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### ROUTING COMPONENT FOR A DISHWASHER APPLIANCE

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#### Abstract

A dishwasher appliance includes a frame member defining a first attachment aperture and a second attachment aperture, a wash tub positioned adjacent the frame member and defining a wash chamber for receipt of a load of articles, and a routing component mounted to the frame member. The routing component includes a mounting structure for engaging the frame member through the first attachment aperture and the second attachment aperture, a hose retainer for retaining a drain hose of the dishwasher appliance, and a wiring harness retainer for retaining a wiring harness of the dishwasher appliance.

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#### Background/Summary

##### FIELD OF THE INVENTION

[0001] The present subject matter relates generally to dishwasher appliances, and more particularly,

to systems for mounting pipes, hoses, conduit, cables, or electrical wire in a dishwasher appliance.

## BACKGROUND OF THE INVENTION

[0002] Dishwasher appliances generally include a tub that defines a wash chamber. Rack assemblies can be mounted within the wash chamber of the tub for receipt of articles for washing. Wash fluid (e.g., various combinations of water and detergent along with optional additives) may be introduced into the tub where it collects in a sump space at the bottom of the wash chamber. During wash and rinse cycles, a pump may be used to circulate wash fluid to spray assemblies within the wash chamber that can apply or direct wash fluid towards articles disposed within the rack assemblies in order to clean such articles. During a drain cycle, a pump may periodically discharge soiled wash fluid that collects in the sump space and the process may be repeated.

[0003] Dishwasher appliances often include various pipes, hoses, conduits, cables, or electrical wires that need to be routed throughout the appliance to facilitate proper operation. Mounting and routing of these components is typically accomplished with screws and mounting brackets, which require a minimum of two installation components, complicating assembly time and increasing costs. In addition, mounting using a mechanical fastener frequently does not constrain the bracket in all directions and thus fails to prevent rotation or translation in a manner that may permit the routed cable from becoming detached or rotated out of position.

[0004] Accordingly, a dishwasher appliance including features for securing cables and hoses would be desirable. More specifically, features that are easy to install, require minimal components, and reduce the likelihood of a cable becoming loose would be particularly beneficial.

## BRIEF DESCRIPTION OF THE INVENTION

[0005] Aspects and advantages of the invention will be set forth in part in the following description, or may be obvious from the description, or may be learned through practice of the invention.

[0006] In one exemplary embodiment, a dishwasher appliance is provided including a frame member defining a first attachment aperture and a second attachment aperture, a wash tub positioned adjacent the frame member and defining a wash chamber for receipt of a load of articles, and a routing component mounted to the frame member. The routing component includes a mounting structure for engaging the frame member through the first attachment aperture and the second attachment aperture, a hose retainer for retaining a drain hose of the dishwasher appliance, and a wiring harness retainer for retaining a wiring harness of the dishwasher appliance.

[0007] In another exemplary embodiment, a routing component for an appliance is provided. The appliance includes a frame member defining a first attachment aperture and a second attachment aperture. The routing component includes a mounting structure for engaging the frame member through the first attachment aperture and the second attachment aperture, a hose retainer for retaining a hose of the appliance, and a wiring harness retainer for retaining a wiring harness of the appliance.

[0008] These and other features, aspects and advantages of the present invention will become better understood with reference to the following description and appended claims. The accompanying drawings, which are incorporated in and constitute a part of this specification, illustrate embodiments of the invention and, together with the description, serve to explain the principles of the invention.

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## Description

### BRIEF DESCRIPTION OF THE DRAWINGS

[0009] A full and enabling disclosure of the present invention, including the best mode thereof, directed to one of ordinary skill in the art, is set forth in the specification, which makes reference to the appended figures.

[0010] FIG. 1 provides a perspective view of a dishwasher appliance, including a dishwasher door according to an example embodiment of the present disclosure.

[0011] FIG. 2 provides a cross-sectional side view of the example dishwashing appliance of FIG. 1 according to an example embodiment of the present disclosure.

[0012] FIG. 3 provides a perspective view of the example dishwashing appliance of FIG. 1 with the cabinet removed to reveal a drain hose and routing component according to an example embodiment of the present subject matter.

[0013] FIG. 4 provides a perspective view of the example routing component of FIG. 3 positioned in the dishwasher appliance according to an example embodiment of the present subject matter.

[0014] FIG. 5 provides a perspective view of the example routing component of FIG. 3 positioned in the dishwasher appliance according to an example embodiment of the present subject matter.

[0015] FIG. 6 provides a perspective view of the example routing component of FIG. 3 according to an example embodiment of the present subject matter.

[0016] FIG. 7 provides a side view of the example routing component of FIG. 3 according to an example embodiment of the present subject matter.

[0017] FIG. 8 provides a perspective view of the example routing component of FIG. 3 at the beginning of an installation process according to an example embodiment of the present subject matter.

[0018] FIG. 9 provides a perspective view of the example routing component of FIG. 3 after the installation process according to an example embodiment of the present subject matter.

[0019] Repeat use of reference characters in the present specification and drawings is intended to represent the same or analogous features or elements of the present invention.

#### DETAILED DESCRIPTION

[0020] Reference now will be made in detail to embodiments of the invention, one or more examples of which are illustrated in the drawings. Each example is provided by way of explanation of the invention, not limitation of the invention. In fact, it will be apparent to those skilled in the art that various modifications and variations can be made in the present invention without departing from the scope or spirit of the invention. For instance, features illustrated or described as part of one embodiment can be used with another embodiment to yield a still further embodiment. Thus, it is intended that the present invention covers such modifications and variations as come within the scope of the appended claims and their equivalents.

[0021] As used herein, the terms “first,” “second,” and “third” may be used interchangeably to distinguish one component from another and are not intended to signify location or importance of the individual components. In addition, the term “or” is generally intended to be inclusive (i.e., “A or B” is intended to mean “A or B or both”). Furthermore, as used herein, terms of approximation, such as “approximately,” “substantially,” or “about,” refer to being within a ten percent margin of error.

[0022] FIGS. 1 and 2 depict an exemplary domestic dishwashing appliance or dishwasher **100** that may be configured in accordance with aspects of the present disclosure. For the particular embodiment of FIGS. 1 and 2, the dishwasher **100** includes a cabinet **102** having a tub **104** therein that defines a wash chamber **106**. As shown, tub **104** extends between a top **107** and a bottom **108** along a vertical direction V, between a pair of side walls **110** along a lateral direction L, and between a front side **111** and a rear side **112** along a transverse direction T. Each of the vertical direction V, lateral direction L, and transverse direction T are mutually orthogonal to one another.

[0023] The tub **104** includes a front opening **114** and a door **116** hinged at its bottom for movement between a normally closed vertical position (shown in FIG. 2), wherein the wash chamber **106** is sealed shut for washing operation, and a horizontal open position for loading and unloading of articles from the dishwasher **100**. According to exemplary embodiments, dishwasher **100** further includes a door closure mechanism or assembly **118** that is used to lock and unlock door **116** for accessing and sealing wash chamber **106**.

[0024] As illustrated in FIG. 2, tub side walls **110** may accommodate a plurality of rack assemblies. More specifically, guide rails **120** may be mounted to side walls **110** for supporting a lower rack assembly **122**, a middle rack assembly **124**, and an upper rack assembly **126**. As illustrated, upper rack assembly **126** is positioned at a top portion of wash chamber **106** above middle rack assembly **124**, which is positioned above lower rack assembly **122** along the vertical direction V. Each rack assembly **122**, **124**, **126** is adapted for movement between an extended loading position (not shown) in which the rack is substantially positioned outside the wash chamber **106**, and a retracted position (shown in FIGS. 1 and 2) in which the rack is located inside the wash chamber **106**. This is facilitated, for example, by rollers **128** mounted onto rack assemblies **122**, **124**, **126**, respectively. Although guide rails **120** and rollers **128** are illustrated herein as facilitating movement of the respective rack assemblies **122**, **124**, **126**, it should be appreciated that any suitable sliding mechanism or member may be used according to alternative embodiments.

[0025] Some or all of the rack assemblies **122**, **124**, **126** are fabricated into lattice structures including a plurality of wires or elongated members **130** (for clarity of illustration, not all elongated members making up rack assemblies **122**, **124**, **126** are shown in FIG. 2). In this regard, rack assemblies **122**, **124**, **126** are generally configured for supporting articles within wash chamber **106** while allowing a flow of wash fluid to reach and impinge on those articles (e.g., during a cleaning or rinsing cycle). According to another exemplary embodiment, a silverware basket (not shown) may be removably attached to a rack assembly (e.g., lower rack assembly **122**) for placement of silverware, utensils, and the like, that are otherwise too small to be accommodated by rack **122**.

[0026] Dishwasher **100** further includes a plurality of spray assemblies for urging a flow of water or wash fluid onto the articles placed within wash chamber **106**. More specifically, as illustrated in FIG. 2, dishwasher **100** includes a lower spray arm assembly **134** disposed in a lower region **136** of wash chamber **106** and above a sump **138** so as to rotate in relatively close proximity to lower rack assembly **122**. Similarly, a mid-level spray arm assembly **140** is located in an upper region of wash chamber **106** and may be located below and in close proximity to middle rack assembly **124**. In this regard, mid-level spray arm assembly **140** may generally be configured for urging a flow of wash fluid up through middle rack assembly **124** and upper rack assembly **126**. Additionally, an upper spray assembly **142** may be located above upper rack assembly **126** along the vertical direction V. In this manner, upper spray assembly **142** may be configured for urging or cascading a flow of wash fluid downward over rack assemblies **122**, **124**, and **126**. As further illustrated in FIG. 2, upper rack assembly **126** may further define an integral spray manifold **144**, which is generally configured for urging a flow of wash fluid substantially upward along the vertical direction V through upper rack assembly **126**.

[0027] The various spray assemblies and manifolds described herein may be part of a fluid distribution system or fluid circulation assembly **150** for circulating water and wash fluid in the tub **104**. More specifically, fluid circulation assembly **150** includes a pump **152** for circulating water or wash fluid (e.g., detergent, water, or rinse aid) in the tub **104**. Pump **152** may be located within sump **138** or within a machinery compartment located below sump **138** of tub **104**, as generally recognized in the art. Fluid circulation assembly **150** may include one or more fluid conduits or circulation piping for directing water or wash fluid from pump **152** to the various spray assemblies and manifolds. For example, as illustrated in FIG. 2, a primary supply conduit **154** may extend from pump **152**, along rear **112** of tub **104** along the vertical direction V to supply wash fluid throughout wash chamber **106**.

[0028] As illustrated, primary supply conduit **154** is used to supply wash fluid to one or more spray assemblies (e.g., to mid-level spray arm assembly **140** and upper spray assembly **142**). However, it should be appreciated that according to alternative embodiments, any other suitable plumbing configuration may be used to supply wash fluid throughout the various spray manifolds and assemblies described herein. For example, according to another exemplary embodiment, primary supply conduit **154** could be used to provide wash fluid to mid-level spray arm assembly **140** and a

dedicated secondary supply conduit (not shown) could be utilized to provide wash fluid to upper spray assembly **142**. Other plumbing configurations may be used for providing wash fluid to the various spray devices and manifolds at any location within dishwasher appliance **100**.

[0029] Each spray arm assembly **134**, **140**, **142**, integral spray manifold **144**, or other spray device may include an arrangement of discharge ports or orifices for directing wash fluid received from pump **152** onto dishes or other articles located in wash chamber **106**. The arrangement of the discharge ports, also referred to as jets, apertures, or orifices, may provide a rotational force by virtue of wash fluid flowing through the discharge ports. Alternatively, spray arm assemblies **134**, **140**, **142** may be motor-driven, or may operate using any other suitable drive mechanism. Spray manifolds and assemblies may also be stationary. The resultant movement of the spray arm assemblies **134**, **140**, **142** and the spray from fixed manifolds provides coverage of dishes and other dishwasher contents with a washing spray. Other configurations of spray assemblies may be used as well. For example, dishwasher **100** may have additional spray assemblies for cleaning silverware, for scouring casserole dishes, for spraying pots and pans, for cleaning bottles, etc. One skilled in the art will appreciate that the embodiments discussed herein are used for the purpose of explanation only and are not limitations of the present subject matter.

[0030] In operation, pump **152** draws wash fluid in from sump **138** and pumps it to a diverter assembly **156** (e.g., which may be positioned within sump **138** of dishwasher appliance **100**). Diverter assembly **156** may include a diverter disk (not shown) disposed within a diverter chamber **158** for selectively distributing the wash fluid to the spray arm assemblies **134**, **140**, **142** or other spray manifolds or devices. For example, the diverter disk may have a plurality of apertures that are configured to align with one or more outlet ports (not shown) at the top of diverter chamber **158**. In this manner, the diverter disk may be selectively rotated to provide wash fluid to the desired spray device.

[0031] According to an exemplary embodiment, diverter assembly **156** is configured for selectively distributing the flow of wash fluid from pump **152** to various fluid supply conduits, only some of which are illustrated in FIG. 2 for clarity. More specifically, diverter assembly **156** may include four outlet ports (not shown) for supplying wash fluid to a first conduit for rotating lower spray arm assembly **134** in the clockwise direction, a second conduit for rotating lower spray arm assembly **134** in the counter-clockwise direction, a third conduit for spraying an auxiliary rack such as the silverware rack, and a fourth conduit for supply mid-level or upper spray assemblies **140**, **142** (e.g., such as primary supply conduit **154**).

[0032] The dishwasher **100** is further equipped with a controller **160** to regulate operation of the dishwasher **100**. The controller **160** may include one or more memory devices and one or more microprocessors, such as general or special purpose microprocessors operable to execute programming instructions or micro-control code associated with a cleaning cycle. The memory may represent random access memory such as DRAM, or read only memory such as ROM or FLASH. In one embodiment, the processor executes programming instructions stored in memory. The memory may be a separate component from the processor or may be included onboard within the processor. Alternatively, controller **160** may be constructed without using a microprocessor (e.g., using a combination of discrete analog or digital logic circuitry, such as switches, amplifiers, integrators, comparators, flip-flops, AND gates, and the like) to perform control functionality instead of relying upon software.

[0033] The controller **160** may be positioned in a variety of locations throughout dishwasher **100**. In the illustrated embodiment, the controller **160** may be located within a control panel area **162** of door **116**, as shown in FIGS. 1 and 2. In such an embodiment, input/output (“I/O”) signals may be routed between the control system and various operational components of dishwasher **100** along wiring harnesses that may be routed through the bottom of door **116**. Typically, the controller **160** may be in operative communication with a user interface panel **164** through which a user may select various operational features and modes and monitor progress of the dishwasher **100**. In one

embodiment, the user interface **164** may represent a general purpose I/O (“GPIO”) device or functional block. In certain embodiments, the user interface **164** includes input components **166**, such as one or more of a variety of electrical, mechanical or electro-mechanical input devices including capacitive touch screens/buttons, rotary dials, push buttons, and touch pads. The user interface **164** may further include one or more display components **168**, such as a digital display device or one or more indicator light assemblies designed to provide operational feedback to a user. The user interface **164** may be in communication with the controller **160** via one or more signal lines or shared communication busses.

[0034] It should be appreciated that the invention is not limited to any particular style, model, or configuration of dishwasher **100**. The exemplary embodiment depicted in FIGS. **1** and **2** is for illustrative purposes only. For example, different locations may be provided for user interface **164**, different configurations may be provided for rack assemblies **122**, **124**, **126**, different spray arm assemblies **134**, **140**, **142** and spray manifold configurations may be used, and other differences may be applied while remaining within the scope of the present subject matter. Moreover, aspects of the present subject matter may be applied to other appliances as well, such as refrigerators, ovens, microwaves, etc.

[0035] Referring now generally to FIGS. **1** and **2**, door **116** will be described according to exemplary embodiments of the present subject matter. Although door **116** is described herein as being used with dishwasher **100**, it should be appreciated that door **116** or variations thereof may be used on any other suitable residential or commercial appliance. As described herein, door **116** may share a coordinate system with dishwasher **100**, e.g., when door **116** is in the closed position (e.g., as shown in FIG. **2**). Specifically, door **116** may define a vertical direction V, a lateral direction L, and a transverse direction T. Therefore, these directions may be used herein to refer to features of door **116** and its various components and sub-assemblies.

[0036] As shown, in the normally closed position, door **116** extends from a top end or top edge **180** to a bottom end or bottom edge **182** along the vertical direction V; from a front end **184** to a rear end **186** along the transverse direction T; and between two lateral ends **188** along the lateral direction L. According to exemplary embodiments, door **116** may be formed from one or more exterior panels that define an interior chamber of door **116**. According to exemplary embodiments, the exterior panels of door **116** may be panels that are stamped from stainless steel or may be formed from any other suitably rigid material, such as thermoformed plastic, other metals, etc. In general, the exterior panels of door **116** may be assembled in any suitable manner, e.g., may be secured together using any suitable mechanical fastener, welding, snap-fit mechanisms, etc. In addition, it should be appreciated that an insulating material (not shown), such as fiberglass or foam insulation, may be positioned within door **116** to provide thermal and/or sound insulation to dishwasher **100**.

[0037] Referring still to FIGS. **1** and **2**, user interface panel **164** is positioned proximate top edge **180** of door **116** along the vertical direction V. In this manner, user interface panel **164** may be partially hidden below a countertop when dishwasher appliance **100** is installed below the countertop and door **116** is closed. Accordingly, dishwasher appliance **100** may be referred to as a “top control dishwasher appliance.” However, it should be appreciated that aspects of the present subject matter may be used with dishwasher appliances having other configurations or any other suitable appliance. For example, user interface panel **164** may be alternately positioned on front face or front end **184** of door **116**.

[0038] User interface panel **164** is positioned on door **116** such that a user can engage or interact with user interface panel **164**, e.g., to select operating cycles and parameters, activate/deactivate operating cycles, or adjust other operating parameters of dishwasher appliance **100**. User interface panel **164** may include a printed circuit board (not shown) that is positioned within door **116**. According to exemplary embodiments, printed circuit board may include or be operatively coupled to controller **160** and/or user interface panel **164**. In addition, user interface panel **164** may include

or be operably coupled to one or more user inputs or touch buttons (e.g., identified generally herein as user inputs **166**) for receiving user input, providing user notifications, or illuminating to indicate cycle or operating status.

[0039] Specifically, according to the illustrated embodiment, user inputs **166** include a plurality of capacitive sensors that are mounted to user interface panel **164** and are operable to detect user inputs. For example, these capacitive sensors may be configured for triggering when a user touches a top edge **180** of user interface panel **164** in a region associated with a particular user input **166**. In particular, these capacitive sensors can detect when a finger or another conductive material with a dielectric different than air contacts or approaches user interface panel **164**, along with the precise location, pressure, etc. of the finger interaction.

[0040] When a user touches top edge **180** of user interface panel **164** adjacent one of user inputs **166**, the associated capacitive sensors may be triggered and may communicate a corresponding signal to controller **160**. In such a manner, operations of dishwasher appliance **100** can be initiated and controlled. According to exemplary embodiments, the capacitive sensors may be distributed laterally on user interface panel **164**. It will be understood that other any suitable number, type, and position of capacitive sensors may be used while remaining within the scope of the present subject matter. Indeed, any suitable number, type, and configuration of user inputs **166** may be used while remaining within the scope of the present subject matter.

[0041] User interface panel **164** may define a plurality of surfaces that are intended to be illuminated for various purposes. For example, user inputs **166** may be illuminated by light sources to inform the user of the location of the button or to provide some other status indication. Notably, this illumination is typically achieved by directing a light beam along the vertical direction V onto top edge **180** of user interface panel **164**. Door **116** may further include a plurality of light sources or lighting devices that are configured for illuminating one or more surfaces of user interface panel **164**. It should be appreciated that these light sources may include any suitable number, type, configuration, and orientation of light sources mounted at any suitable location to illuminate status indicators or buttons in any suitable colors, sizes, patterns, etc. In other words, the light sources may be provided as any suitable number, type, position, and configuration of electrical light source(s), using any suitable light technology and illuminating in any suitable color. For example, the light sources may include one or more light emitting diodes (LEDs), which may each illuminate in a single color (e.g., white LEDs), or which may each illuminate in multiple colors (e.g., multi-color or RGB LEDs) depending on the control signal from controller **160**.

[0042] However, it should be appreciated that according to alternative embodiments, the light sources may include any other suitable traditional light bulbs or sources, such as halogen bulbs, fluorescent bulbs, incandescent bulbs, glow bars, a fiber light source, etc. Moreover, the light sources may be operably coupled (e.g., electrically coupled) to controller **160** or another suitable control board to facilitate activation or illumination of the light sources (e.g., to indicate a user input, state of the dishwasher appliance, state of the wash cycle, or any other relevant information to a user).

[0043] According to exemplary embodiments, user interface panel **164** may be any suitable transparent or semitransparent feature for diffusing, directing, or otherwise transmitting light from a light source. For example, user interface panel **164** may be formed from a suitable transparent or translucent material configured to direct light energy, such as a dielectric material, such as glass or plastic, polycarbonate, polypropylene, polyacrylic, or any other suitable material.

[0044] In addition, user interface panel **164** may be a dead fronted panel. As used herein, the term “dead front” and the like is generally intended to refer to portions of a control panel which may be used as indicators, buttons, interactive control surfaces, or other user-interaction features without exposing the user to the operating side of the equipment or live parts and connections, i.e., lights, electrical connections, etc. For example, user interface panel **164** may include a transparent or translucent body and an opaque masking material that is selectively printed on top edge **180** of the

translucent body to define capacitive touch buttons or user inputs **166**.

[0045] The opaque material may be deposited on the translucent body to define any suitable number, size, and configuration of illuminated features. These illuminated features may be shapes or include other forms such as symbols, words, etc. that are visible on user interface panel **164**. More specifically, when light sources are energized, capacitive touch buttons or user inputs **166** on top edge **180** may be illuminated. Thus, the dead fronted top edge **180** may be the surface that is contacted for controlling dishwasher appliance **100** or which may be illuminated for purposes of indicating operating status or other conditions to the user of the dishwasher appliance **100**.

[0046] Referring still to FIG. **1**, a schematic diagram of an external communication system **190** will be described according to an exemplary embodiment of the present subject matter. In general, external communication system **190** is configured for permitting interaction, data transfer, and other communications between dishwasher appliance **100** and one or more external devices. For example, this communication may be used to provide and receive operating parameters, user instructions or notifications, performance characteristics, user preferences, or any other suitable information for improved performance of dishwasher appliance **100**. In addition, it should be appreciated that external communication system **190** may be used to transfer data or other information to improve performance of one or more external devices or appliances and/or improve user interaction with such devices.

[0047] For example, external communication system **190** permits controller **160** of dishwasher appliance **100** to communicate with a separate device external to dishwasher appliance **100**, referred to generally herein as an external device **192**. As described in more detail below, these communications may be facilitated using a wired or wireless connection, such as via a network **194**. In general, external device **192** may be any suitable device separate from dishwasher appliance **100** that is configured to provide and/or receive communications, information, data, or commands from a user. In this regard, external device **192** may be, for example, a personal phone, a smartphone, a tablet, a laptop or personal computer, a wearable device, a smart home system, or another mobile or remote device.

[0048] In addition, a remote server **196** may be in communication with dishwasher appliance **100** and/or external device **192** through network **194**. In this regard, for example, remote server **196** may be a cloud-based server **196**, and is thus located at a distant location, such as in a separate state, country, etc. According to an exemplary embodiment, external device **192** may communicate with a remote server **196** over network **194**, such as the Internet, to transmit/receive data or information, provide user inputs, receive user notifications or instructions, interact with or control dishwasher appliance **100**, etc. In addition, external device **192** and remote server **196** may communicate with dishwasher appliance **100** to communicate similar information.

[0049] In general, communication between dishwasher appliance **100**, external device **192**, remote server **196**, and/or other user devices or appliances may be carried using any type of wired or wireless connection and using any suitable type of communication network, non-limiting examples of which are provided below. For example, external device **192** may be in direct or indirect communication with dishwasher appliance **100** through any suitable wired or wireless communication connections or interfaces, such as network **194**. For example, network **194** may include one or more of a local area network (LAN), a wide area network (WAN), a personal area network (PAN), the Internet, a cellular network, any other suitable short- or long-range wireless networks, etc. In addition, communications may be transmitted using any suitable communications devices or protocols, such as via Wi-Fi®, Bluetooth®, Zigbee®, wireless radio, laser, infrared, Ethernet type devices and interfaces, etc. In addition, such communication may use a variety of communication protocols (e.g., TCP/IP, HTTP, SMTP, FTP), encodings or formats (e.g., HTML, XML), and/or protection schemes (e.g., VPN, secure HTTP, SSL).

[0050] External communication system **190** is described herein according to an exemplary embodiment of the present subject matter. However, it should be appreciated that the exemplary



functions and configurations of external communication system **190** provided herein are used only as examples to facilitate description of aspects of the present subject matter. System configurations may vary, other communication devices may be used to communicate directly or indirectly with one or more associated appliances, other communication protocols and steps may be implemented, etc. These variations and modifications are contemplated as within the scope of the present subject matter.

[0051] Referring now generally to FIGS. **3** through **9**, dishwasher appliance **100** may further include a frame member **200** that is positioned adjacent wash tub **104** and is generally configured for providing structural support to various components of dishwasher appliance **100**. For example, as illustrated, dishwasher appliance **100** may include a drain hose **202** that is routed between the wash tub **104** and cabinet **102**. In addition, as shown for example in FIGS. **4** and **5**, a wiring harness **204** is illustrated which may be one of the various wiring harnesses routed throughout dishwasher appliance **100** to interconnect various components. Notably, it is desirable to secure drain hose **202**, wiring harness **204**, and other components between wash tub **104** and cabinet **102**, e.g., to prevent undesirable movement upon installation, to prevent damage during installation, etc.

[0052] Accordingly, aspects of the present subject matter are directed to a simple and effective means for securing multiple hoses, pipes, conduits, wiring harnesses, or other components of dishwasher appliance **100**. As will be explained in more detail below, the components for routing these hoses and wiring harnesses, referred to generally herein as “routing components,” are simple, single piece components that may be installed in a single act by a single hand of the installation technician. Accordingly, these routing components save time and money while reducing complexity. By contrast, conventional methods for attaching such wiring harnesses are often complex and costly, requiring multiple components, fasteners, and an elongated installation time. An example routing component **210** will now be described according to an example embodiment, but it should be appreciated that variations and modifications may be made while remaining within the scope of the present subject matter.

[0053] According to the illustrated embodiment, routing component **210** may be mounted directly to frame member **200**. More specifically, according to the illustrated embodiment, frame member **200** extends substantially along the vertical direction V behind door **114** and is a rigid structural member. In addition, frame member **200** may define a first attachment aperture **212** and a second attachment aperture **214** that are separated along the vertical direction V. First attachment aperture **212** and second attachment aperture **214** may pass through frame member **200** from a front side **216** to a rear side **218**. In addition, frame member **200** may define lateral sides **220**.

[0054] As best shown in FIGS. **4** through **9**, routing component **210** may generally define a mounting structure **230** that is configured for engaging frame member **200** through first attachment aperture **212** and second attachment aperture **214**. Moreover, as explained above, mounting structure **230** may engage frame member **200** without the use of mechanical fasteners, adhesives, or other complex assembly components. To facilitate explanation of features of routing component **210**, the directional orientation of dishwasher appliance **100** will be used, assuming that routing component **210** is in the installed position.

[0055] According to the illustrated embodiment, mounting structure **230** defines a flat mounting face **232** that is configured for seating flat against front side **216** of frame member **200** when routing component **210** is in the installed position. In addition, mounting structure **230** may include a pivot hook **234** and a resilient clip **236** that extend from opposite sides of flat mounting face **232**. More specifically, flat mounting face **232** may define a first side **238** and a second side **240** that are spaced apart along the vertical direction V on opposite sides of flat mounting face **232**. Pivot hook **234** may generally extend downward along the vertical direction V away from first side **238** and may define a hook **242** at its distal end for engaging first attachment aperture **212**. In addition, resilient clip **236** may generally extend upward along the vertical direction V away from second side **240** of flat mounting face **232** and may define a locking lip **244** for engaging second

attachment aperture **214**.

[0056] As best shown in FIGS. **8** and **9**, installation of routing component **210** involves passing hook **242** of pivot hook **234** through first attachment aperture **212** and then rotating or pivoting routing component **210** upward until flat mounting face **232** seats against front side **216** of frame member **200** and locking lip **244** snaps into second attachment aperture **214**. In this regard, resilient clip **236** may be flexible to permit deformation until locking lip **244** may pass through second attachment aperture **214**. In the installed position, hook **242** and locking lip **244** may engage rear side **218** of frame member **200** to secure routing component **210** in the installed position.

[0057] Referring to FIGS. **4** through **9**, routing component **210** may further include a locking flange **246** that extends along a transverse direction T from the backside of flat mounting face **232**. For example, locking flange **246** may extend toward frame member **200** and between pivot hook **234** and resilient clip **236**. As illustrated, locking flange **246** may engage one of the lateral sides **220** of frame member **200** when routing component **210** is in the installed position. Notably, when routing component **210** is installed as described above, routing component **210** may be restrained in six degrees of freedom when the mounting structure **230** engages the frame member **200**. In other words, routing component **210** may be prevented from translating along and rotating about the vertical direction V, the lateral direction L, and the transverse direction T when in the installed position.

[0058] Notably, routing component **210** may be injection molded as a single, integral piece. In addition, it should be appreciated that routing component **210** may be formed from any suitably rigid material. For example, according to exemplary embodiments, routing component **210** may be formed by injection molding, e.g., using a suitable plastic material, such as injection molding grade Polybutylene Terephthalate (PBT), Nylon 6, high impact polystyrene (HIPS), acrylonitrile butadiene styrene (ABS), or any other suitable blend of polymers. Alternatively, according to the exemplary embodiment, these components may be compression molded, e.g., using sheet molding compound (SMC) thermoset plastic or other thermoplastics. According to still other embodiments, portions of routing component **210** may be formed from any other suitable rigid material.

[0059] As explained above, routing component **210** may further include features for retaining one or more hoses, conduits, pipes, wires, cables, or other components of dishwasher appliance **100**. For example, according to the illustrated embodiment, routing component **210** may include a hose retainer **250** that is configured for retaining drain hose **202** of dishwasher appliance **100**. Specifically, hose retainer **250** may include an arcuate member **252** that is positioned at a distal end of routing component **210**. As shown, arcuate member **252** may have a diameter that is equal to or slightly less than a diameter of drain hose **202** (e.g., in the relaxed position). In addition, routing component **210** may include retraining protrusions **254** positioned at the open ends of arcuate member **252**. Accordingly, an installation technician may press drain hose **202** into hose retainer **250** and arcuate member **252** may flex slightly to permit entry of drain hose **202** into hose retainer **250**, where it is captured and secured by retaining protrusions **254**.

[0060] In addition to hose retainer **250**, routing component **210** may include a wiring harness retainer **260** that is configured for retaining wiring harness **204** of dishwasher appliance **100**. According to the illustrated embodiment, wiring harness retainer **260** is positioned between mounting structure **230** and hose retainer **250** along the transverse direction T. In general, wiring harness retainer **260** may include a connecting structure **262** that extends between mounting structure **230** and hose retainer **250**. More specifically, connecting structure **262** may define an arcuate profile or wiring harness recess **264** that is configured for receiving wiring harness **204**. In addition, wiring harness retainer **260** may include a retention arm **266** that extends from connecting structure **262** to define an opening **268** of wiring harness recess **264**.

[0061] In this manner, a user may pass wiring harness **204** through opening **268** and into wiring harness recess **264** where it may be secured by retention arm **266**. Moreover, according to the illustrated embodiment, a distal end of retention arm **266** may define a locking flange **270** that

extends through opening **268** to prevent removal of wiring harness **204** from wiring harness recess **264**. Notably, retention arm **266** may be flexible to permit insertion of wiring harness **204**. In other words, a user may need to deflect retention arm **266** slightly to get wiring harness **204** into wiring harness recess **264** where it is retained permanently by retention arm **266** and a locking flange **270**. [0062] Referring still generally to FIGS. **4** through **9**, frame member **200** may be mounted to wash tub **104** and connecting structure **262** of wiring harness retainer **260** may define an auxiliary recess **280** that is positioned between connecting structure **262** and wash tub **104** opposite wiring harness recess **264** relative to connecting structure **262**. In addition, arcuate member **252** of hose retainer **250** may at least partially define auxiliary recess **280**. In this manner, installation of routing component **210** may define a number of locations for routing pipes, hoses, wires, etc. These additional components may be routed through auxiliary recess **280** where they may be retained between the wash tub **104** connecting structure **262** and arcuate member **252**.

[0063] According to still other embodiments, retention arm **266** may define a cutout aperture **282** configured for receiving a fir tree connector clip **284** (e.g., an example of which is identified by reference numeral **284** in FIGS. **4** and **5**). Notably, fir tree connector clip **284** may be configured for supporting still another wiring harness or cable of dishwasher appliance **100**. Accordingly, routing component **210** generally provides a single, simple to install component that can serve as a routing hub for facilitating easy and safe routing of various pipes, conduits, wires, cables, etc.

[0064] As explained above, aspects of the present subject matter are generally directed to a combined cable retainer and drain hose retainer clip with a locating and mounting feature for use in a dishwasher. The clip may include a round hook feature on one side that is inserted into a hole of a J-collar component (e.g., the frame member), wherein the clip is rotated into position to snap a flexing part on the other side of the clip to the J-collar component. As the clip is rotated into place, a flange (anti-rotation feature) of the clip may slide under the J-collar in the space between the J-collar and tub to prevent rotation. This design allows installing by hand using a rock-in motion that is friendly to ergonomics, while constraining all **6** degrees of freedom of the component. Having a single component eliminates the need of features on a harness, reduces cost with components, as well as streamlines and reduces assembly time. The wire harness retainer may be flexed up to allow the wire to pass the retaining feature (a lead in a slot) of the clip. Once the wire is past the retaining feature, the flexible geometry may be relaxed to its nominal position, in which the retaining feature acts as a mechanical stop to prevent the harness from backing out.

[0065] This written description uses examples to disclose the invention, including the best mode, and also to enable any person skilled in the art to practice the invention, including making and using any devices or systems and performing any incorporated methods. The patentable scope of the invention is defined by the claims, and may include other examples that occur to those skilled in the art. Such other examples are intended to be within the scope of the claims if they include structural elements that do not differ from the literal language of the claims, or if they include equivalent structural elements with insubstantial differences from the literal languages of the claims.

## Claims

**1.** A dishwasher appliance defining a vertical direction, a lateral direction, and a transverse direction, the dishwasher appliance comprising: a frame member defining a first attachment aperture and a second attachment aperture; a wash tub positioned adjacent the frame member and defining a wash chamber for receipt of a load of articles; and a routing component mounted to the frame member, the routing component comprising: a mounting structure for engaging the frame member through the first attachment aperture and the second attachment aperture; a hose retainer for retaining a drain hose of the dishwasher appliance; and a wiring harness retainer for retaining a wiring harness of the dishwasher appliance.

2. The dishwasher appliance of claim 1, wherein the mounting structure comprises: a flat mounting face for engaging a front side of the frame member; a pivot hook extending from a first side of the flat mounting face and defining a hook for engaging the first attachment aperture; and a resilient clip extending from a second side of the flat mounting face, the resilient clip defining a locking lip for engaging the second attachment aperture, wherein the routing component is installed on the frame member by passing the hook of the pivot hook through the first attachment aperture and pivoting the routing component such that the flat mounting face seats against the front side of the frame member and the locking lip snaps into the second attachment aperture.
3. The dishwasher appliance of claim 2, wherein the routing component further comprises: a locking flange extending from flat mounting face between the pivot hook and resilient clip for engaging a side of the frame member.
4. The dishwasher appliance of claim 1, wherein the routing component is restrained in six degrees of freedom when the mounting structure engages the frame member.
5. The dishwasher appliance of claim 1, wherein the routing component is injection molded as a single, integral piece.
6. The dishwasher appliance of claim 1, wherein the hose retainer is an arcuate member positioned at a distal end of the routing component.
7. The dishwasher appliance of claim 6, wherein the routing component comprises retaining protrusions positioned at both open ends the arcuate member.
8. The dishwasher appliance of claim 1, wherein the wiring harness retainer is positioned between the mounting structure and the hose retainer.
9. The dishwasher appliance of claim 1, wherein the wiring harness retainer comprises: a connecting structure that extends between the mounting structure and the hose retainer; and a retention arm that extends from the connecting structure to define an opening to a wiring harness recess.
10. The dishwasher appliance of claim 9, wherein a distal end of the retention arm defines a locking flange to prevent removal of the wiring harness from the wiring harness recess.
11. The dishwasher appliance of claim 9, wherein the retention arm is flexible to permit insertion of the wiring harness into the wiring harness recess.
12. The dishwasher appliance of claim 9, wherein the frame member is mounted to the wash tub and the connecting structure defines an auxiliary recess between the connecting structure and the wash tub opposite the wiring harness recess relative to the connecting structure.
13. The dishwasher appliance of claim 9, wherein the retention arm defines a cutout aperture for receiving a fir tree connector clip.
14. A routing component for an appliance, the appliance comprising a frame member defining a first attachment aperture and a second attachment aperture, the routing component comprising: a mounting structure for engaging the frame member through the first attachment aperture and the second attachment aperture; a hose retainer for retaining a hose of the appliance; and a wiring harness retainer for retaining a wiring harness of the appliance.
15. The routing component of claim 14, wherein the mounting structure comprises: a flat mounting face for engaging a front side of the frame member; a pivot hook extending from a first side of the flat mounting face and defining a hook for engaging the first attachment aperture; and a resilient clip extending from a second side of the flat mounting face, the resilient clip defining a locking lip for engaging the second attachment aperture, wherein the routing component is installed on the frame member by passing the hook of the pivot hook through the first attachment aperture and pivoting the routing component such that the flat mounting face seats against the front side of the frame member and the locking lip snaps into the second attachment aperture.
16. The routing component of claim 15, wherein the routing component further comprises: a locking flange extending from flat mounting face between the pivot hook and resilient clip for engaging a side of the frame member.

**17.** The routing component of claim 14, wherein the routing component is restrained in six degrees of freedom when the mounting structure engages the frame member.

**18.** The routing component of claim 14, wherein the routing component is injection molded as a single, integral piece.

**19.** The routing component of claim 14, wherein the hose retainer is an arcuate member positioned at a distal end of the routing component, and wherein the routing component comprises retaining protrusions positioned at both open ends the arcuate member.

**20.** The routing component of claim 14, wherein the wiring harness retainer comprises: a connecting structure that extends between the mounting structure and the hose retainer; and a retention arm that extends from the connecting structure to define an opening to a wiring harness recess.

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