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DOOR LATCH FOR AN APPLIANCE

Abstract

A cooking appliance includes an appliance body including a plurality of panels. The plurality of panels includes a front panel and a top panel, where the front panel defines a cavity aperture and a lock aperture. A cooking cavity assembly is disposed within the appliance body, where the cooking cavity assembly defines a cooking cavity. An appliance door includes a door frame defining a latch aperture and a door engagement surface. A door lock assembly is disposed within an electronics cavity and includes a door latch including an arm and a hook end extending from the arm. The hook end defines a latch engagement surface and is configured to engage the door engagement surface. An actuator is configured to rotate the door latch between an unlocked position allowing for selective access of the cooking cavity and a locked position preventing access to the cooking cavity.

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Background/Summary

BACKGROUND OF THE DISCLOSURE

[0001] The present disclosure generally relates to a door latch for an appliance, and more specifically, to a door latch for a cooking appliance.

SUMMARY OF THE DISCLOSURE

[0002] According to one aspect of the present disclosure, a cooking appliance includes an appliance body including a plurality of panels. The plurality of panels includes a front panel and a top panel, where the front panel defines a cavity aperture and a lock aperture. A cooking cavity assembly is disposed within the appliance body, where the cooking cavity assembly defines a cooking cavity, and where an electronics cavity is defined between the top panel of the appliance body and the cooking cavity assembly. An appliance door is operably coupled to the appliance body to allow for selective access to the cooking cavity and includes a door frame defining a latch aperture and a door engagement surface and inner and outer door panels coupled to the door frame. A door lock assembly is disposed within the electronics cavity and includes a door latch including an arm and a hook end extending from the arm. The hook end defines a latch engagement surface and is configured to engage the door engagement surface. The latch engagement surface extends at about an angle of between about 80° to about 90° away from the arm to engage the door frame. An actuator is configured to rotate the door latch between an unlocked position allowing for selective access of the cooking cavity and a locked position preventing access to the cooking cavity by engaging the latch engagement surface with the door engagement surface. The door latch is in the locked position when a cleaning cycle of said appliance is active.

[0003] According to another aspect, an oven includes an oven cabinet defining an oven compartment. A door is operably coupled to the oven cabinet to allow for selective access to the oven compartment. The door includes a door frame defining a latch aperture, where the latch aperture includes a door engagement surface. A latching mechanism includes a door latch including an arm and a hook end extending from the arm, where the hook end defines a latch engagement surface configured to engage the door engagement surface. A coefficient of friction between the latch engagement surface and the door engagement surface when engaged is between about 0.7 and about 0.8. An actuator is configured to rotate the door latch between an unlocked position allowing for selective access of the oven compartment and a locked position preventing access to the oven compartment by engaging the latch engagement surface with the door engagement surface. The door latch is in the locked position when a cleaning cycle of said oven is active.

[0004] According to yet another aspect, an appliance includes an appliance cabinet defining a cavity, a door operably coupled to the appliance cabinet to allow for selective access to the cavity, the door including a door frame defining a latch aperture, and a latching mechanism operable between an unlocked position allowing for selective access to the cavity and a locked position to prevent selective access to the cavity. The latching mechanism includes a door latch having an arm and a hook end defining an engagement surface. The engagement surface is configured to engage the latch aperture of the door frame and extends at about an angle of between about 80° to about 90° away from the arm to engage the door frame.

[0005] These and other features, advantages, and objects of the present disclosure will be further

understood and appreciated by those skilled in the art by reference to the following specification, claims, and appended drawings.

Description

BRIEF DESCRIPTION OF THE DRAWINGS
[0006] In the drawings:
[0007] FIG. **1** is a front elevational view of a cooking appliance set within cabinetry within a kitchen, according to the present disclosure;
[0008] FIG. **2** is a front perspective view of a cooking appliance including a door in a closed position denying access to a cooking cavity from an external environment, according to the present disclosure;
[0009] FIG. **3** is a front perspective view of a cooking appliance including a door in an open position allowing access to a cooking cavity, according to the present disclosure;
[0010] FIG. **4** is a cross-section of the cooking appliance of FIG. **2**, taken along line IV-IV, the cooking appliance includes a door lock assembly, according to the present disclosure;
[0011] FIG. **5**A is a partial top elevational view of a door lock assembly disposed in an electronics compartment of a cooking appliance, the door lock assembly is in an unlocked position and a door position sensor in a disengage position, according to the present disclosure;
[0012] FIG. **5**B is a partial top elevational view of a door lock assembly disposed in an electronics compartment of a cooking appliance, the door lock assembly is in an unlocked position and a door position sensor in an engage position, according to the present disclosure;
[0013] FIG. **5**C is a partial top elevational view of a door lock assembly disposed in an electronics compartment of a cooking appliance, the door lock assembly is in a locked position and a door position sensor in an engage position, according to the present disclosure;
[0014] FIG. **6** is a top elevational view of a latch member, according to the present disclosure;
[0015] FIG. **7**A is a partial top elevational view of a latch member including a latch engagement surface engaging a latch receiving aperture, the latch engagement surface extending at an angle away from an arm of the latch member, according to the present disclosure;
[0016] FIG. **7**B is a partial top elevational view of a latch member including a latch engagement surface engaging a latch receiving aperture, the latch engagement surface being textured, according to the present disclosure;
[0017] FIG. **7**C is a partial top elevational view of a latch member including a latch engagement surface engaging a latch receiving aperture, the latch engagement surface being recessed relative to a bottom edge of a hook end, according to the present disclosure;
[0018] FIG. **7**D is a partial top elevational view of a latch member including a latch engagement surface engaging a latch receiving aperture, the latch engagement surface including a plurality of recesses, according to the present disclosure; and
[0019] FIG. **8** is a schematic diagram of a control system for a cooking appliance, according to the present disclosure.
[0020] The components in the figures are not necessarily to scale, emphasis instead being placed upon illustrating the principles described herein.
DETAILED DESCRIPTION
[0021] The present illustrated embodiments reside primarily in combinations of method steps and apparatus components related to an appliance door latch. Accordingly, the apparatus components and method steps have been represented, where appropriate, by conventional symbols in the drawings, showing only those specific details that are pertinent to understanding the embodiments of the present disclosure so as not to obscure the disclosure with details that will be readily apparent to those of ordinary skill in the art having the benefit of the description herein. Further,

like numerals in the description and drawings represent like elements.

[0022] For purposes of description herein, the terms “upper,” “lower,” “right,” “left,” “rear,” “front,” “vertical,” “horizontal,” and derivatives thereof shall relate to the disclosure as oriented in FIGS. **1** and **2**. Unless stated otherwise, the term “front” shall refer to the surface of the element closer to an intended viewer, and the term “rear” shall refer to the surface of the element further from the intended viewer. However, it is to be understood that the disclosure may assume various alternative orientations, except where expressly specified to the contrary. It is also to be understood that the specific devices and processes illustrated in the attached drawings, and described in the following specification are simply exemplary embodiments of the inventive concepts defined in the appended claims. Hence, specific dimensions and other physical characteristics relating to the embodiments disclosed herein are not to be considered as limiting, unless the claims expressly state otherwise.

[0023] The terms “including,” “comprises,” “comprising,” or any other variation thereof, are intended to cover a non-exclusive inclusion, such that a process, method, article, or apparatus that comprises a list of elements does not include only those elements but may include other elements not expressly listed or inherent to such process, method, article, or apparatus. An element preceded by “comprises a . . . ” does not, without more constraints, preclude the existence of additional identical elements in the process, method, article, or apparatus that comprises the element.

[0024] Referring to FIGS. **1-8**, reference numeral **10** generally designates a cooking appliance including an appliance body **12** including a plurality of panels **14**, which may include a front panel **16**, a top panel **18**, a bottom panel **20**, a rear panel **22**, a first side panel **24**, and a second side panel **26**. The front panel **16** defines a cavity aperture **28** and a lock aperture **30** or a latch aperture **30**. A cooking cavity assembly **32** is disposed within the appliance body **12**. The cooking cavity assembly **32** defines a cooking cavity **34** or an oven compartment **34**. An electronics compartment **36** or electronics cavity **36** is defined between the top panel **18** of the appliance body **12** and the cooking cavity assembly **32**. An appliance door **38** is operably coupled to the appliance body **12** to allow for selective access to the cooking cavity **34**. The appliance door **38** includes a door frame **40** defining a latch aperture **42** or a latch receiving aperture **42** and a door engagement surface **44**. An outer door panel **46** and an inner door panel **48** are coupled to the door frame **40**.

[0025] A door lock assembly **50** or a latching mechanism **50** is disposed within the electronics compartment **36**. The door lock assembly **50** includes a door latch **52** or a latch member **52**. The latch member **52** includes an arm **54** and a hook end **56** extending from the arm **54**. The hook end **56** defines a latch engagement surface **58** configured to engage the door engagement surface **44**. An actuator **60** is configured to rotate the latch member **52** between an unlocked position **62** allowing for selective access of the cooking cavity **34** and a locked position **64** preventing access to the cooking cavity **34** by engaging the latch engagement surface **58** with the door engagement surface **44**. The latch member **52** is in the locked position **64** when a cleaning cycle of said appliance is active.

[0026] Referring to FIGS. **1-3**, the cooking appliance **10** includes the appliance body **12** with the appliance door **38** rotatably coupled to the appliance body **12**. The appliance door **38** is configured to rotate between an open position **80** and a closed position **82** to selectively allow access to the cooking cavity **34**. The cooking appliance **10** is illustrated as a single-cavity, cabinet-mounted appliance. The cooking appliance **10** is coupled to cabinet **84** within a kitchen environment. It is contemplated that the cooking appliance **10** may be a mounted appliance, a slide-in appliance, a freestanding appliance, or a countertop appliance. Additionally, the cooking appliance **10** may include the single cooking cavity **34** or multiple cooking cavities **34**. Additionally or alternatively, the cooking appliance **10** may be, for example, a microwave oven, a traditional oven, or a multi-function appliance that performs oven-like functions (e.g., roast, bake, etc.) as well as other functions.

[0027] The appliance body **12** may include the plurality of panels **14** defining an internal volume

86. The plurality of panels **14** may include the front panel **16**, the top panel **18**, the bottom panel **20**, the rear panel **22**, the first side panel **24**, and the second side panel **26**. Each of the panels **14** may be coupled to adjacent panels **14** to define the appliance body **12**. The front panel **16** of the appliance body **12** may define the cavity aperture **28**, the latch aperture **30**, and may define vent apertures **88**. The vent apertures **88** may be in fluid communication with the electronics compartment, environment surrounding the cooking appliance **10**, and the door **38**.

[0028] Referring still to FIGS. **1**-**3**, and now also FIG. **4**, the cavity assembly **32** is disposed within the internal volume **86** of the appliance body **12** and defines the cooking cavity **34**. The cavity assembly **32** may be coupled to the front panel **16** of the appliance body **12** to align the cooking cavity **34** with the cavity aperture **28** of the front panel **16**. The appliance body **12** and the cavity assembly **32** form an appliance cabinet or an oven cabinet that defines the cooking cavity **34**. The electronics compartment **36** is defined between the cavity assembly **32** and the appliance body **12**. The electronics compartment **36** is generally defined above the cavity assembly **32** and below the top panel **18** of the appliance body **12**. However, it is contemplated that the electronics compartment **36** between the appliance body **12** and either side, below, behind, and/or above the cavity assembly **32**.

[0029] In some implementations, the cavity assembly **32** may be a cavity liner **92** having a plurality of panels **94**, which may include an upper panel **94***a*, a lower panel **94***b*, a first side panel **94***c*, a second side panel **94***d* and a rear panel **94**. In such implementations, the cavity liner **92** separates the cooking cavity **34** from the electronics compartment **36**. In other implementations, the cavity assembly **32** may include the cavity liner **92** and a divider panel **96** or a divider wall **96** coupled to the cavity liner **92**. In such implementations, the electronics compartment **36** may be partially or fully defined between the divider wall **96** and the appliance body **12**. When the electronics compartment **36** is partially defined between the divider wall **96** and the appliance body **12**, the cavity liner **92** may further define the electronics compartment **36**.

[0030] A control panel assembly **100** may be positioned above the front panel **16** and includes a housing **102**. The housing **102** extends forward of the front panel **16** and forms a forward upper edge of the appliance body **12** that extends over a top edge **104** of the appliance door **38** when the appliance door **38** is in the closed position **82**. The housing **102** of the control panel assembly **100** may be operably coupled with the appliance body **12** or may be integrally formed with the appliance body **12**. A front surface **106** of the housing **102** is oriented to be substantially co-planar with a front surface of the appliance door **38** when the appliance door **38** is in the closed position **82**. The control panel assembly **100** further includes a plurality of user inputs **108** positioned on the front surface **106** of the housing **102**. The user inputs **108** may include knobs, a touch display, or any other user input capable of providing instructions regarding the operation of the appliance **10** without departing from the teaching of the present disclosure.

[0031] The housing **102** of the control panel assembly **100** may define a control panel cavity **110** configured to house various electronic components of the cooking appliance **10** (e.g., electrical connections for the user inputs **108**). The control panel cavity **110** may be in communication with the electronics compartment **36** of the appliance body **12** or may be defined separately from the electronics compartment **36**.

[0032] Referring still to FIGS. **1**-**4**, the door **38** is operably coupled to appliance body **12** to allow for selective access to the cooking cavity **34**. The door **38** may be coupled to the front panel **16** of the appliance body **12** using hinges **120**. The door **38** may include the door frame **40** extending around a perimeter of the door **38** and the outer door panel **46** and the inner door panel **48** coupled to the door frame **40** to define an interior space **122**.

[0033] In some implementations, the door frame **40** may include a plurality of frame members **126**, which may include a top frame member **126***a*, a first side frame member **126***b*, a second side frame member **126***c* and a bottom frame member **126***d*, coupled together to form the door frame **40**. The top frame member **126***a* may extend across the door **38** proximate the top edge **104** of the door **38**.

The top frame member **126***a* may be configured to couple the outer door panel **46** and the inner door panel **48** together, with other frame members **126**, to form the door **38**. For example, the top frame member **126***a* may be shaped as a rectangular cap configured to fit over top edges of one or both of the outer and inner door panels **46**, **48**.

[0034] The top frame member **126***a* may define door vents **128** configured to be aligned with some or all of the vent apertures **88** of the front panel **16** when the door **38** is in the closed position **82**. The vents **128** may be configured to place the interior space **122** of the door **38** in fluid communication with the electronics compartment **36** and may direct air through the door **38** and the electronics compartment **36**.

[0035] The top frame member **126***a* may define the latch receiving aperture **42** proximate the top edge **104** of the door **38**. The latch receiving aperture **42** may have a similar size and shape to the size and shape of the latch aperture **30** or may have a different size and shape compared to the latch aperture **30**. When the door **38** is in the closed position **82**, the latch receiving aperture **42** is configured to align with the latch aperture **30**, to allow for the door lock assembly **50** to be moved between the unlocked position **62** and the locked position **64**, as discussed herein.

[0036] In other implementations, the door frame **40** may be single, continuous piece and define the latch receiving aperture **42** and the door vents **128**. The latch receiving aperture **42** and the door vents **128** may be defined proximate the top edge **104** of the door **38**, similar to that discussed with reference to the top frame member **126***a*.

[0037] The latch receiving aperture **42** includes the door engagement surface **44** to engage the latch member **52**. The latch receiving aperture **42** may include a lip or a protrusion **130** extending around a perimeter of the latch receiving aperture **42**. The protrusion **130** may define the door engagement surface **44** on a distal end of the protrusion **130**.

[0038] Referring to FIGS. **5**A-**6**, the door lock assembly **50** is positioned within the electronics compartment **36** and positioned rearward of the front panel **16**. The door lock assembly **50** is aligned with the latch aperture **30** defined in the front panel **16**, allowing for the latch member **52** to extend therethrough. In various implementations, the door lock assembly **50** may be supported by the divider panel **96** of the cavity assembly **32**. In other examples, the door lock assembly **50** may be supported by the cavity liner **92** or other surface positioned to orient the door lock assembly **50** to align with the latch aperture **30** of the front panel **16**.

[0039] The door lock assembly **50** is generally configured to have the unlocked position **62** (illustrated in FIGS. **5**A and **5**B) and the locked position **64** (illustrated in FIG. **5**C). When the door lock assembly **50** is in the unlocked position **62**, the door **38** is operable between the open position **80** and the closed position **82**, which allows for selective access to the cooking cavity **34** When the door lock assembly **50** is in the locked position **64** and engaging the door **38**, the door **38** is prevented from being moved from the closed position **82** to the open position **80** due to the latch member **52** engaging the door frame **40**. The door lock assembly **50** may be used to prevent access to the cooking cavity **34** when the cooking appliance **10** is in operation or not in operation.

[0040] The door lock assembly **50** includes the latch member **52** positioned proximate to and aligned with the latch aperture **30** and operably coupled with a base plate **140**. The latch member **52** includes a base portion **142** operably coupled with the base plate **140**. The latch member **52** includes the arm **54** extending from the base portion **142** and through the latch aperture **30**. The latch member **52** may also include the hook end **56** extending from the arm **54**. The hook end **56** defines the latch engagement surface **58** that engages the door engagement surface **44** when the door latching mechanism **50** is in the looked position **64**.

[0041] The base portion **142** of the latch member **52** may define a first aperture **144** and a second aperture **146**. The first aperture **144** and the second aperture **146** may be aligned on a line **148** extending along an inner edge **150** of the arm **54**. A fastener **152** may extend through the first aperture **144** and through an aperture defined on the base plate **140** to form a pivot point, as shown by arrow **154**. The pivot point **154** allows for the latch member **52** to be rotated between the

unlocked position **62** and the locked position **64**. The fastener **152** may be a bolt, screw, rivet, or any other fastener allowing for the latch member **52** to rotate.

[0042] The latch member **52** may include a hook arm **156** or a biasing arm **156** extending at an angle **158** relative to the inner edge **150** of the arm **54**. The hook arm **156** may be coupled to a biasing member **160** coupled to the base plate **140**. The biasing member **160** biases the latch member **52** toward the locked position **64**. The biasing member **160** has a biasing force that must be overcome by the actuator **60** to move the latch member **52** to the unlocked position **62**. Similarly, the biasing member **160** may retain or assist in retaining the latch member **52** in the locked position **64**.

[0043] The actuator **60** may be coupled to the base plate **140** and configured to rotate the latch member **52** around the pivot point **154** between the unlocked position **62** and the locked position **64**. The actuator **60** may be coupled to the latch member **52** via the second aperture **146** to rotate the latch member **52**. The actuator **60** overcomes the biasing force of the biasing member **160** to move the latch member **52** from the locked position **64** to the unlocked position **62**. The actuator **60** may retain the latch member **52** in the locked position **64**.

[0044] The latch member **52** is not limited to being rotatably coupled to base plate **140** and may have other configurations. For example, the latch member **52** may have a pivot point that slides relative to the latch aperture **30** and the base plate **140**, and rotates to engage the door engagement surface **44**.

[0045] Referring to FIGS. **5**A-**5**C, the door lock assembly **50** may also include a door position sensor **170** or a door close sensor **170** configured to determine whether the door **38** was in the open position **80** or in the closed position **82**. The door position sensor **170** may be an optical sensor, a light sensor, a switch sensor, or other sensor configured to determine the position of the door **38**. The door position sensor **170** may also be a mechanical mechanism to trigger a sensor.

[0046] As illustrated in FIGS. **5**A-**5**C, the door position sensor **170** is a mechanical mechanism **172** configured to trigger or activate a switch sensor **174**. The mechanical mechanism **172** has an engaged position **176** (illustrated in FIGS. **5**B and **5**C) where the mechanism **172** is engaged with the door **38** and a disengaged position **178** (illustrated in FIG. **5**A), where the mechanism **172** is not engaged with the door **38**. The mechanical mechanism **172** includes an arm **180** having a c-shape and a biasing member **182**. The arm **180** is pivotable coupled to the base plate **140** allowing for the arm **180** to be rotated between the engaged position **176** and the disengaged position **178**. The biasing member **182** biases the arm **180** toward the disengaged position **178**. The biasing of the arm **180** allows for the arm **180** to move to the disengaged position **178** when the door **38** is not in the closed position **82**.

[0047] The arm **180** includes a bulge **184** configured to activate or depress the switch sensor **174** when the arm is **180** is in the engaged position **176** and not activate the switch sensor **174** when in the disengaged position **178**. As illustrated in FIG. **5**A, when the door **38** is in the open position **80** or spaced away from the arm **180**, the switch sensor **174** is not activated due to the arm **180** being in the disengaged position **178** and the bulge **184** not contacting the switch sensor **174**. As illustrated in FIGS. **5**B and **5**C, when the door **38** is in the closed position **82**, the bulge **184** of the arm **180** engages the switch sensor **174** indicating that the door **38** is in the closed position **82**. The biasing force toward the disengaged position **178** of the biasing member **182** is overcome when the door **38** is in the closed position **82**, allowing for the switch sensor **174** to be activated. The door position sensor **170** may be used in the operation of the appliance, as discussed further herein.

[0048] Referring to FIGS. **6**-**7**D, the latch engagement surface **58** is configured to retain the door in the closed position **82** when the door latching mechanism **50** is in the locked position **64**. When the latch member **52** is in the locked position **64**, the door **38** is held shut. To reduce or prevent the latch member **52** from slipping off or disengaging from the door engagement surface **44** when in the locked position **64**, the latch engagement surface **58** may extend away at an angle **192** (as illustrated in FIG. **7**A) and/or be textured (as illustrated in FIG. **7**B) to increase a coefficient of

friction between the latch engagement surface **58** and the door engagement surface **44**. The latch engagement surface **58** may be recessed relative to a bottom edge **188** of the hook end **56** (as illustrated in FIG. **7**C) and/or include a plurality of recesses **190** relative to the bottom edge **188** of the hook end **56** (as illustrated in FIG. **7**D) to reduce or prevent the latch member **52** from slipping off or disengaging from the door engagement surface **44** when in the locked position **64**.

[0049] The latch engagement surface **58** may extend away from the arm **54** at an angle **192** (as illustrated in FIG. **7**A), perpendicular from the arm **54** (as illustrated in FIG. **7**B), or substantially perpendicular from the arm **54**. Stated differently, the bottom edge **188** of the hook end **56** may extend away from the arm **54** at the angle **192**, perpendicular from the arm **54**, or substantially perpendicular from the arm **54**. The latch engagement surface **58** being angled relative to the arm **54** forms a point **194** where the door engagement surface **44** is seated. Seating the door engagement surface **44** within the point **194** reduces or prevents the latch member **52** from slipping off or disengaging from the door engagement surface **44**, when in the locked position **64**. The door engagement surface **44** being seated at the point **194** increases the force required to disengage the door latch **52** from the door engagement surface **44**, when in the locked position **64**.

[0050] The angle **192** the latch engagement surface **58** extends away from the arm **54** may be an acute angle. In some implementations, the angle **192** the latch engagement surface **58** extends away from the arm **54** may be between about 80° and about 89°, between about 83° and about 88°, or between about 85° and 87°. In other implementations, the angle 192 may be about 78°, about 79°, about 80°, about 81°, about 82°, about 83°, about 84°, about 85°, about 86°, about 87°, about 88°, about 89°, or within any range bound by any two of those values (e.g., from about 78° to about 89°, from about 82° to about 84°, from about 86° to about 88°, etc.).

[0051] The latch engagement surface **58** may be textured to engage the door engagement surface **44** to increase the coefficient of friction between the latch engagement surface **58** and the door engagement surface **44**. The latch engagement surface **58** may be a textured metal surface or a bare metal surface to engage the door engagement surface **44**. Similarly, the door engagement surface **44** may be a textured metal surface or a bare metal surface to engage the latch engagement surface **58**. The increased coefficient of friction between the latch engagement surface **58** and the door engagement surface **44**, consequently, increases the force required to disengage the door latch **52** from the door engagement surface **44**, when in the locked position **64**.

[0052] The coefficient of friction between the latch engagement surface **58** and the door engagement surface **44** may be between about 0.70 and about 0.80, between about 0.68 and about 0.82, or between about 0.74 and about 0.76. In other implementations, the coefficient of friction between the latch engagement surface **58** and the door engagement surface **44** may be about 0.67, about 0.68, about 0.69, about 0.70, about 0.71, about 0.72, about 0.73, about 0.74, about 0.75, about 0.76, about 0.77, about 0.78, about 0.79, about 0.80, about 0.81, about 0.82, about 0.83 or within any range bound by any two of those values (e.g., from about 0.67 to about 0.83, from about 0.70 to about 0.75, from about 0.74 to about 0.79, etc.).

[0053] Referring to FIG. **7**C, the latch engagement surface **58** may extend along a recessed surface **196**. The recessed surface **196** may extend between the inner edge **150** of the arm **54** and a recess wall **198** and parallel to the bottom edge **188** of the hook end **56**. The recess wall **198** may extend between the recessed surface **196** and the bottom edge **188** of the hook end **56** and extend perpendicular to the recess surface **196**. The recess wall **198**, the latch engagement surface **58**, and the inner edge **150** of the arm **54** form a recessed portion **200** that engages the door engagement surface **44**. The door engagement surface **44** engages the latch engagement surface **58** and the recces wall **198**, which may reduce or prevent the latch member **52** from slipping off or disengaging from the door engagement surface **44**, when in the locked position **64**.

[0054] Referring to FIG. **7**D, the latch engagement surface **58** may include the plurality of recesses **190** to engage the door engagement surface **44**. The plurality of recesses **190** may be U-Shaped recesses, V-Shaped recesses, or other geometric shaped recesses. One or more of the recesses **190**

may engage the door engagement surface **44**. An edge of the door engagement surface **44** may be seated in one or more of the recesses **190**. The door engagement surface **44** engaging with the recesses **190** may reduce or prevent the latch member **52** from slipping off or disengaging from the door engagement surface **44**, when in the locked position **64**.

[0055] Referring to FIG. **8**, with reference to FIGS. **1**-**7**D, various components of the cooking appliance **10** are schematically illustrated, including the door lock assembly **50**. The cooking appliance **10** includes a controller **230** including a processor **232** and memory **234** configured to store instructions. The controller **230** is in communication with and configured to receive input from the user inputs **108** of the control panel assembly **100** and from various sensors of the appliance **10**, including the door position sensor **170**. The controller **230** is configured to utilize the inputs to provide instructions to various other components of the cooking appliance **10**, such as, for example, heating elements configured to heat the cooking cavity **34**. Where the user inputs **108** includes a display **236**, the controller **230** may further be configured to communicate with the display **236** to show information regarding the cooking appliance **10** (e.g., the position of the door **38** and/or door lock assembly **50**).

[0056] The door position sensor **170** is configured to detect the position of the door **38** and is configured to provide input to the controller **230** regarding the position of the door **38** (e.g., whether the door **38** is in the open position **80** or in the closed position **82**). Specifically, when a user selects a high-heat cycle (e.g., a cleaning cycle) for the cooking appliance **10** using the user inputs **108**, the controller **230** is configured to utilize an input from the door position sensor **170** to determine the position of the door **38** prior to initiating the high-heat cycle. If the door **38** is in the closed position **82**, the controller **230** is configured to actuate the actuator **60** of the door lock assembly **50** to move the latch member **52** of between the unlocked position **62** and the locked position **64** based on the inputs from the user inputs **108**. In other examples, the controller **230** may receive input from a high-heat cycle specific input positioned proximate the other user inputs **108** of the control panel assembly **64** and may be configured to operate the actuator **60** based on input from the high-heat cycle specific input.

[0057] When the latch member **52** is in the locked position **64**, and the door **38** is secured in the closed position **82**, the controller **230** is configured to operate the cooking appliance **10** to initiate the high-heat cycle. However, if the door position sensor **170** senses that the door **38** is not in the closed position **82** (e.g., is in an intermediate position or in the open position **80**), the controller **230** is configured to prevent initiation of the high-heat cycle based on the input from the door position sensor **170**. It is contemplated that the controller **230** may be configured to prevent or limit any operation of the cooking appliance **10**, including initiation of various heat cycles or activation of the actuator **60** to move the latch member **52** to the locked position **64**, when the door **38** is in the open position **80** without departing from the teaching of the present disclosure.

[0058] Use of the present device may provide a variety of advantages. For example, the door lock assembly **50** may provide a secure coupling of the door **38** with the appliance body **12** when the door **38** is in the closed position **82** and the latch member **52** of the locked position **64**. Further, the latch engagement surface **58** extending at the angle **192** away from the arm **54** and/or being textured to increase the coefficient of friction between the latch engagement surface **58** and the door engagement surface **44** may provide for a more secure coupling of the door **38** to appliance body **12**. This more secure coupling may be achieved by reducing or preventing the latch member **52** from slipping or disengaging from the door engagement surface **44** of the latch receiving aperture **42** due to the angle **192** and/or the increased coefficient of friction between the latch engagement surface **58** and the door engagement surface **44**. Furthermore, the door position sensor **170** may provide input to the controller **230** to ensure the door **38** is in the closed position **82** before the door lock assembly **50** is actuated and the latch member **52** is moved into the locked position **64** to couple the door **38** with the appliance body **12** and before the controller **230** activates the high-heat cycle of the cooking appliance **10**. Additional benefits or advantages may be realized

and/or achieved.
[0059] The disclosure herein is further summarized in the following paragraphs and is further characterized by combinations of any and all of the various aspects described therein.
[0060] According to one aspect of the present disclosure, a cooking appliance includes an appliance body including a plurality of panels. The plurality of panels includes a front panel and a top panel, where the front panel defines a cavity aperture and a lock aperture. A cooking cavity assembly is disposed within the appliance body, where the cooking cavity assembly defines a cooking cavity, and where an electronics cavity is defined between the top panel of the appliance body and the cooking cavity assembly. An appliance door is operably coupled to the appliance body to allow for selective access to the cooking cavity and includes a door frame defining a latch aperture and a door engagement surface and inner and outer door panels coupled to the door frame. A door lock assembly is disposed within the electronics cavity and includes a door latch including an arm and a hook end extending from the arm. The hook end defines a latch engagement surface and is configured to engage the door engagement surface. The latch engagement surface extends at about an angle of between about 80° to about 90° away from the arm to engage the door frame. An actuator is configured to rotate the door latch between an unlocked position allowing for selective access of the cooking cavity and a locked position preventing access to the cooking cavity by engaging the latch engagement surface with the door engagement surface. The door latch is in the locked position when a cleaning cycle of said appliance is active.
[0061] According to another aspect, a door lock assembly includes a door close sensor configured to sense whether a door is in a closed position.
[0062] According to yet another aspect, when a door close sensor senses a door is in an open position an actuator does not rotate a door latch to a locked position.
[0063] According to another aspect, a door close sensor includes a switch sensor and an arm having an engaged position and a disengaged position. The arm activates the switch sensor in the engaged position, and the switch sensor is not activated when the arm is in the disengaged position. The arm is in the engaged position when a door is in a closed position. A biasing member configured to bias the arm toward the disengaged position. The arm is in the disengaged position when the door is in an open position or an intermediate position.
[0064] According to yet another aspect, a latch engagement surface extends at about an angle of about 86° away from an arm to engage a door frame.
[0065] According to another aspect, a coefficient of friction between a latch engagement surface and a door engagement surface when engaged is between about 0.7 and about 0.8.
[0066] According to yet another aspect, a latch engagement surface is a first textured metal surface and a door engagement surface is a second textured metal surface. The engagement of the first textured metal surface and the second textured metal surface forms a coefficient of friction between the latch engagement surface and the door engagement surface.
[0067] According to another aspect, a coefficient of friction between a latch engagement surface and a door engagement surface when engaged is about 0.75.
[0068] According to another aspect, an oven includes an oven cabinet defining an oven compartment. A door is operably coupled to the oven cabinet to allow for selective access to the oven compartment. The door includes a door frame defining a latch aperture, where the latch aperture includes a door engagement surface. a latching mechanism includes a door latch including an arm and a hook end extending from the arm, where the hook end defines a latch engagement surface configured to engage the door engagement surface. A coefficient of friction between the latch engagement surface and the door engagement surface when engaged is between about 0.7 and about 0.8. An actuator is configured to rotate the door latch between an unlocked position allowing for selective access of the oven compartment and a locked position preventing access to the oven compartment by engaging the latch engagement surface with the door engagement surface. The door latch is in the locked position when a cleaning cycle of said oven is active.

[0069] According to yet another aspect, a latch engagement surface extends at about an angle of between about 80° to about 90° away from an arm to engage a door frame.
[0070] According to another aspect, a latch engagement surface extends at about an angle of about 86° away from an arm to engage a door frame.
[0071] According to yet another aspect, a coefficient of friction between the latch engagement surface and a door engagement surface when engaged is about 0.75.
[0072] According to another aspect, a latching mechanism includes a door close sensor configured to sense whether the door is in a closed position. When a door close sensor senses the door is not in the closed position, the actuator does not rotate the door latch to the locked position.
[0073] According to yet another aspect, a latch engagement surface is a first textured metal surface and the door engagement surface is a second textured metal surface. The engagement of the first textured metal surface and the second textured metal surface forms a coefficient of friction between the latch engagement surface and the door engagement surface.
[0074] According to yet another aspect, an appliance includes an appliance cabinet defining a cavity, a door operably coupled to the appliance cabinet to allow for selective access to the cavity, the door including a door frame defining a latch aperture, and a latching mechanism operable between an unlocked position allowing for selective access to the cavity and a locked position to prevent selective access to the cavity. The latching mechanism includes a door latch having an arm and a hook end defining an engagement surface. The engagement surface is configured to engage the latch aperture of the door frame and extends at about an angle of between about 80° to about 90° away from the arm to engage the door frame.
[0075] According to another aspect, an engagement surface extends at about an angle of about 86° away from an arm to engage a door frame.
[0076] According to yet another aspect, a latch aperture defines a door engagement surface, where a coefficient of friction between an engagement surface and the door engagement surface when engaged is between about 0.7 and about 0.8.
[0077] According to another aspect, a latching mechanism is in a locked position when a cleaning cycle of an appliance is active.
[0078] According to yet another aspect, a latching mechanism includes an actuator configured to move a door latch between an unlocked position and a locked position.
[0079] According to another aspect, a latching mechanism includes a door close sensor configured to sense whether a door is in a closed position.
[0080] It will be understood by one having ordinary skill in the art that construction of the described disclosure and other components is not limited to any specific material. Other exemplary embodiments of the disclosure disclosed herein may be formed from a wide variety of materials, unless described otherwise herein.
[0081] For purposes of this disclosure, the term “coupled” (in all of its forms, couple, coupling, coupled, etc.) generally means the joining of two components (electrical or mechanical) directly or indirectly to one another. Such joining may be stationary in nature or movable in nature. Such joining may be achieved with the two components (electrical or mechanical) and any additional intermediate members being integrally formed as a single unitary body with one another or with the two components. Such joining may be permanent in nature or may be removable or releasable in nature unless otherwise stated.
[0082] It is also important to note that the construction and arrangement of the elements of the disclosure as shown in the exemplary embodiments is illustrative only. Although only a few embodiments of the present innovations have been described in detail in this disclosure, those skilled in the art who review this disclosure will readily appreciate that many modifications are possible (e.g., variations in sizes, dimensions, structures, shapes and proportions of the various elements, values of parameters, mounting arrangements, use of materials, colors, orientations, etc.) without materially departing from the novel teachings and advantages of the subject matter recited.

For example, elements shown as integrally formed may be constructed of multiple parts or elements shown as multiple parts may be integrally formed, the operation of the interfaces may be reversed or otherwise varied, the length or width of the structures and/or members or connector or other elements of the system may be varied, the nature or number of adjustment positions provided between the elements may be varied. It should be noted that the elements and/or assemblies of the system may be constructed from any of a wide variety of materials that provide sufficient strength or durability, in any of a wide variety of colors, textures, and combinations. Accordingly, all such modifications are intended to be included within the scope of the present innovations. Other substitutions, modifications, changes, and omissions may be made in the design, operating conditions, and arrangement of the desired and other exemplary embodiments without departing from the spirit of the present innovations.

[0083] It will be understood that any described processes or steps within described processes may be combined with other disclosed processes or steps to form structures within the scope of the present disclosure. The exemplary structures and processes disclosed herein are for illustrative purposes and are not to be construed as limiting.

Claims

1. A cooking appliance, comprising: an appliance body including a plurality of panels, wherein the plurality of panels includes a front panel and a top panel, and wherein the front panel defines a cavity aperture and a lock aperture; a cooking cavity assembly disposed within the appliance body, wherein the cooking cavity assembly defines a cooking cavity, wherein an electronics cavity is defined between the top panel of the appliance body and the cooking cavity assembly; an appliance door operably coupled to the appliance body to allow for selective access to the cooking cavity, wherein the appliance door includes: a door frame defining a latch aperture and a door engagement surface; an outer door panel coupled to the door frame; and an inner door panel coupled to the door frame; and a door lock assembly disposed within the electronics cavity, the door lock assembly includes: a door latch including an arm and a hook end extending from the arm, wherein the hook end defines a latch engagement surface configured to engage the door engagement surface, and wherein the latch engagement surface extends at about an angle of between about 80° to about 90° away from the arm to engage the door frame; and an actuator configured to rotate the door latch between an unlocked position allowing for selective access of the cooking cavity and a locked position preventing access to the cooking cavity by engaging the latch engagement surface with the door engagement surface, wherein the door latch is in the locked position when a cleaning cycle of said appliance is active.

2. The cooking appliance of claim 1, wherein the door lock assembly includes a door close sensor configured to sense whether the door is in a closed position.

3. The cooking appliance of claim 2, wherein when the door close sensor senses the door is in an open position the actuator does not rotate the door latch to the locked position.

4. The cooking appliance of claim 2, wherein the door close sensor includes: a switch sensor; an arm having an engaged position and a disengaged position, wherein the arm activates the switch sensor in the engaged position, and wherein the switch sensor is not activated when the arm is in the disengaged position, and further wherein the arm is in the engaged position when the door is in a closed position; and a biasing member configured to bias the arm toward the disengaged position, wherein the arm is in the disengaged position when the door is in an open position or an intermediate position.

5. The cooking appliance of claim 1, wherein the latch engagement surface extends at about an angle of about 86° away from the arm to engage the door frame.

6. The cooking appliance of claim 1, wherein a coefficient of friction between the latch engagement surface and the door engagement surface when engaged is between about 0.7 and about 0.8.

7. The cooking appliance of claim 6, wherein the latch engagement surface is a first textured metal surface and the door engagement surface is a second textured metal surface, and wherein the engagement of the first textured metal surface and the second textured metal surface forms the coefficient of friction between the latch engagement surface and the door engagement surface.
8. The cooking appliance of claim 1, wherein a coefficient of friction between the latch engagement surface and the door engagement surface when engaged is about 0.75.
9. An oven, comprising: an oven cabinet defining an oven compartment; a door operably coupled to the oven cabinet to allow for selective access to the oven compartment, the door including a door frame defining a latch aperture, wherein the latch aperture includes a door engagement surface; and a latching mechanism including: a door latch including an arm and a hook end extending from the arm, wherein the hook end defines a latch engagement surface configured to engage the door engagement surface, and wherein a coefficient of friction between the latch engagement surface and the door engagement surface when engaged is between about 0.7 and about 0.8; and an actuator configured to rotate the door latch between an unlocked position allowing for selective access of the oven compartment and a locked position preventing access to the oven compartment by engaging the latch engagement surface with the door engagement surface, wherein the door latch is in the locked position when a cleaning cycle of said oven is active.
10. The oven of claim 9, wherein the latch engagement surface extends at about an angle of between about 80° to about 90° away from the arm to engage the door frame.
11. The oven of claim 9, wherein the latch engagement surface extends at about an angle of about 86° away from the arm to engage the door frame.
12. The oven of claim 9, wherein the coefficient of friction between the latch engagement surface and the door engagement surface when engaged is about 0.75.
13. The oven of claim 9, wherein the latching mechanism includes a door close sensor configured to sense whether the door is in a closed position, and wherein when the door close sensor senses the door is not in the closed position the actuator does not rotate the door latch to the locked position.
14. The oven of claim 9, wherein the latch engagement surface is a first textured metal surface and the door engagement surface is a second textured metal surface, and wherein the engagement of the first textured metal surface and the second textured metal surface forms the coefficient of friction between the latch engagement surface and the door engagement surface.
15. An appliance, comprising: an appliance cabinet defining a cavity; a door operably coupled to the appliance cabinet to allow for selective access to the cavity, the door including a door frame defining a latch aperture; and a latching mechanism operable between an unlocked position allowing for selective access to the cavity and a locked position to prevent selective access to the cavity, wherein the latching mechanism includes a door latch having an arm and a hook end defining an engagement surface, and wherein the engagement surface is configured to engage the latch aperture of the door frame and extends at about an angle of between about 80° to about 90° away from the arm to engage the door frame.
16. The appliance of claim 15, wherein the engagement surface extends at about an angle of about 86° away from the arm to engage the door frame.
17. The appliance of claim 15, wherein the latch aperture defines a door engagement surface, and wherein a coefficient of friction between the engagement surface and the door engagement surface when engaged is between about 0.7 and about 0.8.
18. The appliance of claim 15, wherein the latching mechanism is in the locked position when a cleaning cycle of said appliance is active.
19. The appliance of claim 15, wherein the latching mechanism includes an actuator configured to move the door latch between the unlocked position and the locked position.
20. The appliance of claim 15, wherein the latching mechanism includes a door close sensor configured to sense whether the door is in a closed position.