A kitchen appliance for processing foodstuff includes a housing enclosing a motor. A bowl is removably mountable to the housing. The bowl includes a mouth for receiving a rotatable tool within the bowl. A bowl lid is removably mountable on to the mouth of the bowl. A clamping mechanism is movably attached to the bowl lid and removably engagable with at least a portion of the bowl. The clamping mechanism is movable between a first position for engaging at least a portion of the bowl to retain the bowl lid on the mouth of the bowl and a second position spaced-apart from the bowl for allowing the bowl lid to be removed from the bowl. The kitchen appliance being assembled without rotating the bowl relative to the housing or the lid relative to the bowl.
KITCHEN APPLIANCE FOR PROCESSING FOODSTUFF AND METHOD OF OPERATING SAME

BACKGROUND OF THE DISCLOSURE

[0001] The present disclosure relates generally to a kitchen appliance for processing foodstuffs and, more particularly, to a food processor that is relatively simple and easy to assemble and operate.

[0002] Motorized kitchen appliances for the preparation of foodstuffs typically include two or more components that are selectively attachable. For example, conventional food processors include a bowl removably attachable to a housing and a bowl lid removable attachable to a bowl. The structure or features that allow such components to be attached and/or function as a single unit can be difficult and/or awkward to utilize.

[0003] The device of the present disclosure is easy to assemble and operate, and it overcomes the disadvantages found in conventional kitchen appliances.

BRIEF SUMMARY OF THE DISCLOSURE

[0004] Briefly stated, one aspect of the present disclosure is directed to a kitchen appliance for processing foodstuffs including a housing enclosing a motor. A bowl is removably mountable to the housing without twisting or rotating the bowl relative to the housing. The bowl includes a mouth for receiving a rotatable tool within the bowl. A bowl lid is removably mountable to the mouth of the bowl without twisting or rotating the bowl lid relative to the bowl or housing. At least one clamping mechanism is movably attached to the bowl lid and removably engagable with at least a portion of the bowl. The clamping mechanism is movably between a first position for engaging at least a portion of the bowl to retain the bowl lid on the mouth of the bowl and a second position spaced apart from the bowl for allowing the bowl lid to be removed from the bowl. In one embodiment, the bowl lid comprises two clamping mechanisms. It is also envisioned that the clamping mechanisms may be located on the bowl and selectively engage the lid.

[0005] Another aspect of the present disclosure is directed to a kitchen appliance for processing foodstuffs including a housing enclosing a motor. The housing has a reduced diameter portion proximate a first upper end thereof. A bowl is removably mountable to the housing. The bowl includes a base wall and a side wall extending upwardly therefrom. The side wall defines a mouth of the bowl opposite the base wall. A skirt extends downwardly from the base wall opposite the mouth. A drive shaft extends into a cavity of the bowl and is selectively connected to a motor located in the housing. A bowl lid is removably mountable on to the mouth of the bowl. A first rotatable tool is removably mountable to at least a portion of the drive shaft. A second rotatable tool is removably mountable to at least a portion of the drive shaft. The bowl is removably mountable to the housing by positioning at least a portion of the skirt of the bowl to surround at least a portion of the reduced diameter portion of the housing.

[0006] In yet another aspect, the present disclosure is directed to a kitchen appliance for processing foodstuffs including a housing enclosing a motor. A bowl is removably mountable to the housing. The bowl includes a base wall and a side wall extending upwardly therefrom. The side wall defines the mouth of the bowl opposite the base wall. The drive shaft extends into a cavity of the bowl. The drive shaft is rotatable with respect to the bowl and is separable from the housing. A clutch mechanism is positioned on/within the bowl. The clutch mechanism operatively connects the motor of the housing to the drive shaft of the bowl when the bowl is properly positioned on the housing. A bowl lid is removably mountable on to the mouth of the bowl. A first rotatable tool is removably mountable to at least a portion of the drive shaft. A second rotatable tool is removably mountable to at least a portion of the drive shaft. When the bowl is properly positioned on the housing and upon actuation of the motor, the clutch mechanism effects rotation of the drive shaft with respect to the bowl to process foodstuffs thereon.

[0007] In yet a further aspect, the present disclosure is directed to a kitchen appliance for processing foodstuffs including a housing enclosing a motor, a switch mechanism to prevent actuation of the motor, and an actuation member pivotable between a first position and a second position. In the first position, the actuation member is spaced-apart from the switch mechanism to maintain the switch mechanism in an open position and prevent actuation of the motor. In the second position, the actuation member engages the switch mechanism to close the switch mechanism to actuate the motor. A bowl is removably mountable to the housing. The bowl includes a mouth for receiving a rotatable tool within the bowl. The bowl also includes a first member for selectively engaging the actuation member for actuating the switch mechanism. A bowl lid is removably mountable on to the mouth of the bowl. When either the bowl lid is removed from the mouth of the bowl or the bowl is removed from the housing, the actuation member is in the first position. When the bowl lid is properly positioned on the mouth of the bowl and the bowl is properly positioned on the housing, the actuation member is in the second position.

BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWINGS

[0008] The foregoing summary, as well as the following detailed description of the disclosure, will be better understood when read in conjunction with the appended drawings. For the purpose of illustrating the disclosure, there is shown in the drawings an embodiment or embodiments, which is/are presently, preferred. It should be understood, however, that the disclosure is not limited to the precise arrangements and instrumentalities shown.

[0009] In the drawings:
[0010] FIG. 1 is a top perspective view of a kitchen appliance according to a preferred embodiment of the present disclosure, wherein the kitchen appliance is shown in a fully assembled configuration;

[0011] FIG. 2 is a partially exploded top perspective view of the kitchen appliance of FIG. 1, wherein a bowl is shown separated from a housing, the bowl is shown as being at least partially transparent for clarity of the disclosure, and certain components within the bowl are omitted for clarity;

[0012] FIG. 3 is a cross-sectional side elevational view of the kitchen appliance, wherein a safety interlock feature is shown in a closed, engaged, or activated position;

[0013] FIG. 4 is a cross-sectional side elevational view of the kitchen appliance, wherein a safety interlock feature is shown in an open, disengaged, or deactivated position;

[0014] FIG. 5 is a partially exploded top perspective view of a portion of the kitchen appliance;
[0015] FIG. 6 is an enlarged side elevational view of the safety interlock feature shown in the deactivated position; and
[0016] FIG. 7 is an enlarged side elevational view of the safety interlock feature shown in the activated position.

DETAILED DESCRIPTION OF THE DISCLOSURE

[0017] Certain terminology is used in the following description for convenience only and is not limiting. The words “lower,” “bottom,” “upper” and “top” designate directions in the drawings to which reference is made. The words “inwardly,” “outwardly,” “upwardly” and “downwardly” refer to directions toward and away from, respectively, the geometric center of the device, and designated parts thereof, in accordance with the present disclosure. Unless specifically set forth herein, the terms “a,” “an” and “the” are not limited to one element, but instead should be read as meaning “at least one.” The terminology includes the words noted above, derivatives thereof and words of similar import.

[0018] The present disclosure is directed to a motorized kitchen appliance for processing foodstuffs. The subject appliance is described and illustrated in terms of various embodiments but is not limited thereto. In general, the present appliance comprises a novel construction in that it, among other components or features, employs a drive shaft fixed to a bowl assembly instead of fixed to a motor housing, includes a coupling mechanism between the housing assembly and bowl assembly to create a selective engagement between a motor in the housing and the drive shaft in the bowl, provides various components that are assembled together without twisting or rotating the components, and ensures that the coupling components between the motor and drive shaft transmit torque only. The appliance comprises a housing, bowl and lid that all fit in a single orientation and are joined together along a vertical axis without rotating the housing, bowl or lid relative to each other. The present disclosure is not limited to these specific embodiments but also includes variations and equivalent structures that would be apparent to one of skill in the art upon review of the present disclosure.

[0019] Referring to the drawings in detail, wherein like numerals indicate like elements throughout, FIGS. 1-7 illustrate a kitchen appliance 10 in accordance with a preferred embodiment of the present disclosure. The kitchen appliance 10 is intended or designed for processing, blending or otherwise mixing foodstuffs (not shown), such as meats, vegetables, soups, beverages, sauces and the like or any combination thereof. The kitchen appliance 10 is preferably in the form of a food processor, but the kitchen appliance 10 may be any device that includes at least two separable components. As shown in FIGS. 1-5, the kitchen appliance 10 defines a longitudinal axis A that extends perpendicularly to a support surface, such as a tabletop or countertop, when the kitchen appliance 10 is placed on the support surface (not shown).

[0020] Referring to FIGS. 1-5, the kitchen appliance 10 includes a housing 12 that at least partially encloses a motor 14 and a fan 16. The motor 14 is preferably a one-speed universal motor, but the present disclosure is not so limited. Power is preferably supplied to the motor 14 from a conventional wall outlet (not shown) through a power cord (not shown). As shown in FIG. 2, the housing 12 includes a first upper end 18 and an opposing second lower end 20. It is preferred that two or more spaced-apart feet 22 extend downwardly from the second lower end 20 of the housing 12 to support the kitchen appliance 10 on the support surface. However, the kitchen appliance 10 is not limited to inclusion of the feet 22. For example, a bottom surface of the second lower end 20 of the housing 12 may rest directly on the support surface.

[0021] As shown in FIGS. 2-4, the housing 12 preferably has a generally cylindrical shape with a reduced diameter portion 24 proximate the first upper end 18 thereof. A ledge 26 (see FIG. 2) preferably delineates the reduced diameter portion 24 from the remainder of the housing 12. The ledge 26 preferably extends generally, if not exactly, perpendicularly to the longitudinal axis A of the kitchen appliance 10. The reduced diameter portion 24 of the housing 12 preferably has a generally constant or consistent diameter throughout a height thereof, such that an exterior surface of the reduced diameter portion 24 extends generally, if not exactly, parallel to the longitudinal axis A of the kitchen appliance 10.

[0022] Referring to FIG. 2, at least one and preferably two spaced-apart grooves 28 preferably extend to least partially radially inwardly into the reduced diameter portion 24 of the housing 12. The two grooves 28 can be diametrically opposed on housing 12, and one of the grooves 28 may be positioned vertically above a control panel 100 of the housing 12. Each groove 28 preferably has a generally arcuate, concave shape and preferably extends the entire height of the reduced diameter portion 24, although the exact geometry and construction may vary. Each groove 28 extends from the ledge 26 to the first upper end 18 of the housing 12. Each groove 28 preferably extends generally, if not exactly, parallel to the longitudinal axis A of the kitchen appliance 10.

[0023] The housing 12 may be constructed of an injection molded acrylonitrile butadiene styrene (ABS) material. The ABS material may be desirable due to its relatively smooth surface finish, its ability to readily take on various colors, its high impact and crack resistance, and its ability to be plated with a metallic finish. However, the housing 12 is not limited to injection molded ABS materials and may be constructed of nearly any generally rigid material that is able to take on the general shape of the housing 12 and perform the functionality of the housing 12 described herein. For example, the housing 12, and any other components of the kitchen appliance, may be constructed of a polymeric, metallic or like material or combination thereof. The housing 12 may be opaque, fully transparent, or some amount of transparency therebetween.

[0024] Referring again to FIG. 2, a drive member 30 is located on or within the housing 12. The drive member 30 is rotatable with respect to the housing 12. The drive member 30 is operatively connected to the motor 12, such as through a gear reduction system (see FIGS. 3 and 4). In a preferred embodiment, the drive member 30 is positioned proximate the first upper end 18 of the housing 12 and forms a relatively small cavity or recess 32 that extends downwardly into the housing 12. A plurality of equal-distantly spaced-apart splines or projections 34 extend radially inwardly into the recess 32 of the drive member 30. Each spline 34 preferably extends an entire height of the recess 32.

[0025] Referring to FIGS. 3, 4, 6 and 7, a switch mechanism 36 is preferably at least partially surrounded by the housing 12. The switch mechanism 36 is preferably positioned proximate to the motor 14, and the switch mechanism 36 is operatively connected to the motor 14 to permit actuation of the motor 14. The switch mechanism 36 comprises an arm 38 that extends outwardly therefrom and is movable or pivotable thereto. The arm 38 is movable or pivotable between a first, open or disengaged position (see FIGS. 4 and 6) and a second,
closed or engaged position (see FIGS. 3 and 7). In the first position, at least a free end of the arm 38 is laterally or radially
spaced-apart from the switch mechanism 36, such that the switch
mechanism 36 is in an open or non-activating position. When the free end of the arm 38 is positioned next to or in
abutting contact with the switch mechanism 36, the switch
mechanism 36 is in a closed or activated position, such that
operation of the control panel 100 controls operation of the
motor 14.

[0026] Referring to FIGS. 1-5, a bowl or jar 40 is removably
mountable to at least a portion of the first upper end 18 of the
housing 12. Mounting of the bowl 40 to the housing 12 is
accomplished without rotating or twisting the bowl 40 rela-
tive to the housing 12. The bowl 40 includes a base wall 42
and a side wall 44 extending upwardly therefrom. The base
wall 42 extends generally, if not exactly, perpendicularly to
the longitudinal axis A. As shown in FIG. 5, the side wall 44
defines a mouth 46 opposite the base wall 42 for receiving a
rotatable tool (described in detail below) within the bowl 40.
A handle 48 preferably extends radially outwardly from at
least a portion of an exterior surface of the side wall 44 of
the bowl 40. The handle 48 preferably extends from the base
wall 42 to the mouth 46, and is at least partially arcuate to
define an opening or passageway with the exterior surface of the side
wall 44.

[0027] Referring again to FIGS. 1-5, the bowl 40 preferably
includes a skirt 50 extending downwardly from the base wall
42 opposite the mouth 46. The skirt 50 extends generally, if
not exactly, perpendicularly to the longitudinal axis A. The
skirt 50 extends around an entire periphery of the bowl 40 and
is preferably arcuate in shape to match a general circular or
cylindrical shape of the bowl 40 when viewed from above or
below. When the bowl 40 is properly mounted on to the
housing 12, a free end of the skirt 50 preferably contacts or
engages the ledge 26 of the housing 12.

[0028] As shown in FIG. 2, at least one and preferably two
spaced-apart projections 52 extend radially inwardly from an
interior surface of the skirt 50. The two projections 52 may be
diametrically opposed or otherwise positioned to engage the
corresponding groove(s) 28 of housing 12. Each projection
52 preferably has an arcuate, convex shape that preferably
extends an entire height of the skirt 50 (i.e., from the base wall
42 of the bowl 40 to the free end of the skirt 50) so as to be
complementary to groove(s) 28 of housing 12. Each projec-
tion 52 preferably extends generally, if not exactly, perpen-
dicularly to the longitudinal axis A. The handle 48 of the bowl
40 may be circumferentially equidistantly spaced-apart from
each projection 52. Such a configuration of the handle 48 and
the projections 52 allows a user to easily and quickly realize
when the bowl 40 is properly aligned with the housing 12.

[0029] As shown in FIGS. 3 and 4, a drive shaft 54 extends
into a cavity of the bowl 40. The drive shaft 54 is permanently
attached to the bowl 40. The drive shaft 54 generally extends
from the mouth 46 of the bowl 40 to the base wall 42 thereof.
The drive shaft 54 preferably extends generally, if not exactly,
parallel to the grooves 28 and the longitudinal axis A of the
kitchen appliance 10 when the bowl 40 is properly mounted to
the housing 12. The drive shaft 54 is rotatable with respect to
the bowl 40 and is selectively connected to the motor in
housing 12. As drive shaft 42 is integral to the bowl, drive
shaft 42 is also separable from the housing 12 when bowl 40
is selectively removed from housing 12. Basically, when the
bowl 40 is removed from the housing 12, the drive shaft 54 is
removed from a physical connection to the housing 12 as
well. One or more bearings 60 may at least partially surround
the drive shaft 54 and/or allow the drive shaft 54 to be rotat-
able attached to the bowl 40. The drive shaft 54 is operatively
connected to the motor 14 such that actuation of the motor 14
rotates the drive shaft 54. The structure and/or features that
operatively or indirectly connect the motor 14 within the
housing 12 and the drive shaft 54 within the bowl 40 are
described in detail below.

[0030] Referring to FIGS. 3 and 4, a clutch mechanism 61 is
positioned on or otherwise located within the bowl 40. The
clutch mechanism 61 is preferably at least one component of
the kitchen appliance 10 that operatively connects the motor
14 of the housing 12 to the drive shaft 54 of the bowl 40 when
the bowl 40 is properly positioned on the housing 12. More
specifically, when the bowl 40 is properly positioned on the
housing 12 and upon actuation of the motor 14, the clutch
mechanism 61 makes rotation of the drive shaft 54 with
respect to the bowl 40 to process, blend or otherwise mix
foodstuff within the bowl 40. The bearing(s) 60 described
above may be one component of the clutch mechanism 61, or
the bearing(s) 60 may be a separate element from the clutch
mechanism 61.

[0031] With reference to FIG. 2, a lug 62 extends down-
wardly from the base wall 42 of the bowl 40. The lug 62 may
form part of the clutch mechanism 61, or the lug 62 may be a
separate element or structure from the clutch mechanism 61.
The lug 62 is preferably generally cylindrical or circular in
shape when viewed from above and/or below. The skirt 50 of
the bowl 40 preferably extends downwardly along the lon-
gitudinal axis A further than the lug 62. In a preferred
embodi-
ment where the lug 62 is a separate element from the clutch
mechanism 61, the lug 62 is preferably operatively engaged
with the clutch mechanism 61. The lug 62 preferably includes
a plurality of spaced-apart indentations 64 that extend the
entire height of the lug 62. When the bowl 40 is properly
attached to the housing 12, each indentation 64 of the lug 62
preferably receives at least a portion of one of the splines 34
of the drive member 30, such that the drive member 30 is
operatively engaged with the lug 62 and the bowl 40 is prop-
erly positioned on the housing 12. In other words, the lug 62
and the drive member 30 complement one another to transfer
motion from the motor 14 to the drive shaft 54. It is noted that
the various coupling components between the drive shaft 54
and motor 14 transmit torque only about a drive axis (i.e., a
blade or tool rotation axis) and prevent thrust along the drive
axis (i.e., no force along axis A of FIG. 1).

[0032] With further reference to FIG. 2, the bowl 40 is
removably mountable to the housing 12 by positioning at
least a portion of the skirt 50 of the bowl 40 to surround at
least a portion of the reduced diameter portion 24 of the
housing 12. More preferably, when the bowl 40 is properly
attached or mounted to the housing 12, the skirt 50 surrounds
the entire reduced diameter portion 24. A diameter of the
interior surface of the skirt 50 is preferably at least slightly
greater than a diameter of the exterior surface of the reduced
diameter portion 24. As a result, the skirt 50 can surround the
reduced diameter portion 24 in a relatively close manner, such
that the bowl 40 is stable when properly positioned on the
housing 12. In particular, when the bowl 40 is properly posi-
tioned on the housing 12, each projection 52 of the skirt 50 is
preferably at least partially received within one of the grooves
28 of the housing 12. As a result, the bowl 40 is properly attached to the housing 12 by moving the bowl 40 in a vertical manner generally, if not exactly, parallel to or along the longitudinal axis A of the kitchen appliance 10. In other words, the bowl 40 is properly attached to the housing 12 by moving the bowl 40 linearly downwardly on to the housing 12, such that no twisting of the bowl 40 relative to the housing 12 is required once the bowl 40 contacts the housing 12. Assembly of the bowl 40 on the housing 12 can only be achieved via a proper vertical alignment of the bowl 40. Accordingly, the method of assembling the kitchen appliance 10 disclosed herein is simpler, easier, and more reliable than prior art methods. There is no clamping mechanism or physical impediment to the vertical movement of the bowl 40 away from the housing 12. This construction also provides the user with positive feedback in the form of a proper fit of the bowl 40 on the housing 12 when the bowl 40 is in the proper position. In other words, the bowl 40 will not mount to the housing 12 if it is not properly aligned.

[0033] Referring to FIGS. 1-5, a bowl lid 68 is removably mountable on to the mouth 46 of the bowl 40. The bowl lid 68 includes a generally flat or planner top wall 70. When viewed from above and/or below, the bowl lid 68 has a generally circular shape to match the generally circular shape of the bowl 40. In contrast to conventional bowl lids, the bowl lid 68 is attached to the bowl 40 without twisting the bowl lid 68 relative to the bowl 40 once the bowl lid 68 contacts the bowl 40. Instead, the bowl lid 68 is vertically movable with respect to the bowl 40 along the longitudinal axis A to attach and/or remove the bowl lid 68 from the bowl 40. The bowl lid 68 is not rotated or twisted relative to the bowl 40 in order to secure the bowl lid 68 to the bowl 40. Such a method of assembling the kitchen appliance 10 has been discovered to be a simpler and easier mechanism for assembly relative to prior art methods.

[0034] To permit such functionality, the bowl lid 68 includes at least one and preferably two spaced-apart extensions 72 (see FIG. 5) that extend radially outwardly from the bowl lid 68. The two extensions 72 are preferably diametrically opposed on the bowl lid 68. Each extension 72 preferably includes a groove 74 therein. There is no hinge between bowl 40 and bowl lid 68 to align the placement of the lid or allow rotation of the lid relative to the bowl. Nevertheless, the construction disclosed herein ensures that the lid 68 is mounted in the proper alignment on bowl 40.

[0035] The bowl lid 68, as well as the bowl 40 and any complementary components thereof, may be constructed of a molded, transparent styrene acrylonitrile (SAN) material. However, the bowl 40 and the bowl lid 68 are not limited to constructions using molded SAN material and may be constructed of nearly any polymeric, metallic, glass or like material that is able to form the desired shape(s) and withstand the normal operating conditions described herein. The bowl 40, the bowl lid 68 and any other features or complementary components may be opaque or partially opaque if desired.

[0036] Referring to FIGS. 1-5, an optional feed tube 76 extends upwardly from the top wall 70 of the bowl lid 68 along a feed axis B (see FIGS. 3 and 5). The feed axis B extends generally, if not exactly, perpendicularly from the top wall 70 of the bowl lid 68 and generally, if not exactly, parallel to the longitudinal axis A of the kitchen appliance 10. As shown in FIGS. 4 and 5, the feed tube 76 defines a feed cavity 78 and a mouth 80 for accessing the feed cavity 78. The kitchen appliance 10 is not limited to inclusion of the feed tube 7.

[0037] Referring again to FIGS. 1-5, an optional food pusher 82 is removably insertable into at least a portion of the feed cavity 78 of the feed tube 76. The food pusher 82 is preferably removable from within the feed cavity 78 along the feed axis B. The food pusher 82 has a generally cylindrical shape when viewed from above and/or below. As shown in FIG. 5, the food pusher 82 includes an upper pusher lip 84, and a side wall 86 extending downwardly therefrom to a lower pusher wall 88.

[0038] An outer periphery of the side wall 86 of the food pusher 82 is preferably at least slightly smaller than an inner periphery of the feed cavity 78, such that the food pusher 82 is slideable into and out of the feed cavity 78. However, the upper pusher lip 84 of the food pusher 82 preferably has an outer periphery that is at least slightly larger than the feed cavity 78, such that the food pusher 82 is able to move within the feed cavity 78 only to a point where the upper pusher lip 84 engages a top surface of the feed tube 76. The food pusher 82 is preferably slideable in the feed cavity 78 to urge foodstuff toward the bowl 40 when the bowl lid 68 is mounted to the bowl 40. A height of the food pusher 82 is preferably at least slightly less than a height of the feed tube 76, such that the food pusher 82 does not and cannot extend into the cavity of the bowl 40 when the bowl lid 68 is properly mounted to the bowl 40 and the food pusher 82 is positioned within the feed cavity 78 of the feed tube 76. As shown in FIGS. 1-3 and 5, a nested food pusher 102 may be removably insertable into the food pusher 82.

[0039] Referring to FIGS. 3, 4, 6 and 7, an actuation member 37 is preferably at least partially surrounding the housing 12 and movable with respect to the housing 12. The actuation member 37 is preferably pivotable with respect to the housing 12 about an axis that extends generally, if not exactly, perpendicularly to the longitudinal axis of the kitchen appliance 10. As shown in FIG. 7, the actuation member 37 has a central, generally circular hub 37a and two spaced-apart arms or prongs 37b that extend radially outwardly therefrom. Such a configuration allows the actuation member 37 to selectively engage or contact various portions of the kitchen appliance 10, as described herein. However, the actuation member 37 is not limited to a particular shape, but can be any size, shape and/or configuration that is capable of performing the functionality described herein.

[0040] In further detail, the actuation member 37 is pivotable between a first position (see FIGS. 4 and 6), such as when the bowl 40 is separated from the housing 12, when the bowl lid 68 is removed from the mouth 46 of the bowl 40, and/or when the food pusher 82 is removed from the feed cavity 78, and a second position (see FIGS. 3 and 7), such as when the bowl 40 is properly positioned on the housing 12, the bowl lid 68 is properly positioned on the bowl 40, and the food pusher 82 is properly positioned within the feed cavity 78. In the first position, the actuation member 37 is preferably spaced-apart from the switch mechanism 36 (and the arm 38 thereof) to maintain the switch mechanism 36 in the open position and prevent actuation of the motor 14. In the second position, the actuation member 37 engages the arm 38 of the switch mechanism 36 and pivots the arm 38 to close the switch mechanism 36 to actuate the motor 14.

[0041] A biasing member 65 preferably surrounds at least a portion of the actuation member 37 and biases the actuation
member 37 in the first position. The biasing member 65 may be a leaf spring or any other mechanism that is capable of urging and/or rotating the actuation member 37 into or toward a desired position. One end of the biasing member 65 may be wrapped around or otherwise secured to a pivot point of the actuation member 37, and another end of the biasing member 65 may contact a portion of the interior of the housing 12, which would provide leverage for the biasing member 65.

[0042] Referring to FIGS. 3, 4, 6 and 7, the bowl 40 includes a first member 66 for selectively engaging the actuation member 37 of the housing 12, which in turn actuates the switch mechanism 36 within the housing 12. At least a portion of the first member 66 is vertically aligned with at least a portion of the actuation member 37 of the housing 12 when the bowl 40 is properly mounted to the housing 12. The first member 66 is in the shape of an elongated rod that has a length at least slightly greater than a height of the bowl 40, as measured from the base wall 42 to the mouth 46 thereof. However, the first member 66 is not limited to a particular shape or position within the bowl 40.

[0043] Referring to FIGS. 3-7, the bowl lid 68 includes a second member 104 for selectively engaging the first member 66 of the bowl 40, which in turn engages the actuation member 37 for actuating the switch mechanism 36. At least a portion of the second member 104 is vertically aligned with at least a portion of the first member 66 when the bowl 40 is properly mounted to the housing 12. The second member 104 is in the shape of an elongated rod that preferably has a length approximately a height of the feed tube 76. A biasing member 106, such as a coil spring, biases the second member 104 vertically upwardly to a disengaged position. The biasing member 106 can surround at least a portion of the second member 104. A lower end of the biasing member 106 is in direct contact with and supported by a portion of the bowl 40 (such as a top of the handle 48) and/or the bowl lid 68.

[0044] As shown in FIGS. 3, 4, 6 and 7, a third member 108 may be pivotally attached to an upper end of the second member 104. The third member 108 is pivotable between a first position (see FIGS. 4 and 6), wherein at least a portion of the third member 108 extends radially inwardly into the feed cavity 78, and a second position (see FIGS. 3 and 7), wherein the entire third member 108 is positioned radially outwardly of the feed cavity 78. The third member 108 may be biased toward or to the first position (see FIGS. 4 and 6), such as by adding additional weight to one portion of the third member 108. The third member 108 is preferably movable from the first position (see FIGS. 4 and 6) to the second position (see FIGS. 3 and 7) by properly inserting the food pusher 82 into the feed cavity 78. When the food pusher 82 is properly inserted into the feed cavity 78, at least a portion of the food pusher 82 contacts at least a portion of the third member 108, which at least slightly rotates the third member 108. The rotation of the third member 108 pushes the second member 104 at least slightly downwardly against the opposing force of the biasing member 106.

[0045] Preferably, the actuation member 37, the first member 66, the second member 104 and/or the third member 108 combine to form a safety interlock feature of the kitchen application 10, such that the motor 14 cannot be actuated unless the interlock components are properly assembled and/or configured. For example, it is preferred that if the bowl 40 is not properly attached to the housing 12, and the bowl lid 68 is not properly attached to the bowl 40, the motor 14 cannot be operated through the control panel 100. When the bowl lid 68 is properly mounted to the bowl 40, the second member 104 may be moved downwardly to engage the first member 66 by pushing the food pusher 82 into the feed cavity 78 of the feed tube 76. The downward movement of the food pusher 82 may engage at least a portion of the second member 104 and overcome the upwardly force of the biasing member 106, which in turn pushes the first member 66 downwardly. When the bowl 40 is properly mounted to the housing 12, the downward movement of the first member 66 engages at least a portion of the actuation member 37, which causes the actuation member 37 to rotate and activate the switch mechanism 36 and the motor 14. In such a configuration, a user can control or otherwise operate the motor 14 through the control panel 100. In addition, such a configuration is advantageous because there is little or no horizontally-extending force (e.g., parallel to the longitudinal axis A) generated by the safety interlock feature that tends to separate the housing and bowl of conventional kitchen appliances. Without a twist lock engagement between the bowl and housing, there is no mechanical stop to keep the bowl 40 from being displaced vertically, which could disengage the drive mechanism from the drive shaft. Upward biasing forces on bowl 40 are preferably minimized.

[0046] The safety interlock feature may be comprised of less than all of the above-identified components. In other words, the kitchen appliance 10 is not limited to inclusion of the second member 104 and the third member 108. For example, in a preferred embodiment wherein the kitchen appliance 10 does not include the feed tube 76, the second and third members 104 and 108 may not be necessary or desirable. In such an embodiment, the safety interlock feature may only include the actuation member 37 and the first member 66, such that placing the bowl lid 68 properly onto the mouth 46 of the bowl 40 preferably moves the first member 66 downwardly to contact or otherwise engage the actuation member 37.

[0047] Referring to FIGS. 3-5, the kitchen appliance 10 includes at least one separate rotatable tool or cutting mechanisms. Each rotatable tool is sized and shaped to be positioned entirely within the space surrounded by the bowl lid 68 and the bowl 40 when the bowl lid 68 is properly mounted to the bowl 40. Each rotatable tool is directly attachable to separate portions of the drive shaft 54. It is preferred that two rotatable tools are not simultaneously operated or rotated within the bowl 40. However, if desired, two or more rotatable tools may be placed on or attached to the drive shaft 54.

[0048] More specifically, a first rotatable tool 96 may be directly connected to and rotatable by at least a first portion of the drive shaft 54, such as the upper end thereof, in a first operating configuration. A separate rotatable tool 98 is preferably directly connected to and rotatable by at least a second portion of the drive shaft 54 in a second operating configuration when the first tool 96 is not positioned within the bowl 40. Each rotatable tool 96, 98 snap or friction fits onto the drive shaft 54. In a preferred embodiment, the first rotatable tool 96 is a generally flat or planar shredding blade, and the second rotatable tool 98 is a slicing or S-blade. However, each rotatable tool 96, 98 may have an alternative form or shape.

[0049] Referring to FIGS. 1, 2 and 5, at least one and preferably two spaced-apart clamping mechanisms 90 are preferably removably attached to the bowl lid 68. The clamping mechanism(s) 90 allow(s) the bowl lid 68 to be removed and/or attached to the bowl 40 without rotating either the bowl lid 68 or the bowl 40. In contrast to prior art bowl and bowl lid
combinations, no twisting is necessary to attach and/or remove the bowl lid 68 to/from the bowl 40. Each clamping mechanism 90 is also removably engageable with at least a portion of the bowl 40. It is preferred that the two clamping mechanisms 90 are diametrically opposed on the bowl lid 68. However, the kitchen appliance 10 may have more clamping mechanisms 90, or clamping mechanisms 90 located in different positions and/or configurations than as explicitly described herein. For instance, clamping mechanism 90 may be located on bowl 40.

Each clamping mechanism 90 is pivotable between a first position (see FIGS. 1 and 2, and the right-most clamping mechanism 90 in FIG. 5) for engaging at least a portion of the bowl 40 to retain the bowl lid 68 on the mouth 46 of the bowl 40 and a second position (see the left-most clamping mechanism 90 in FIG. 5) spaced-apart from the bowl 40 for allowing the bowl lid 68 to be removed from the bowl 40. Each clamping mechanism 90 is preferably pivotable about an axis that extends generally perpendicularly to the longitudinal axis A of the kitchen appliance 10.

As shown in FIG. 5, each clamping mechanism 90 preferably includes at least one and preferably two spaced-apart shafts 92. Each shaft 92 preferably has a generally cylindrical shape that extends generally perpendicularly to the longitudinal axis A of the kitchen appliance 10. Each shaft 92 of each clamping mechanism 90 is preferably sized, shaped and/or configured to fit within one groove 74 of each extension 72 of the bowl lid 68. Each combined groove 74 and shaft 92 preferably has a complimentary shape, such that the shaft 92 can rotate within the groove 74. Such a configuration allows each clamping mechanism 90 to be rotatable with respect to the bowl lid 68.

Referring to FIG. 5, at least one and preferably two spaced-apart projections 56 extend radially outwardly from the bowl 40 proximate the mouth 46 thereof. The two projections 56 may be diametrically opposed on the bowl 40. Each projection 56 is preferably integrally, uniformly and/or monolithically formed with at least a portion of the bowl 40, and preferably extends generally, if not exactly, perpendicularly to the longitudinal axis A. Each projection 56 may be at least slightly circumferentially curved or arcuate to generally match the circular or cylindrical shape of the bowl 40. Each projection 56 may include one or a plurality of spaced-apart recesses 58 proximate with the underside thereof. The recesses 58 are preferably separated by a dividing wall 59 that extends generally, if not exactly, parallel to the longitudinal axis A.

Referring again to FIG. 5, each clamping mechanism 90 preferably includes at least one projection 94 extending radially inwardly from an interior surface thereof. The projection 94 is preferably spaced-apart from the shafts 92, such that the projection 94 is positioned to engage or otherwise at least partially surround at least a portion of one of the projections 56 of the bowl 40 when the bowl lid 68 is properly positioned on the mouth 46 of the bowl 40. To remove the bowl lid 68 from the bowl 40 when the clamping mechanism (s) 90 is/are engaged, it is preferred that a user grasps a portion of a lower end of each clamping mechanism 90 to rotate the lower end thereof upwardly and/or outwardly away from the bowl 40 so as to disengage the projection 94 of the clamping mechanism 90 with the projection 56 of the bowl 40. However, the clamping mechanism(s) 90 is/are not limited to the precise size, shape, location and/or configuration described herein. For example, each clamping mechanism 90 may be pivotably attached to the bowl 40, and removable attached to the bowl lid 68.

A preferred method of assembling the kitchen appliance 10 to process foodstuff therein includes placing the housing 12 on the support surface. The bowl 40 is preferably attached or mounted to the first upper end 18 of the housing 12 by moving the bowl 40 vertically downward from above (i.e., along the longitudinal axis A). The above-described movement of the bowl 40 with respect to the housing 12 allows each projection 52 of the bowl 40 to engage one of the grooves 28 of the housing 12 and allows the lug 62 to be placed within and engage the drive member 10 of the housing 12. Also, the lower end of the first member 66 extends into an opening 12a in the housing 12. The user does not need and, in fact, cannot twist bowl 40 on housing 12. Foodstuff to be processed, blended and/or mixed may be placed in the bowl 40 before or after the bowl 40 is mounted on to the housing 12. The bowl lid 68 is preferably attached to the mouth 46 of the bowl 40 by moving the bowl lid 68 vertically downward from above (i.e., along the longitudinal axis). The bowl lid 68 may be fixed to the bowl 40 by pivoting and/or engaging the clamping mechanism(s) 90 to one or both of the bowl lid 68 and the bowl 40.

In an embodiment that includes the feed tube 76, the food pusher 82 is preferably inserted into the feed cavity 78. The above-described steps allow the safety interlock feature to be activated or engaged, thereby allowing a user to control operation of the motor 14 through the control panel 100. The above-described method of assembling and processing is not limited to the precise order of operations described, and one or more of the steps may occur before or after another.

It will be appreciated by those skilled in the art that changes could be made to the embodiments described above without departing from the broad inventive concept thereof. It is understood, therefore, that this disclosure is not limited to the particular embodiments disclosed, but it is intended to cover modifications within the spirit and scope of the present disclosure as defined by the appended claims.

We claim:

1. A kitchen appliance for processing foodstuff comprising:

- a housing enclosing a motor;
- a bowl removably mountable to the housing, the bowl including a mouth for receiving a rotatable tool within the bowl;
- a bowl lid removably mountable on to the mouth of the bowl; and
- a first clamping mechanism and a second clamping mechanism movably attached to the bowl and removably engageable between the bowl lid and at least a portion of the bowl, the clamping mechanism being movable between a first position to retain the bowl lid on the mouth of the bowl and a second position for allowing the bowl lid to be removed from the bowl.

2. The kitchen appliance according to claim 1, wherein the first and second clamping mechanisms are pivotably attached to the bowl lid, the clamping mechanism being pivotable between the first position and the second position.

3. The kitchen appliance according to claim 2, wherein the kitchen appliance defines a longitudinal axis, and the first and second clamping mechanisms are pivotable about an axis that extends generally perpendicularly to the longitudinal axis.

4. The kitchen appliance according to claim 1, wherein the first clamping mechanism is located on one side of the bowl.
lid and the second clamping mechanism is located on a diametrically opposed side of the bowl lid.

5. The kitchen appliance according to claim 1, further comprising:
   at least one extension extending radially outwardly from the bowl lid, the extension including a groove therein for receipt of at least a portion of the first clamping mechanism therein, wherein engagement of at least a portion of the first clamping mechanism and the groove permits rotational movement of the first clamping mechanism with respect to the bowl lid.

6. The kitchen appliance according to claim 1, further comprising:
   a projection extending radially outwardly from the bowl proximate the mouth thereof, the first clamping mechanism engaging at least a portion of the projection when the first clamping mechanism is in the first position.

7. The kitchen appliance according to claim 1, wherein the bowl lid is attached to the bowl without rotating the bowl lid relative to the bowl.

8. The kitchen appliance according to claim 1, further comprising:
   a clutch mechanism within the bowl;
   a lug extending downwardly from a bottom of the bowl, the lug being operatively engaged with the clutch mechanism; and
   the housing comprising a drive member, the drive member being operatively engaged with the lug when the bowl is properly positioned on the housing.

9. The kitchen appliance according to claim 1, further comprising:
   a feed tube extending from a top wall of the bowl lid, the feed tube defining a feed cavity and including a feed mouth;
   a switch mechanism at least partially surrounded by the housing, the switch mechanism being operatively connected to the motor; and
   an actuation member at least partially surrounded by the housing, the actuation member being pivotable between a first position when the bowl is separated from the housing and a second position when the bowl is properly positioned on the housing and the bowl lid is properly positioned on the bowl, in the first position the actuation member being spaced-apart from the switch mechanism to maintain the switch mechanism in an open position and prevent actuation of the motor, in the second position the actuation member engaging the switch mechanism to close the switch mechanism to actuate the motor.

10. A kitchen appliance for processing foodstuffs comprising:
   a housing enclosing a motor, the housing having a reduced diameter portion proximate a first upper end thereof;
   a bowl removably mountable to the housing, the bowl including a base wall and a side wall extending upwardly therefrom, the side wall defining a mouth of the bowl opposite the base wall, a skirt extending downwardly from the base wall opposite the mouth, a drive shaft extending into a cavity of the bowl and being separable from the housing;
   a bowl lid removably mountable on to the mouth of the bowl;
   a first rotatable tool removably mountable to at least a portion of the drive shaft; and
   a second rotatable tool removably mountable to at least a portion of the drive shaft, wherein the bowl is removably mountable to the housing by positioning at least a portion of the skirt of the bowl to surround at least a portion of the reduced diameter portion of the housing.

11. The kitchen appliance according to claim 10, wherein the bowl is removably mountable to the housing by moving the bowl linearly downwardly onto the housing without rotating the bowl relative to the housing.

12. The kitchen appliance according to claim 10, further comprising:
   a clutch mechanism within the bowl;
   a lug extending downwardly from a bottom of the bowl, the lug being operatively engaged with the clutch mechanism; and
   a drive member on or within the housing, the drive member being operatively engaged with the lug when the bowl is properly positioned on the housing.

13. The kitchen appliance according to claim 10, further comprising:
   at least one groove extending at least partially inwardly into the reduced diameter portion of the housing, the groove extending at least generally parallel to the drive shaft of the bowl when the bowl is mounted to the housing; and
   a projection extending radially inwardly from an interior surface of the skirt,
   wherein at least a portion of the projection is positioned within at least a portion of the groove of the housing when the bowl is positioned on the housing.

14. The kitchen appliance according to claim 10, further comprising:
   a feed tube extending from a top wall of the bowl lid, the feed tube defining a feed cavity and including a feed mouth; and
   a clamping mechanism movably attached to the bowl lid and removably engageable with at least a portion of the bowl, the clamping mechanism being movable between a first position for engaging at least a portion of the bowl to retain the bowl lid on the mouth of the bowl and a second position spaced-apart from the bowl for allowing the bowl lid to be removed from the bowl.

15. A kitchen appliance for processing foodstuffs comprising:
   a housing enclosing a motor;
   a bowl removably mountable to the housing, the bowl including a base wall and a side wall extending upwardly therefrom, the side wall defining a mouth of the bowl opposite the base wall, a drive shaft extending into a cavity of the bowl, the drive shaft being rotatable with respect to the bowl and being separable from the housing;
   a clutch mechanism within the bowl, the clutch mechanism operatively connecting the motor of the housing to the drive shaft of the bowl when the bowl is properly positioned on the housing;
   a bowl lid removably mountable on to the mouth of the bowl;
   a first rotatable tool removably mountable to at least a portion of the drive shaft; and
   a second rotatable tool removably mountable to at least a portion of the drive shaft,
wherein, when the bowl is properly positioned on the housing and upon actuation of the motor, the clutch mechanism effects rotation of the drive shaft with respect to the bowl to process foodstuff therein.

16. The kitchen appliance according to claim 15, further comprising:
   a lug extending downwardly from the base wall of the bowl, the lug being operatively engaged with the clutch mechanism; and
   a drive member on or within the housing, the drive member being operatively engaged with the lug when the bowl is properly positioned on the housing, the motor is operatively connected to the drive member such that actuation of the motor rotates the drive member.

17. The kitchen appliance according to claim 16, further comprising:
   a skirt extending downwardly from the base wall opposite the mouth, the skirt extending around a periphery of the bowl.

18. The kitchen appliance according to claim 15, further comprising:
   a feed tube extending from a top wall of the bowl lid, the feed tube defining a feed cavity and including a feed mouth;
   a switch mechanism at least partially surrounded by the housing, the switch mechanism being operatively connected to the motor; and
   an actuation member at least partially surrounded by the housing, the actuation member being pivotable between a first position when the bowl is separated from the housing and a second position when the bowl is properly positioned on the housing, in the first position the actuation member being spaced-apart from the switch mechanism to maintain the switch mechanism in an open position and prevent actuation of the motor; in the second position the actuation member engaging the switch mechanism to close the switch mechanism to actuate the motor, wherein a biasing member biases the actuation member in the first position.

19. A kitchen appliance for processing foodstuff comprising:
   a housing enclosing a motor, a switch mechanism to permit actuation of the motor, and an actuation member pivotable between a first position and a second position, in the first position the actuation member being spaced-apart from the switch mechanism to maintain the switch mechanism in an open position and prevent actuation of the motor, in second position the actuation member engaging the switch mechanism to close the switch mechanism to actuate the motor;
   a bowl removably mountable to the housing, the bowl including a mouth for receiving a rotatable tool within the bowl, a first member for selectively engaging the actuation member for actuating the switch mechanism, and a drive shaft being separable from the housing; and
   a bowl lid removably mountable on to the mouth of the bowl;
   wherein, when either the bowl lid is removed from the mouth of the bowl or the bowl is removed from the housing, the actuation member is in the first position; and
   wherein, when the bowl lid is properly positioned on the mouth of the bowl and the bowl is properly positioned on the housing, the actuation member is in the second position.

20. The kitchen appliance according to claim 19, wherein the kitchen appliance defines a longitudinal axis, and wherein the actuation member is pivotable with respect to the housing about an axis that extends generally perpendicularly to the longitudinal axis of the kitchen appliance.

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