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Race et al.

[11] **3,738,727**

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[54] **APPLIANCE ANTI-TIP DEVICE**

[75] Inventors: **Martin L. Race**, Elm Grove; **Leonard J. Martiniak**, Waukesha, both of Wis.

[73] Assignee: **General Electric Company**, Louisville, Ky.

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[52] **U.S. Cl.** **312/276**, 312/311, 312/319

[51] **Int. Cl.** **A47b 81/02**

[58] **Field of Search** 312/271, 273, 276, 312/317, 319, 138, 139; 16/1, 180, 190; 49/386, 317

[56] **References Cited**

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Primary Examiner—James T. McCall
Attorney—George C. Atwell et al.

[57] **ABSTRACT**

A free-standing appliance cabinet of the type having a door hinged to swing outwardly to provide access to the inside of the cabinet has an anti-tip arm supported within the cabinet for movement of the cabinet to a tip-preventing position. The anti-tip arm is interconnected with the door so that it is moved outwardly to its tip-preventing position when the door is opened and is refracted when the door is closed. The anti-tip arm is adapted to provide support to the cabinet whereby tipping of the cabinet, in a forwardly direction in response to force downwardly on the open door surface, is prevented. The anti-tip arm has means therewith operable to lock the arm to the cabinet in the event that a tipping force is exerted on some part of the the other than the open door, such as downwardly against an outwardly extended upper rack, to further prevent tilting or upsetting of the cabinet.

8 Claims, 5 Drawing Figures

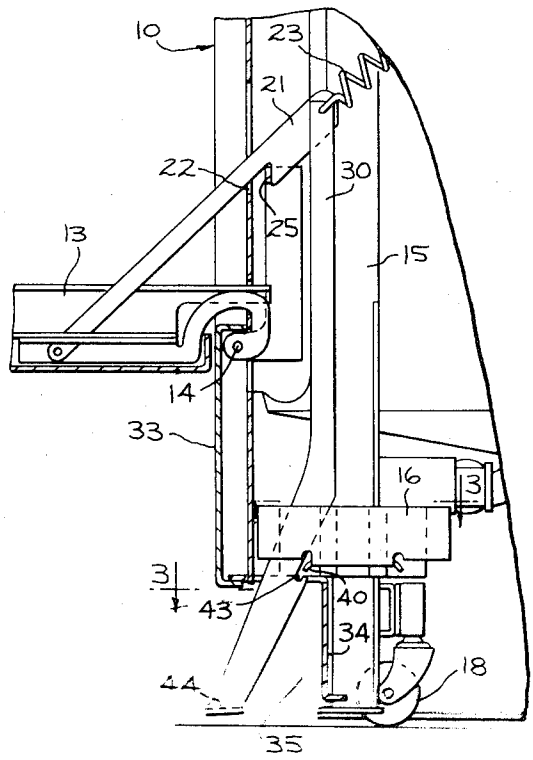


FIG. 5

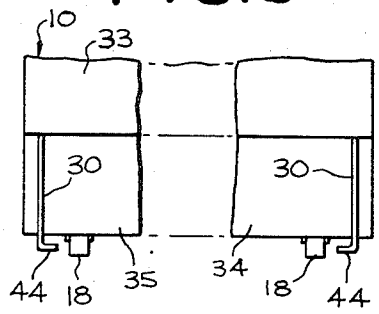
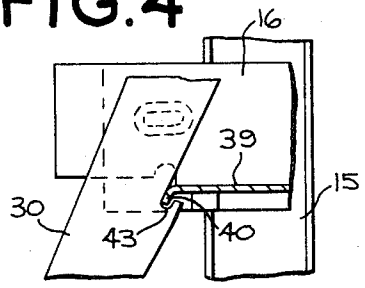


FIG. 4



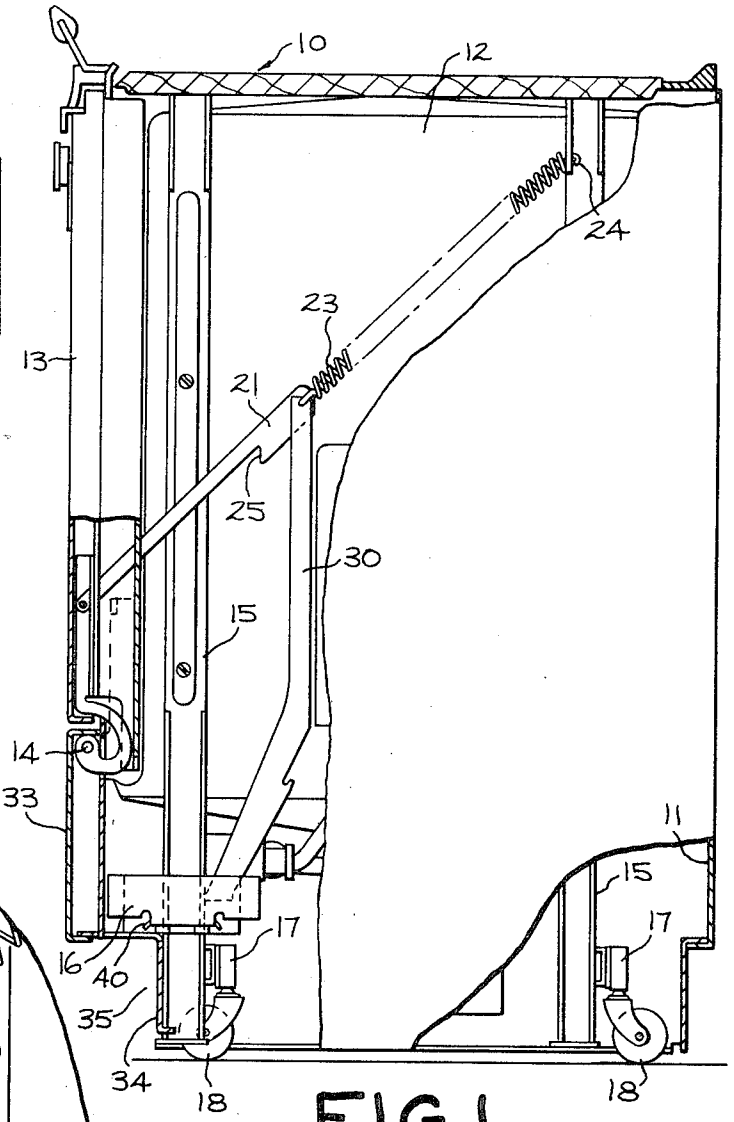


FIG. 1

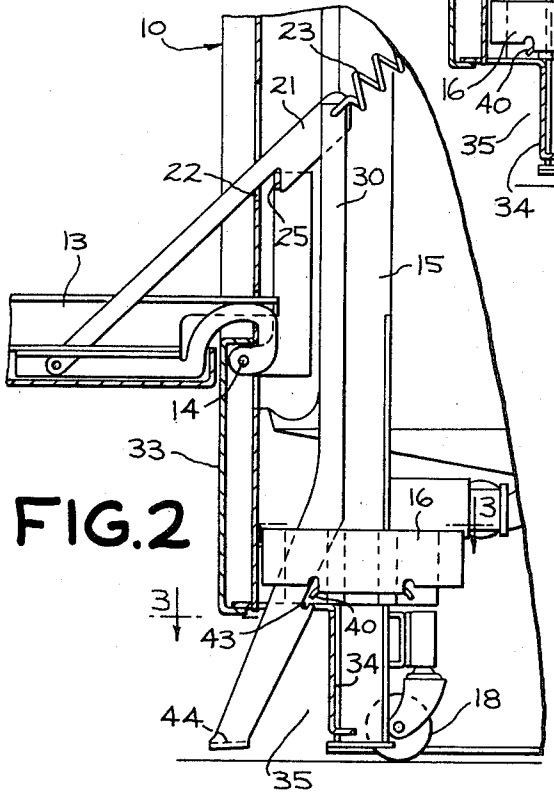


FIG. 2

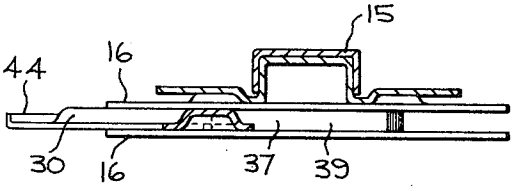


FIG. 3

APPLIANCE ANTI-TIP DEVICE

BACKGROUND OF THE INVENTION

It is common practice to provide an access opening in a side wall and a door for the access opening in an appliance cabinet such as a portable dishwasher. Such a door member may be hinged along its lower edge and open downwardly and outwardly to a substantially horizontal open position to facilitate loading and unloading of the appliance. The portable appliance cabinet is generally prone to tilt forwardly toward its open door if an excessive force is exerted downwardly against the outer end of the door. This is often the result of a force being exerted downwardly at the outer end of the open door.

The danger of upsetting such an appliance cabinet has been overcome in the prior art by provision of anti-tip structure including a brace or rigid support arm that automatically moves outwardly from the cabinet and toward the floor or support surface thereunder as an incident of opening the door. Such devices of the prior art have been elaborate and involve the use of one or more arms that extend a substantial distance outwardly from the appliance cabinet. Such devices, because of the repeated extension and retraction thereof, tend to rub against the floor surface and create wear spots over a period of time. It is therefore believed desirable to have an anti-tip mechanism in combination with an appliance cabinet in the front of a relatively simplified structure that does not actually engage and firmly contact the floor supporting the cabinet except at the actual occasion of tilting the cabinet.

In prior art devices utilizing a movable anti-tip or support arm, at least part of the structure, generally the end of the arm, remains visible at the cabinet outer surface though the arm is fully retracted. Structures of this type are disclosed in U.S. Pat. No. 3,150,904, issued to Kendt et al on Sept. 29, 1964, and in U.S. Pat No. 3,150,905, issued to Payton et al on the same date. It is believed more desirable for esthetic reasons to have the movable arm totally retractable into the appliance cabinet so that the anti-tip mechanism is out of sight when not in use. Such an arrangement is included in the present invention.

SUMMARY OF THE INVENTION

In one form of the present invention a free standing cabinet structure has a door movable from between a closed position and an open position and an anti-tip arm supported fully within the cabinet for slidable movement out of the cabinet to a tip-preventing position. The movement of the anti-tip arm occurs in response to opening and closing of the door whereby the arm is retracted when the door is closed and is in its operable extended tip-preventing position when the door is open. The door has a rigid strut or stop arm that limits its outward opening movement to a substantially horizontal orientation and supports the door in its open position in a cantilevered arrangement relative to the cabinet. The anti-tip arm is preferably a downward extending portion of the door's stop arm. The anti-tip arm of this invention, because it is an integral rigid piece of the door slide arm, serves to prevent force exerted on the open door from being translated to the cabinet structure. Further, means are provided to lock the extended anti-tip arm to the cabinet as an incident of a tilting force being applied to a part of the machine other than the door whereby forward upsetting of the machine is prevented.

The means for temporarily locking the anti-tip arm to the cabinet to prevent retraction of the arm may include a slot on the anti-tip arm that moves into close adjacency with a ridge portion on the frame or cabinet structure when the anti-tip arm moves outwardly to its extended position. A slight tilting motion imparted to the cabinet structure, whereby it tilts forwardly in the direction of its door, will cause the ridge portion to seat within the notch of the anti-tip arm and lock the arm so that it cannot retract. The outer downwardly extending end of the arm contacts the floor surface and prevents further tilting of the cabinet structure.

BRIEF DESCRIPTION OF THE DRAWING

FIG. 1 is an elevational view of a dishwasher cabinet having the side wall thereof cut away to reveal internal components and particularly the structural arrangement of the preferred embodiment of the present invention;

FIG. 2 is a fragmentary elevational view showing the lower front corner of the cabinet in FIG. 1 and showing the cabinet door in its open position;

FIG. 3 is a sectional view taken along line 3—3 of FIG. 2;

FIG. 4 is an enlarged view of a portion of FIG. 2 showing re-orientation of structure thereof in accordance with the operation of the present invention; and

FIG. 5 is a fragmentary front elevational view of a dishwasher cabinet having a pair of anti-tip arms in accordance with a preferred embodiment of the present invention.

DETAILED DESCRIPTION OF THE DRAWING

In FIG. 1 there is illustrated a portable dishwasher **10** having an outer cabinet **11** that surrounds a wash chamber **12**. The wash chamber has a forward access opening covered by a vertically disposed closure member or door **13**. The door **13** is provided with hinge means **14** at its lower edge to facilitate its being opened from a closed position shown in FIG. **1** to the open position shown in FIG. **2**. The cabinet structure is stabilized and supported by means of frame members such as spaced apart vertically oriented upright channel bars **15**. Such channel bars are used on each side of the cabinet to support the overall structure and suspend the wash chamber **12** and the components attached thereto within the cabinet. In addition, the construction may include other frame members such as cross members **16** at the lower forward end of the cabinet structure. At the lower end of each channel bar **15** is a caster **17**. Each caster **17** has a roller **18** contacting the floor surface therebeneath whereby the dishwasher **10** can be manually moved over the floor surface.

As shown in FIG. **1**, the door **13** has preferably at each side thereof a slide bar or stop arm **21** for supporting the door in its open position. The stop arm has an outer end pivotally fastened to the door **13** and is adapted to slide through an opening **22** provided therefor in the cabinet at a point laterally adjacent the major wash chamber opening over which the door **13** closes. The inner end of the slide arm **21** is connected to one end of a biasing means in the form of a spring **23**. The other end of the spring **23** is attached to a rearward frame member, one of the channel bars **15**, at a point **24**. A shoulder **25** is provided at an intermediate point

along the stop arm 21 to contact a cabinet portion downwardly adjacent the opening 22 and thereby limit the outward sliding movement of the stop arm 21.

Extending downwardly from the inner end of the stop arm 21 and integrally attached thereto is an anti-tip arm 30. The anti-tip arm 30 has a canted shape somewhat in the form of a dog leg and is adapted to move forwardly and downwardly in unison with the movement of the stop arm 21 from which it extends. The anti-tip arm 30 is adapted to move outwardly from the disposition shown in FIG. 1 to the disposition shown in FIG. 2 whereby it is in position to prevent upsetting of the dishwasher in a forward direction as will be hereafter described. The anti-tip arm 30 moves out through the bottom front or downwardly facing side of the cabinet 11.

It should be noted that the dishwasher 10 has on the front side thereof, in addition to the substantially large door 13, a removable rectangular shaped service panel 33 located directly below the door 13. The lower end of the panel 33 is supported by outward extending ends of cross member 16, as shown in FIGS. 1 and 2. A sheet metal panel 34 is disposed downwardly below the panel 33 in a set-back disposition to define a toe kick area 35. It is into this toe kick area 35, as shown in FIG. 5, that the anti-tip arm 30 protrudes when it is in its anti-tip position as shown in FIG. 2. FIG. 5 also indicates that the structure heretofore described in reference to FIGS. 1 and 2 is duplicated at each side of the cabinet 11 whereby there are a pair of the anti-tip arms 30 that move outwardly and downwardly to an anti-tip position.

As shown in FIG. 3, each forward corner of the cabinet 11 is provided with a pair of the cross members 16 set in a spaced apart relation to define an opening 37 therebetween through which the lower end of the anti-tip arm 30 slidably moves when the door 13 is opened. A rigid cabinet portion or spacer plate 39 is fixed between the spaced apart cross members 16 adjacent the lower edges thereof, and the forward edge of the spacer plate 39 is turned downwardly to provide a ridge 40, as shown in FIGS. 1, 2 and 4. The ridge 40 operates in combination with a notch 43 provided at an intermediate point along the anti-tip arm 30 to halt forward tilting of the dishwasher 10 when a tilting force is exerted at some point on the cabinet other than on the open door. This would occur, for example, if a child were to grasp the outer end of the extended upper rack and pull downwardly thereon.

With the arrangement heretofore described, as the door 13 is opened, the stop arm 21 moves outwardly from the position shown in FIG. 1 until the shoulder 25 strikes the cabinet and halts the movement of the stop arm 21 as shown in FIG. 2. The outward sliding movement of the stop arm 21 causes the anti-tip arm 30 to also move from the retracted position shown in FIG. 1 to the tip-preventing position shown in FIG. 2. It should be noted that although the anti-tip arm 30 is in a tip-preventing position when the door 13 is opened, there is no actual locking engagement between the anti-tip arm and the cabinet or frame of the dishwasher 10 inasmuch as the notch 43 in the anti-tip arm 30 is disposed in close adjacency to the ridge 40 but is not in contact therewith. However, the arrangement is such that any forward tilting of the cabinet 11, as would be caused by pushing downwardly or placing an extra heavy load on the outer end of an outwardly extended upper dish-supporting rack, will cause the ridge 40 to seat into the notch 43 and thereby push the lower end or foot portion 44 of the anti-tip arm 30 against the floor surface and prevent further forward tilting or forward upsetting of the cabinet 11. The ridge 40 and the notch 43 act cooperatively to function as a locking means to lock the anti-tip arm 30 in its extended position, as an incident of initially tilting the cabinet 11 forwardly, to prevent upsetting of the cabinet 11. Removal of the tilting force from the upper rack or other cabinet portion will permit the cabinet 11 to assume its full upright position whereby the locking means releases automatically by the ridge 40 moving out of engagement with the notch 43. Thereafter, the closing of the door 13 from its open position shown in FIG. 2 to the closed position shown in FIG. 1 will retract the anti-tip arm 30 so that it is fully within the cabinet structure and hidden from view.

As will be evident from the foregoing description, certain aspects of the invention are not intended to be limited to the particular details of construction of the example explained and illustrated, and it is contemplated that various modifications will occur to those skilled in the art. It is therefore intended that the appended claims shall cover such modifications as do not depart from the true spirit and scope of the invention.

We claim:

1. An appliance cabinet structure comprising:
   - a closure member for the cabinet movable from a closed to an open position,
   - an anti-tip arm carried by the cabinet for movement from a retracted position to a tip-preventing position, and
   - means acting as an incident of initially tipping the cabinet to lock the anti-tip arm in its tip-preventing position and thereby prevent upsetting of the cabinet.

2. The invention of claim 1 wherein the anti-tip arm is responsive to movement of the closure member such that the anti-tip arm moves to the tip-preventing position as the closure member is moved to the open position and retracts inwardly as the closure member is moved to the closed position.

3. The invention of claim 1 further comprising a retractable stop arm for supporting the door in its open position, and wherein the anti-tip arm is an extending portion of the stop arm.

4. The invention of claim 1 wherein the anti-tip arm, in its retracted position, is contained entirely within the cabinet.

5. The invention of claim 1 wherein the locking means is releasable automatically as an incident of uprighting the cabinet to its normal erect position.

6. The invention of claim 1 wherein the locking means includes a notch provided in the anti-tip arm and a ridge portion on the cabinet structure that seats in the notch in response to the initial tilting of the cabinet.

7. An appliance cabinet structure of the type adapted to be free-standing and self-supporting on a floor surface, comprising:
   - a closure member for the cabinet pivotally movable from a closed to an open position, an anti-tip arm in the cabinet adapted to move from between a retracted position and an extended position in unison with opening and closing of the closure member,
   - the cabinet having a front side with the closure member extending in a generally vertical plane thereon

when in its closed position and a recessed front toe kick area below the closure member,

the anti-tip arm being disposed whereby, when extended, an end thereof extends across the toe kick area and toward the floor surface beneath the cabinet structure and terminates substantially within the toe kick area.

8. The structure of claim 7 further comprising a stop arm adapted to limit the pivotal opening movement of the closure member and support the closure member in the open position, and the stop arm being integral with the anti-tip arm.

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