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(54) **WAREWASH MACHINE AND RELATED HOOD CONSTRUCTION**

GESCHIRRSPÜLMASCHINE UND ZUGEHÖRIGE HAUBENKONSTRUKTION

LAVE-VAISSELLE ET CONSTRUCTION DE CAPOT ASSOCIÉE

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EP 3 668 364 B1

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Description

TECHNICAL FIELD

[0001] This application relates generally to warewash machines and, more specifically, to a hood construction for hood-type warewash machines as defined in the preamble of claim 1.

[0002] Such a warewash machine is known from JP H02 109 554 U. With said machine, common raising or lowering of an upper and a lower hood is not possible. US 4 134 413 A discloses a dishwashing machine in which the wash/rinse compartment comprises two vertically slidable doors, one at the left side and one at the right side of the compartment, wherein each of the doors has a link pivotally connected to a hand operated lever to open and close the doors.

BACKGROUND

[0003] Warewash machines have become fairly standardized in the industry. Typically, a standard warewasher has a washing chamber with an access opening that allows wares to be placed within the chamber for a washing operation. While larger washing chambers have become desirable, especially taller chambers, it is necessary that the warewash machines having larger washing chambers be dimensioned to fit within a volume that can be accommodated by, e.g., a dish room of a restaurant, especially those dish rooms with limited ceiling heights. Figs. 9 and 10 show an exemplary prior art machine 5 with a hood assembly 7 that raises and lowers without collapsing or telescoping.

[0004] As the cost associated with space is constantly rising, kitchens are getting smaller and smaller and this has made compactness or size of equipment very prominent i.e. foot print as well as height. To this end, a collapsible, vertically opening, telescoping door has been proposed in the past per U.S. Patent No. 5,630,438. The telescoping door includes multiple panels that can slide relative to each other as the door is moved to the open position, with the lower panel moving first until a lip on the lower panel moves up into engagement with the upper panel, at which point both panels then move upward. This design has limitations in that the full weight of the upper panel is taken by the lift force applied to the lower panel.

[0005] Accordingly, it would be desirable to provide a more user friendly telescoping warewasher door system, and on that is particularly suited for use with multi-sided doors, which are also referred to as hoods.

SUMMARY

[0006] According to the present invention, a warewash machine includes a housing in part defining a wash zone having front, left and right access openings. At least one spray arm is disposed above or below the wash zone, the spray arm configured to spray liquid toward the wash

zone. A multi-sided hood assembly includes front, left, right and top side sections, the multi-sided hood assembly movable between a lowered closed position for washing and a raised open position for inlet and outlet of wares.

5 When the multi-sided hood assembly is in the lowered closed position, the multi-sided hood assembly closes the front, left and right access openings. When the multi-sided hood assembly is in the raised open position, the front, left and right access openings are open to permit access to the wash zone for inlet and outlet of wares. 10 The multi-sided hood assembly includes a lower hood unit with front, left and right sides and an upper hood unit with front, left, right and top sides, and a linkage assembly between the lower hood unit and the upper hood unit that causes the upper hood unit and the lower hood unit to move up or down together with the lower hood unit moving faster than the upper hood unit to cause telescoping of the upper hood unit and the lower hood unit as the hood assembly moves. The linkage assembly includes 20 a pivot arm arranged to pivot about a fixed axis at a rear of the housing, a first pivot link connecting the pivot arm to the lower hood unit and a second pivot link connecting the pivot arm to the upper hood unit, wherein the first pivot link is at a first distance from the axis and the second pivot link is at a second distance from the axis, and the first distance is greater than the second distance. 25

[0007] In one implementation, the pivot arm includes a spring-bias assembly that provides lift assistance when the multi-sided hood assembly moves from the lowered closed position to the raised open position. 30

[0008] In one implementation, an amount of lift assistance applied to the lower hood unit is greater than an amount of lift assistance applied to the upper hood unit.

[0009] In one implementation, the lower hood unit includes a fixed lift arm by which the multi-sided hood assembly is raised and lowered. 35

[0010] In one implementation, the upper hood unit also includes a rear side that moves with the upper hood unit.

[0011] The details of one or more embodiments are set forth in the accompanying drawings and the description below. Other features, objects, and advantages will be apparent from the description and drawings, and from the claims. 40

BRIEF DESCRIPTION OF THE DRAWINGS

[0012]

Fig. 1 is a perspective view of a warewash machine; Fig. 2 is a partial perspective of the warewash machine pivot arm and spring bias assembly; Figs. 3-6 are partial perspectives showing progressive movement of the multi-sided hood assembly of the warewasher from a closed position to an open position; 55 Figs. 7 and 8 show side elevations of the warewasher with the multi-sided hood assembly in closed and open positions respectively; and

Figs. 9 and 10 show side elevations of a prior art warewasher with the hood in closed and open positions respectively.

DETAILED DESCRIPTION

[0013] Referring to Figs. 1-8, a warewash machine 10 includes a housing 12 in part defining a wash zone 14 having front 16, left 18 and right 20 access openings. Here, the openings intersect to provide obstruction free wash zone access when the hood assembly is opened. At least one spray arm 22 is disposed above or below the wash zone, the spray arm configured to spray liquid toward the wash zone. The spray arm(s) may be rotating spray arm(s) as is common in the industry, but fixed spray arms are also possible. A sump 24 is provided below the wash zone to collect falling liquid, which can then be re-circulated to the spray arms via a pump during a wash step of a cleaning cycle. At least one spray arm may also be connected to a source of final-rinse liquid (e.g., a booster tank heating fresh hot water with or without rinse solution) for a rinsing step that follows the washing step.

[0014] A multi-sided hood assembly 30 includes front, left, right and top side sections. The multi-sided hood assembly is movable along the housing 12 between a lowered closed position (Figs. 1, 3 and 7) for washing and a raised open position (Figs. 6 and 8) for inlet and outlet of wares. When the multi-sided hood assembly is in the closed position the various panels of the hood assembly close or cover the front, left and right access openings. When the multi-sided hood assembly is in the open position the front, left and right access openings are open to permit access to the wash zone for inlet and egress of wares. The multi-sided hood assembly 30 includes a lower hood unit 32 with front 34, left 36 and right 38 sides (e.g., in the form of panels) and an upper hood unit 40 with front 42, left 44, right 46 and top 48 sides (e.g., in the form of panels). Lower hood unit 32 is open at its top to receive the upper hood unit 40, and both hood units are open at their respective bottoms.

[0015] A linkage assembly 50 is provided between the lower hood unit and the upper hood unit. Here, the linkage assembly includes pivot arms 52 along the left and right sides of the units and arranged to pivot about a fixed axis 54 at a rear of the housing 12. A pivot link 56 connects the right pivot arm 52 to the lower hood unit and a pivot link 58 connects the right pivot arm 52 to the upper hood unit. Similar links are provided for the left pivot arm. The pivot link 56 includes one end pivotably connected to the side of the lower hood unit 32, and the other end pivotably connected to the arm 52 or a bracket mounted on the arm. Similarly, the pivot link 58 includes one end pivotably connected to the side of the upper hood unit 40, and the other end pivotably connected to the arm 52 or a bracket mounted on the arm.

[0016] As best seen in the progression of Figs. 3-6, the linkage assembly causes the upper hood unit 40 and the lower hood unit 32 to move up or down together, with the

lower hood unit 32 moving faster than the upper hood unit 40 due to the distance between pivot link 58 and axis 54 being greater than the distance between pivot link 56 and pivot axis 54. This difference in speed of movement causes a progressive telescoping of the upper hood unit 40 and the lower hood unit 30 (more specifically the lower hood unit sliding along the outside upper hood unit as both hood units move) as the hood assembly moves up and down. As used herein the term telescoping refers to the relative sliding movement of the lower hood unit 32 along the upper hood unit 40, either in a collapsing manner (i.e., the bottom edge of the lower hood unit moving closer to the bottom edge of the upper hood unit as the hood assembly is raised) or in an expanding manner (i.e., the bottom edge of the lower hood unit moving further away from the bottom edge of the upper hood unit as the hood assembly is lowered). A lift arm 80 is fixed to the front of the lower hood unit 32 and may be used by operators to raise and lower the hood assembly.

[0017] As seen in Fig. 2, the pivot arms 52 include a spring-bias assembly 60 that provides lift assistance when moving from multi-sided hood assembly from the closed position to the open position. Here, the pivot arms 52 are interconnected with each other by a rear arm 62, and the spring-bias assembly includes a hanger bracket 64 to engage rear arm 62, a spring 66 that connects at one end to the hanger bracket 64, a rod hook 68 that connects to the other end of the spring 66, with the lower end of the rod hook connecting to the rear side of the housing. The spring provides a downward pulling force on arm 62 at the opposite side of the pivot axis 54, which tends to bias the arms 62 to pivot upward about the axis 54, thus urging the hood units upward as well. An amount of lift assistance applied to the lower hood unit 32 is greater than an amount of lift assistance applied to the upper hood unit 40, again due to the relative positions and orientations of the respective pivot links 56 and 58.

[0018] As seen in Fig. 8, the upper hood unit 40 also includes a rear side 70 that moves up and down with the upper hood unit to maintain an enclosed capture volume that retains moist hot air when the multi-sided hood assembly is moved from the closed position to the open position. A rear side 72 of the housing 12 is also closed and may include a tracks or tacks to assist in movement of the hood units.

[0019] As seen by comparison of Figs. 7 and 8 with the views of Figs. 9 and 10 for a prior art machine 5 with non-telescoping hood 7, the overall height of the warewash machine when the hood is up is reduced by the telescoping assembly, effectively accommodating demands of lower ceiling heights.

[0020] It is to be clearly understood that the above description is intended by way of illustration and example only, is not intended to be taken by way of limitation, and that other changes and modifications are possible.

Claims

1. A warewash machine (10) comprising:

- a housing (12) in part defining a wash zone (14) having front (16), left (18) and right (20) access openings;
- at least one spray arm (22) disposed above or below the wash zone (14), the spray arm (22) configured to spray liquid toward the wash zone (14); and
- a multi-sided hood assembly (30) including front, left, right and top side sections, the multi-sided hood assembly (30) movable between a lowered closed position for washing and a raised open position for inlet and outlet of wares,

wherein, when the multi-sided hood assembly (30) is in the lowered closed position, the multi-sided hood assembly (30) closes the front (16), left (18) and right (20) access openings,

wherein, when the multi-sided hood assembly (30) is in the raised open position, the front (16), left (18) and right (20) access openings are open to permit access to the wash zone (14) for inlet and outlet of wares, wherein the multi-sided hood assembly (30) includes a lower hood unit (32) with front (34), left (36) and right (38) sides and an upper hood unit (40) with front (42), left (44), right (46) and top (48) sides,

characterized by

a linkage assembly (50) between the lower hood unit (32) and the upper hood unit (40) that causes the upper hood unit (40) and the lower hood unit (32) to move up or down together with the lower hood unit (32) moving faster than the upper hood unit (40) to cause telescoping of the upper hood unit (40) and the lower hood unit (32) as the hood assembly (30) moves,

wherein the linkage assembly (50) includes a pivot arm (52) arranged to pivot about a fixed axis (54) at a rear of the housing (12), a first pivot link (56) connecting the pivot arm (52) to the lower hood unit (32) and a second pivot link (58) connecting the pivot arm (52) to the upper hood unit (40),

wherein the first pivot link (56) is at a first distance from the axis (54) and the second pivot link (58) is at a second distance from the axis (54), and the first distance is greater than the second distance.

2. The warewash machine (10) of claim 1,

wherein the pivot arm (52) includes a spring-bias assembly (60) that provides lift assistance when the multi-sided hood assembly (30) moves from the lowered closed position to the raised open position.

3. The warewash machine (10) of claim 2,

wherein an amount of lift assistance applied to the lower hood unit (32) is greater than an amount of lift

assistance applied to the upper hood unit (40).

4. The warewash machine (10) of claim 1,

wherein the lower hood unit (32) includes a fixed lift arm (80) by which the multi-sided hood assembly (30) is raised and lowered.

5. The warewash machine (10) of claim 1,

wherein the upper hood unit (40) also includes a rear side (70) that moves with the upper hood unit (40).

Patentansprüche

1. Geschirrspülmaschine (10), umfassend:

- ein Gehäuse (12), das zum Teil eine Waschzone (14) mit einer vorderen (16), einer linken (18) und einer rechten (20) Zugangsöffnung definiert,

- mindestens einen Sprüharm (22), der oberhalb oder unterhalb der Waschzone (14) angeordnet ist, wobei der Sprüharm (22) dazu ausgestaltet ist, Flüssigkeit zu der Waschzone (14) hin zu sprühen, und

- eine mehrseitige Haubenanordnung (30), die einen vorderen, einen linken, einen rechten und einen oberen Seitenabschnitt aufweist, wobei die mehrseitige Haubenanordnung (30) zwischen einer abgesenkten, geschlossenen Position zum Waschen und einer angehobenen, offenen Position zum Spülguteinlass und -auslass beweglich ist,

wobei, wenn die mehrseitige Haubenanordnung (30) in der abgesenkten, geschlossenen Position ist, die mehrseitige Haubenanordnung (30) die vordere (16), die linke (18) und die rechte (20) Zugangsöffnung schließt,

wobei, wenn die mehrseitige Haubenanordnung (30) in der angehobenen, offenen Position ist, die vordere (16), die linke (18) und die rechte (20) Zugangsöffnung offen sind, um Zugang zu der Waschzone (14) zum Spülguteinlass und -auslass zu gestatten, wobei die mehrseitige Haubenanordnung (30) eine untere Haubeneinheit (32) mit einer vorderen (34), einer linken (36) und einer rechten (38) Seite sowie eine obere Haubeneinheit (40) mit einer vorderen (42), einer linken (44), einer rechten (46) und einer oberen (48) Seite aufweist,

gekennzeichnet durch

eine Gestängeanordnung (50) zwischen der unteren Haubeneinheit (32) und der oberen Haubeneinheit (40), die veranlasst, dass sich die obere Haubeneinheit (40) und die untere Haubeneinheit (32) gemeinsam nach oben oder unten bewegen, wobei sich die untere Haubeneinheit (32) schneller als die obere Haubeneinheit (40) bewegt, um ein Teleskopieren

der oberen Haubeneinheit (40) und der unteren Haubeneinheit (32) zu veranlassen, wenn sich die Haubenanordnung (30) bewegt,

wobei die Gestängeanordnung (50) einen Schwenkarm (52), der dazu angeordnet ist, um eine feststehende Achse (54) an einer Rückseite des Gehäuses (12) zu schwenken, ein erstes Schwenkverbindungsglied (56), das den Schwenkarm (52) mit der unteren Haubeneinheit (32) verbindet, und ein zweites Schwenkverbindungsglied (58), das den Schwenkarm (52) mit der oberen Haubeneinheit (40) verbindet, aufweist, wobei das erste Schwenkverbindungsglied (56) in einem ersten Abstand von der Achse (54) angeordnet ist und das zweite Schwenkverbindungsglied (58) in einem zweiten Abstand von der Achse (54) angeordnet ist, wobei der erste Abstand größer als der zweite Abstand ist.

2. Geschirrspülmaschine (10) nach Anspruch 1, wobei der Schwenkarm (52) eine Federvorspannungsanordnung (60) aufweist, die Hebeunterstützung bereitstellt, wenn sich die mehrseitige Haubenanordnung (30) aus der abgesenkten geschlossenen Position in die angehobene offene Position bewegt.
3. Geschirrspülmaschine (10) nach Anspruch 2, wobei ein Ausmaß an Hebeunterstützung, mit der die untere Haubeneinheit (32) beaufschlagt wird, größer als ein Ausmaß an Hebeunterstützung ist, mit der die obere Haubeneinheit (40) beaufschlagt wird.
4. Geschirrspülmaschine (10) nach Anspruch 1, wobei die untere Haubeneinheit (32) einen feststehenden Hebearm (80) aufweist, mittels dessen die mehrseitige Haubenanordnung (30) angehoben und abgesenkt wird.
5. Geschirrspülmaschine (10) nach Anspruch 1, wobei die obere Haubeneinheit (40) auch eine hintere Seite (70) aufweist, die sich mit der oberen Haubeneinheit (40) bewegt.

Revendications

1. Lave-vaisselle (10) comportant :

- une enceinte (12) définissant en partie une zone (14) de lavage dotée d'ouvertures d'accès avant (16), gauche (18) et droite (20) ;
- au moins un bras (22) de pulvérisation disposé au-dessus ou au-dessous de la zone (14) de lavage, le bras (22) de pulvérisation étant configuré pour pulvériser du liquide vers la zone (14) de lavage ; et
- un ensemble (30) de capot à côtés multiples comprenant des sections de côtés avant, gauche, droit et supérieur, l'ensemble (30) de capot

à côtés multiples étant mobile entre une position fermée abaissée servant au lavage et une position ouverte relevée servant à l'entrée et à la sortie de vaisselle, l'ensemble (30) de capot à côtés multiples fermant, lorsque l'ensemble (30) de capot à côtés multiples est dans la position fermée abaissée, les ouvertures d'accès avant (16), gauche (18) et droite (20),

les ouvertures d'accès avant (16), gauche (18) et droite (20) étant ouvertes lorsque l'ensemble (30) de capot à côtés multiples est dans la position ouverte relevée, pour permettre l'accès à la zone (14) de lavage pour l'entrée et la sortie de vaisselle,

l'ensemble (30) de capot à côtés multiples comprenant une unité (32) de capot inférieur dotée de côtés avant (34), gauche (36) et droit (38) et une unité (40) de capot supérieur dotée de côtés avant (42), gauche (44), droit (46) et supérieur (48),

caractérisé par

un ensemble (50) de bielles entre l'unité (32) de capot inférieur et l'unité (40) de capot supérieur qui amène l'unité (40) de capot supérieur et l'unité (32) de capot inférieur à monter ou descendre ensemble, l'unité (32) de capot inférieur se déplaçant plus vite que l'unité (40) de capot supérieur pour provoquer un effet télescopique de l'unité (40) de capot supérieur et de l'unité (32) de capot inférieur tandis que l'ensemble (30) de capot se déplace,

l'ensemble (50) de bielles comprenant un bras pivotant (52) agencé pour pivoter autour d'un axe fixe (54) à l'arrière de l'enceinte (12), une première bielle pivotante (56) reliant le bras pivotant (52) à l'unité (32) de capot inférieur et une seconde bielle pivotante (58) reliant le bras pivotant (52) à l'unité (40) de capot supérieur,

la première bielle pivotante (56) se trouvant à une première distance de l'axe (54) et la seconde bielle pivotante (58) se trouvant à une seconde distance de l'axe (54), et la première distance étant plus grande que la seconde distance.

2. Lave-vaisselle (10) selon la revendication 1, le bras pivotant (52) comprenant un ensemble (60) de sollicitation par ressort qui assure une aide au relevage lorsque l'ensemble (30) de capot à côtés multiples passe de la position fermée abaissée à la position ouverte relevée.

3. Lave-vaisselle (10) selon la revendication 2, la quantité d'aide au relevage appliquée à l'unité (32) de capot inférieur étant plus grande que la quantité d'aide au relevage appliquée à l'unité (40) de capot supérieur.

4. Lave-vaisselle (10) selon la revendication 1, l'unité (32) de capot inférieur comprenant un bras fixe (80) de relevage par lequel l'ensemble (30) de

capot à côtés multiples est relevé et abaissé.

5. Lave-vaisselle (10) selon la revendication 1, l'unité (40) de capot supérieur comprenant également un côté arrière (70) qui se déplace avec l'unité (40) de capot supérieur. 5

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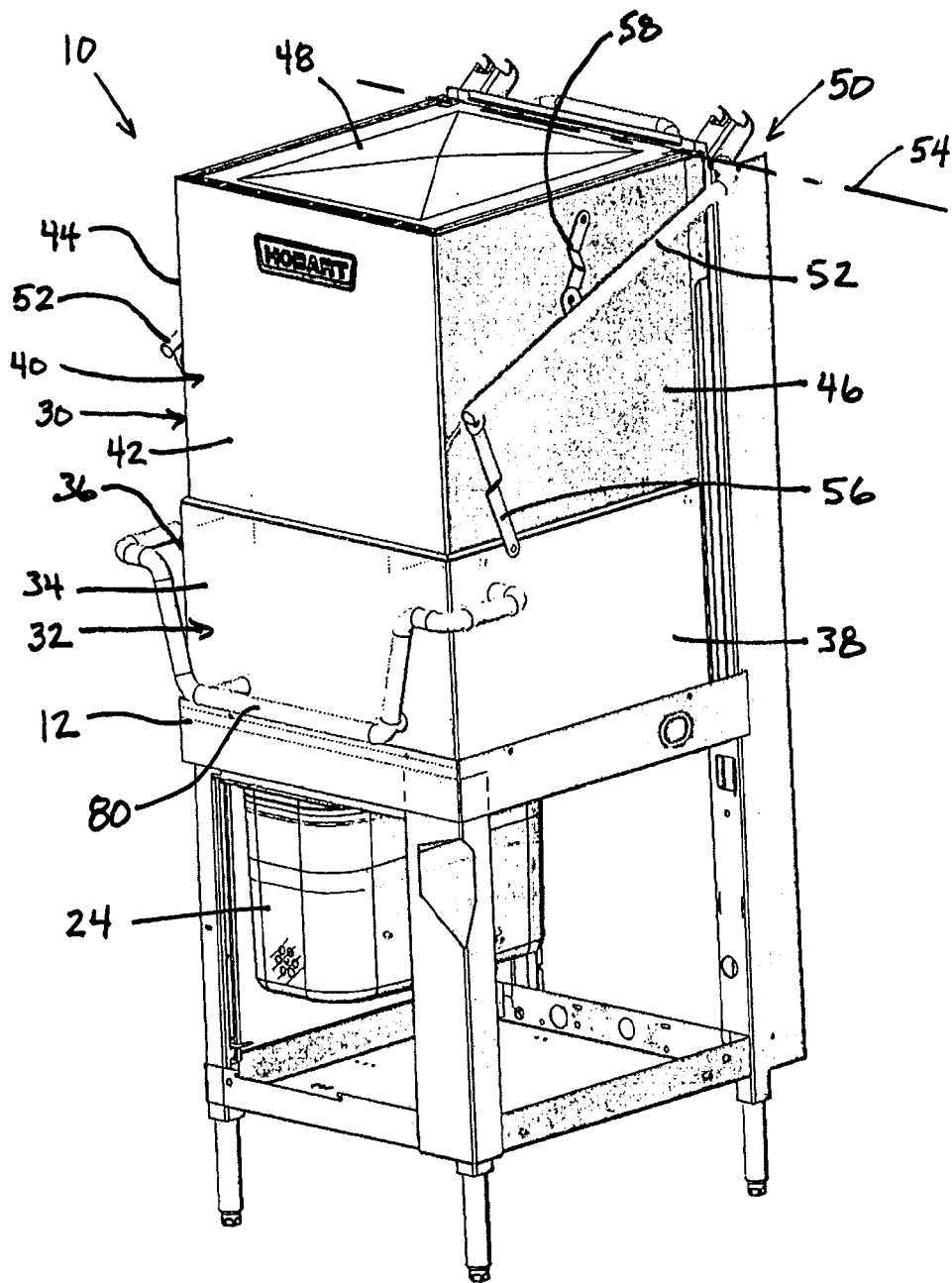


Fig. 1

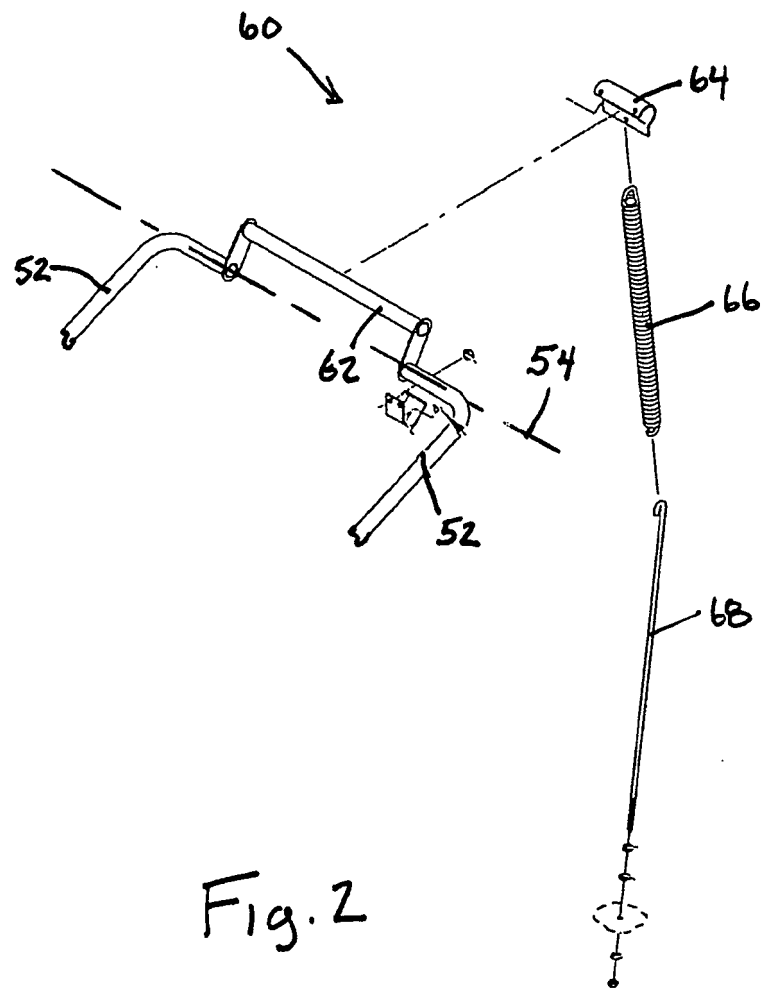


Fig. 2

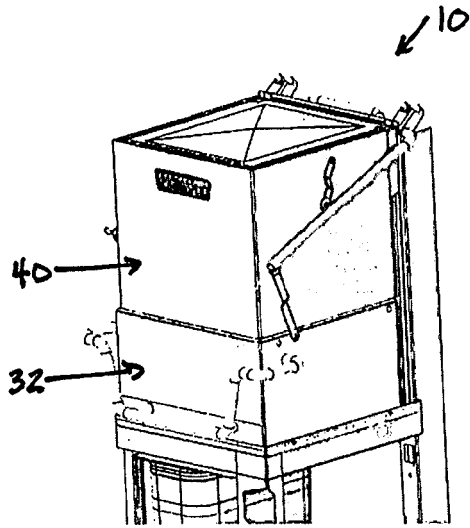


Fig. 3

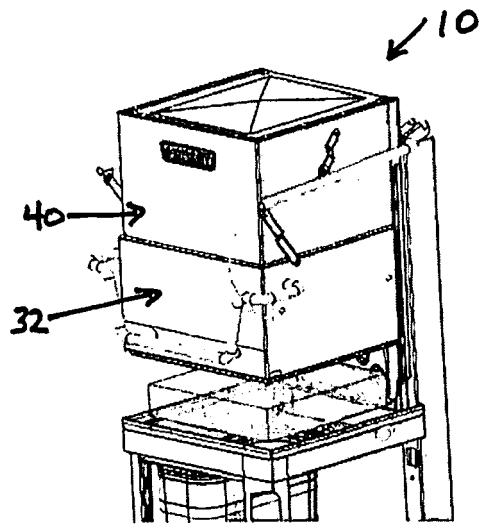


Fig. 4

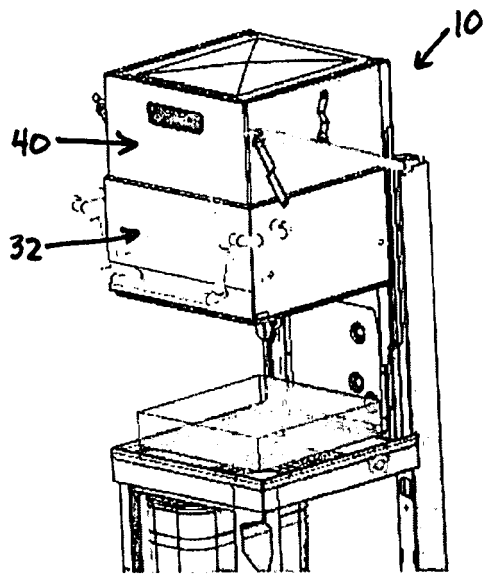


Fig. 5

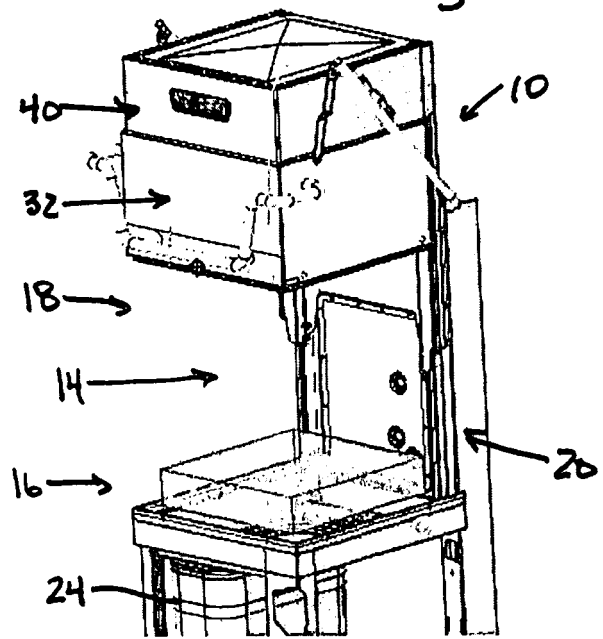


Fig. 6

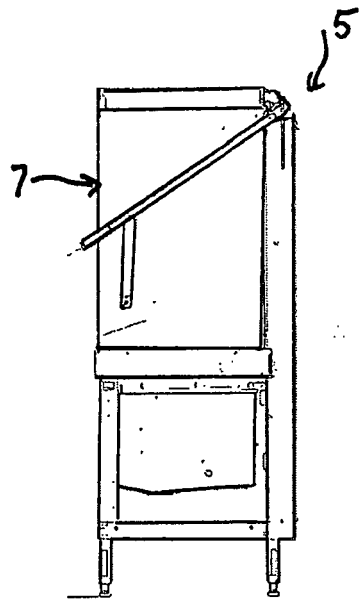


Fig. 9 (Prior Art)

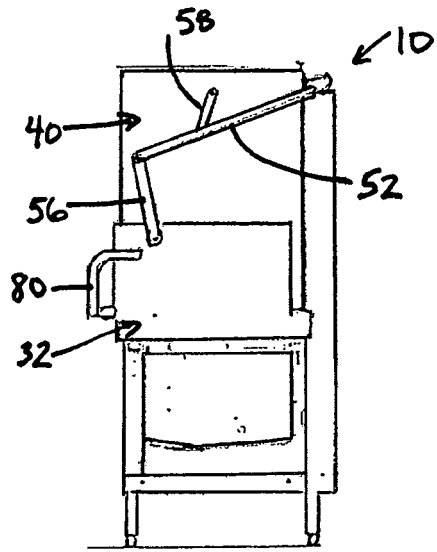


Fig. 7

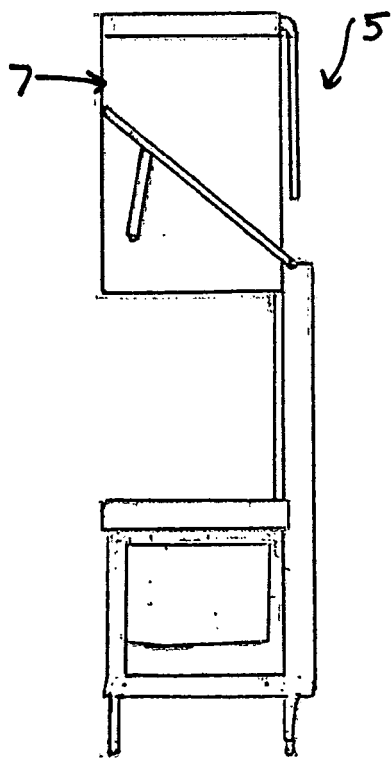


Fig. 10 (Prior Art)

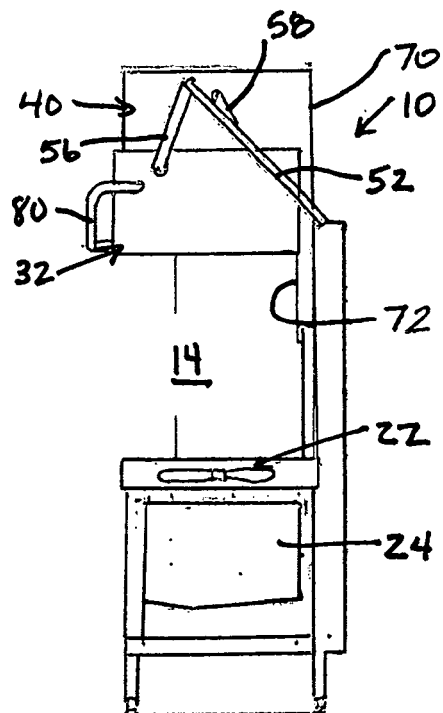


Fig. 8

REFERENCES CITED IN THE DESCRIPTION

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