Kin in view of Bevan and Raspberry Pi 2 Model B discloses a computer with a processor, a display connector, a multi-media

interface, an audio/video jack, and an ethernet socket. It would have been obvious to POSITA to combine Kin with the Raspberry Pi 2 Model B and Bevan as explained below.

191. It would have been obvious to use a Raspberry Pi as the controller for the bird feeder of Kin because it was well-known to POSITA to use Raspberry Pi devices as controllers for bird feeder camera systems, as taught by Bevan. (EX1010 at 5-9). Bevan teaches using a Raspberry Pi as the controller for a wildlife camera that detects motion and takes pictures when birds are present at a bird table (a type of flat bird feeder). (EX1010 at 5-9). It would therefore have been obvious to POSITA to use a Raspberry Pi to control the capture of images and video of birds when the birds were present at a bird feeder.

192. Furthermore, as PO admits, Raspberry Pi was publicly available for handling wireless connectivity and camera control as part of the Raspbian Linux Distribution. (EX1003 at col. 3:27-39). POSITA would have been aware of the Raspbian Linux Distribution and the convenient functionality the distribution provided, and would therefore have been further motivated to use a Raspberry Pi device as the controller for the bird feeder to take advantage of the Raspbian Linux Distribution. Among other advantages, POSITA would have understood the Raspbian Linux Distribution to provide

pre-written and debugged software that would at least save POSITA time when implementing the Raspberry Pi 2 Model B as the controller for the bird feeder.

193. The Raspberry Pi 2 Model B was available prior to the priority date of the ‘242 Patent. This Raspberry Pi model includes an HDMI port, an ethernet port, a micro-USB port/socket, a standard USB port, and a combined 3.5mm audio jack with composite video. (EX1010 at 12). The Model B also included a Camera Serial Interface (CSI) and Display Serial Interface (DSI). (EX1010 at 12). In short, the Raspberry Pi 2 Model B includes all of the elements of claim 4 and actually appears to be the source of those elements given the similarities between the figure of the Raspberry Pi in the instant patent and the shape and layout of the Raspberry Pi 2 Model B board. (EX1010 at 12).

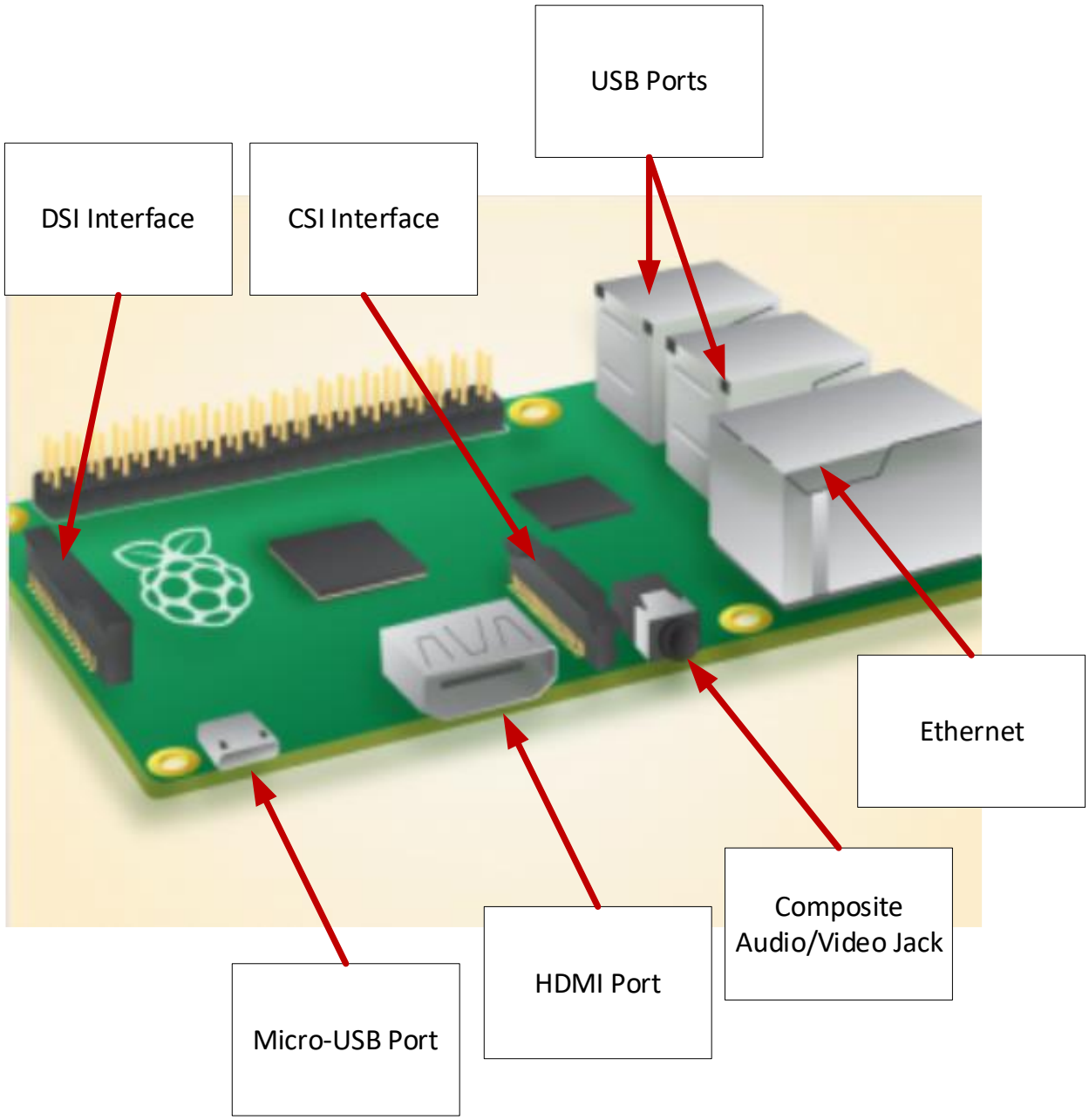
194. Because the Raspberry Pi 2 Model B provides connections for all of the different types of sensors used in Kin, and because it was well-known and well-understood to use Raspberry Pi devices to control cameras, such as those in Kin, it would have been obvious to POSITA to use the Raspberry Pi 2 Model B as the microcontroller board in Kin. Accordingly, claim 4 would have been obvious in its entirety.

195. POSITA would have reasonably expected success using the Raspberry Pi 2 Model B because Bevan teaches how to capture and transmit images of birds using a Raspberry Pi and a camera, indicating that the desired functionality was possible and readily achievable.

196. Furthermore, using a Raspberry Pi device as a driver for a camera was a known technique, as indicated in Bevan, that yielded predictable results (controlling the camera system), and would do so in this context as well.

197. Likewise, use of a Raspberry Pi 2 Model B in lieu of a different type of controller is merely the simple substitution of one known element (a controller) for another known element (a Raspberry Pi 2 Model B, a type of controller) to obtain a predictable result (control over the hardware elements of the system as a whole).

198. Finally, it would be obvious to try the Raspberry Pi 2 Model B because there were a finite number of control circuits and microcontrollers capable of performing the functions described in Kin that are performed by the controller. The Raspberry Pi 2 Model B was one such device and using it as the controller would be using it for one of its intended purposes (as a controller for simple electronic devices). POSITA would reasonably expect this to result in a suitable controller, especially in view of the fact that it was known to use Raspberry Pi devices as controllers for bird feeder cameras.



(EX1010 at 12).

B. Claim 5

5	The self-contained bird feeder of claim 1 wherein the computer comprises a micro USB socket and a USB port.

199. The combination of Kin with Bevan and the Raspberry Pi 2 Model B of claim 1 includes the features of the Raspberry Pi 2 Model B, including a micro-USB socket and a USB port. (EX1010 at 12). Thus, the combination of claim 1, which is motivated for the same reasons as described in claim 4, discloses all elements of claim 5.

C. Claim 6

6	The self-contained bird feeder of claim 4 wherein the multi-media interface comprises an HDMI port.

200. The combination of Kin with Bevan and the Raspberry Pi 2 Model B includes the features of the Raspberry Pi 2 Model B, including an HDMI port. (EX1010 at 12. Thus, the combination of claim 4, which is motivated for the same reasons as described in claim 1, discloses all elements of claim 6.

XVIII. Conclusion

201. As explained above, the '242 Patent is invalid and obvious.

I declare under penalty of perjury that the foregoing is true and accurate to the best of my ability.

Executed on: 11/20/2025

William Walker Clark