

July 9, 1968

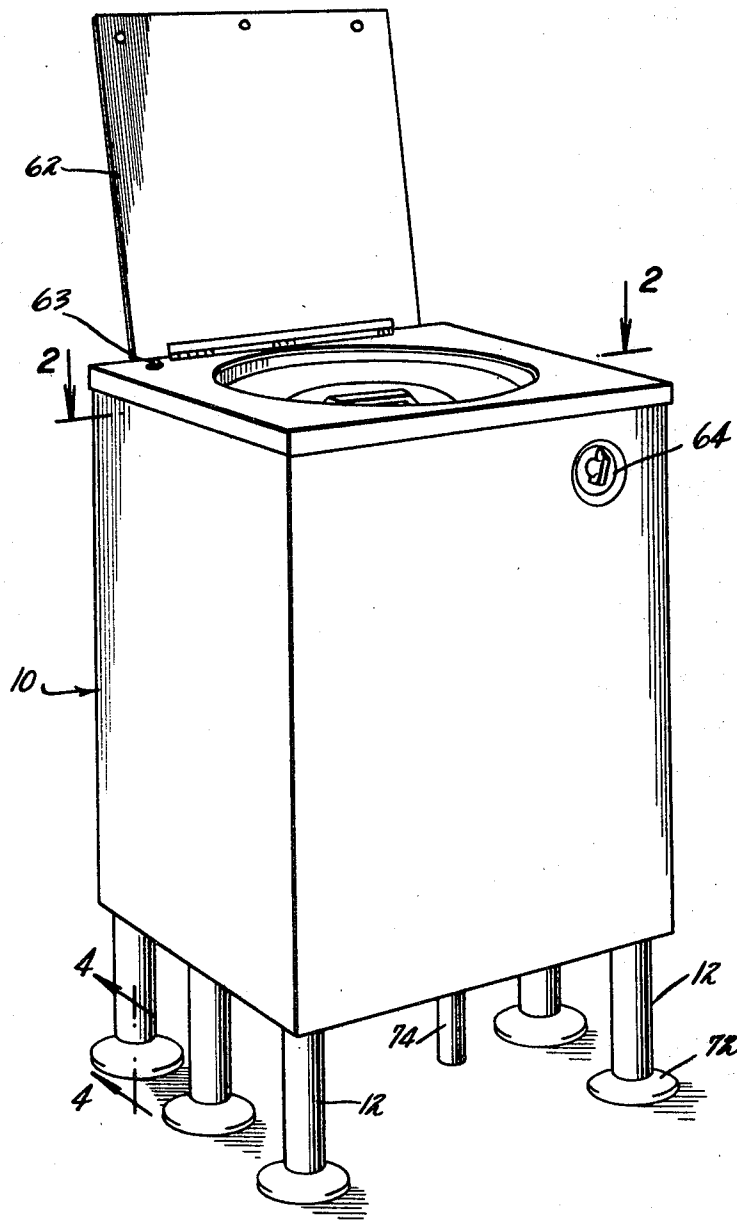
C. H. REEDER
CENTRIFUGAL DRYER

3,391,469

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4 Sheets-Sheet 1

Fig. 1



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Fig. 2

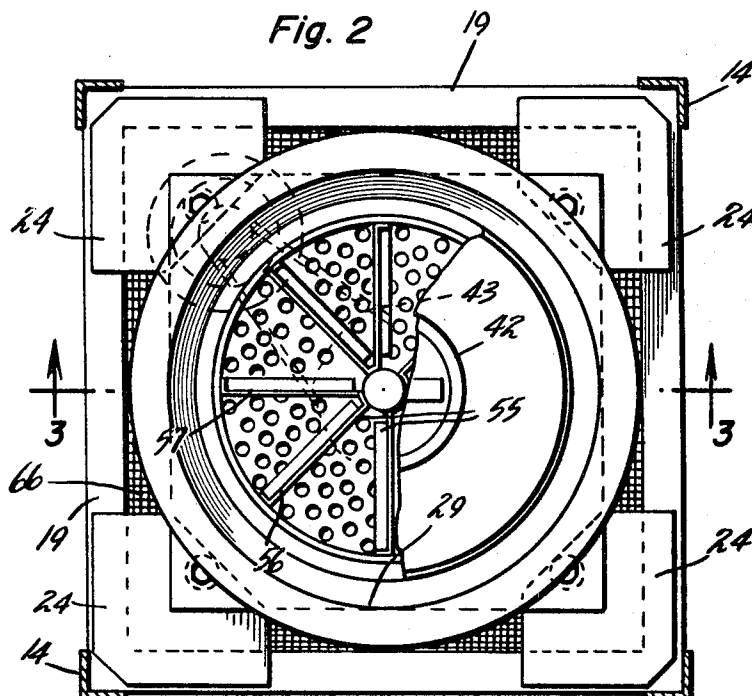


Fig. 5

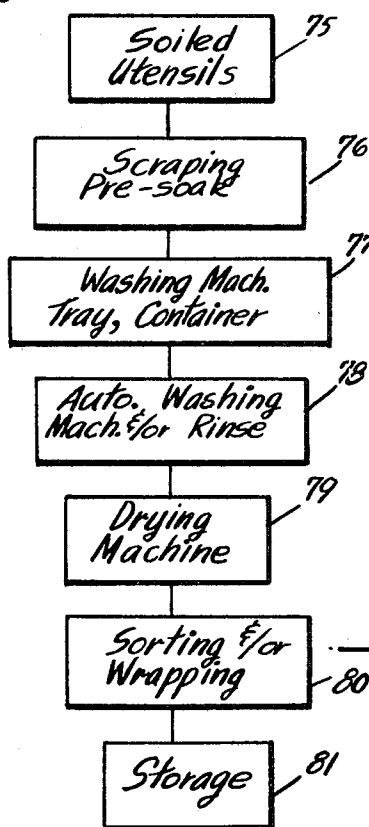


Fig. 6

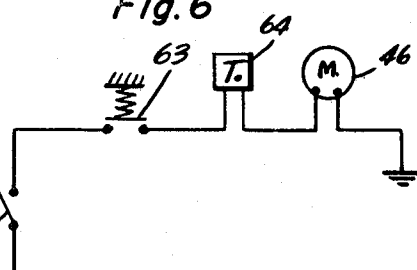
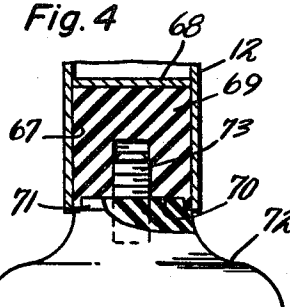


Fig. 4



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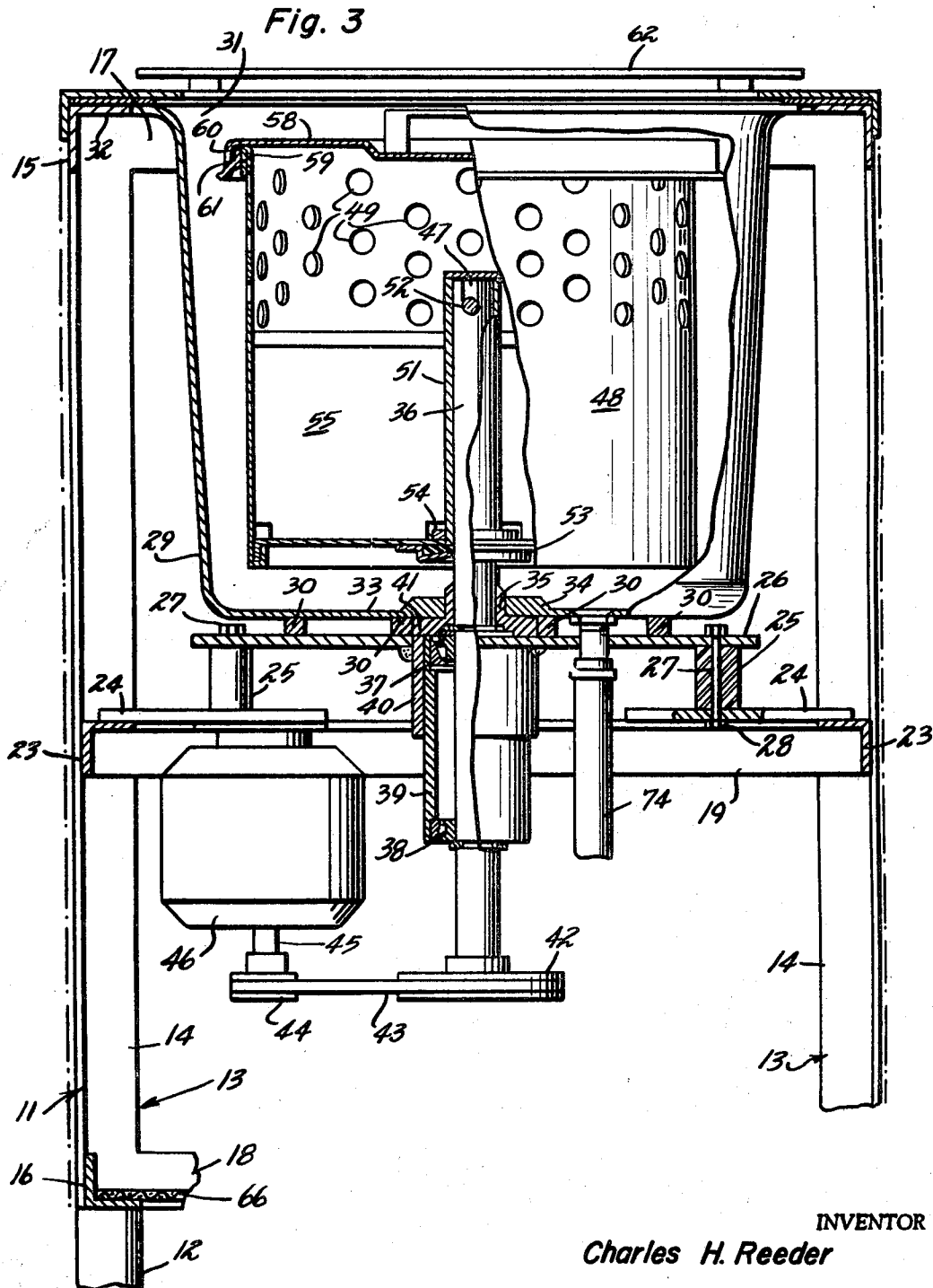
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Fig. 7

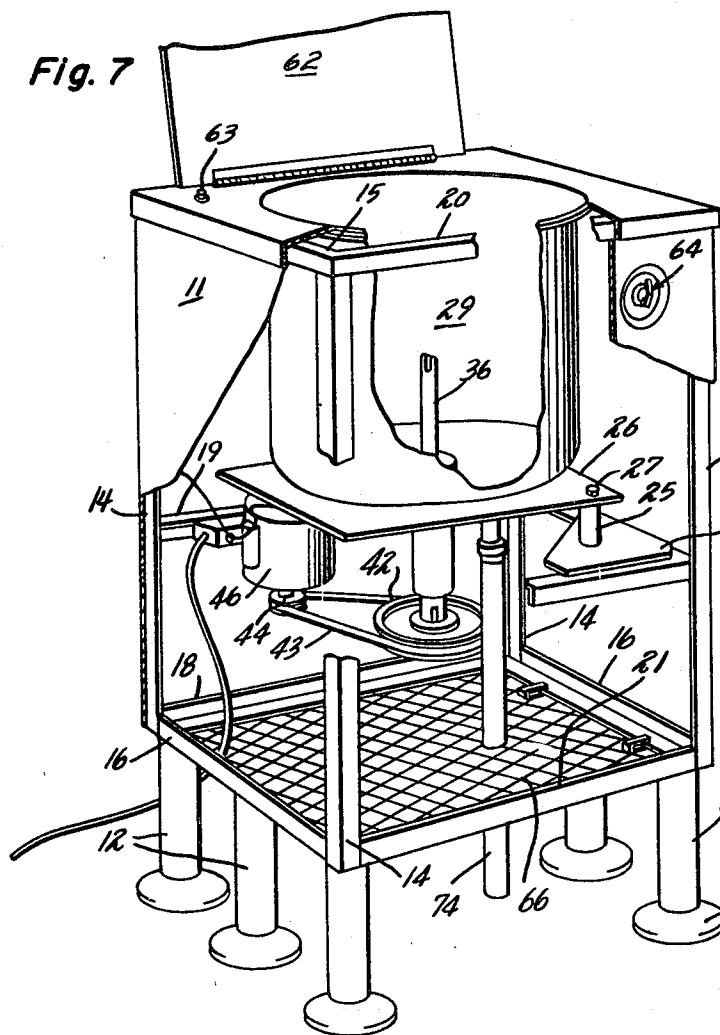


Fig. 9

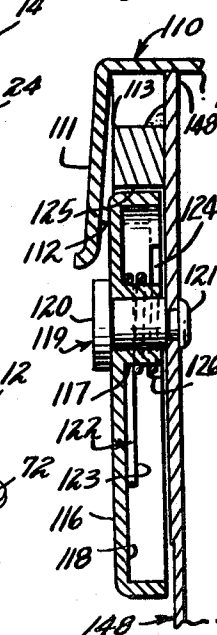
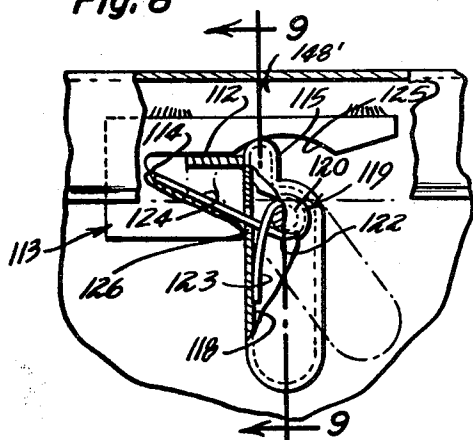


Fig. 8



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3,391,469

CENTRIFUGAL DRYER

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2 Claims. (Cl. 34—58)

ABSTRACT OF THE DISCLOSURE

The disclosure of this invention pertains to an apparatus in which centrifugal force is supplemented by both vertical and horizontal components of motion for dehydrating food or for drying utensils.

The present invention relates to food and utensil processing and dehydrating machine and utensil handling and sterilizing system.

With the increasingly widespread use of automatic dishwashing machines in public eating and catering establishments, the handling and drying of silverware and cooking utensils has created a problem of no small proportion, since virtually all States of the United States now have passed health legislation prohibiting the actual manual handling of these utensils after they have emerged from the aforementioned automatic dishwashing machines; and, until the person who is to actually eat or cook with these utensils touches them, they must have no contact with any person unless sterile rubber gloves or containers are employed to either wrap or transport them. Thus, the handling of large volumes of silverware and cooking utensils after their emergence from these washing machines poses the problem of drying all water and/or condensation from them without contact with human hands or towels held in human hands. It may also be pointed out that any and all types of utensils, in whatever profession used, if required, by law, to be sterile and remain so until employed by the ultimate user, pose a similar problem in drying all water or sterilizing fluid and/or condensation from them without contact with human hands or towels held in human hands.

Concurrent with the utensil handling and drying problem in public eating and catering establishments is the volume handling of certain raw, cooked or prepared foodstuffs and/or combinations thereof, which contain either natural fluids or fluid residue from previous processing which, if allowed to drain off, naturally, by force of gravity, compounds a problem of both handling and storage, as well as economical preparation, and is still not productive of a properly dehydrated condition in such instances as the removal of natural and added preservative liquids from fresh or frozen diced or French style potatoes, chopped greens, broken or shredded lettuce, soaked or cooked spaghetti, macaroni, etc., prior to the final cooking or preparation of these foodstuffs.

The fact that each of these processing or dehydrating problems often exist in close proximity to each other in cafes, restaurants and catering establishments, hospitals and food processing or manufacturing plants, led me to reason that a machine, unique to the solution of the aforementioned handling and processing problems, could be devised to provide for sterile handling and/or dehydration of utensils and foodstuffs since the common denominator is the removal of water and/or other fluids, by whatever means.

It was discovered that the removal of water and/or other fluids from food or utensils must occur at a specific time in the handling and/or processing cycle in order

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to assure conformity with the health codes of the various States.

In the utensil handling cycle, it was found that by inserting a drying machine operation between the automatic washing and hot rinse machine and the sorting and/or wrapping operations, a considerable speed-up of the utensil handling problem would occur if a container unique to the holding of these utensils were provided which could be loaded with the dirty utensils at the scraping and/or pre-soaking point in the cycle, allowed to proceed through the automatic washing and hot rinse machine operation and upon emergence from that operation, the utensil container would be placed in a drying or dehydrating machine for a period of time not to exceed about four minutes, which is the average elapsed time for handling, scraping and/or pre-soaking and washing of utensils up to this point in the handling cycle.

It was reasoned that such a machine would need to operate efficiently in the least observable elapsed time of handling, scraping and/or pre-soaking and washing which was approximately ten seconds, and that the container should facilitate washing and drying up to two hundred fifty (250) pieces of silverware per load, in such a manner that they need not be handled until sorted and wrapped.

Accordingly, in the recognition of the above items of discussion and the well established utensil handling cycle, I established certain criteria of process and design, a substantial departure from which cannot be tolerated. These criteria are:

(1) A container acceptable under the food and utensil handling codes of the several States of the United States.

(2) A dehydrating machine, in which the above-mentioned container might be placed, that would remove all moisture within a time period of from approximately ten seconds to four minutes.

(3) Both container and machine capable of handling weight and moisture equal to that found in a bundle of at least 250 pieces of silverware, similar utensils, foodstuffs or drugs.

(4) Entire contrivance to comply with the minimum standards set forth by the United States Pure Food and Drug Administration regarding the metallurgical requirements of a machine or container in contact with food, drug or their various handling or dispensing utensils.

This invention then provides complete adherence to the above design criteria and at the same time makes use of certain principles in a way unique to the successful operation of this machine.

The present invention contemplates making use of centrifugal force by rotating the basket which contains the utensils or foodstuffs to be processed so that the moisture carried by such utensils and foodstuffs is flown outwardly through the reticulated side wall of the basket.

The present invention further contemplates including in the supporting frame for the rotatable basket two resilient means which not only complement and supplement one another, but also complement and supplement the centrifugal force induced in the basket by spinning it at high rotation speeds for setting up in the machine both vertical and horizontal components of motion when the device is in operation.

It is an aim of the present invention to provide a device of this character in which no motion of translation is imparted to the machine while it is being subjected to the vertical and horizontal component movement so that the machine will not walk over the floor or other supporting medium.

Another object of the present invention is to provide a machine of this kind in which it is not necessary to

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place the utensils or foodstuffs in the spinner or basket so that the weight is evenly distributed in said basket, but in fact by placing the utensils or foodstuffs in the basket so that there is an imbalance set up in the basket will increase the efficiency of the device by promulgating and increasing the centrifugal force and the vertical and horizontal component of movement.

Another feature of the present invention is to provide a door-interlock safety switch which allows a timer to function only when the lid of the machine is in its fully closed position.

Still another feature of the present invention is the manner of quickly and easily connecting and disconnecting the spinner or basket with its drive shaft by merely inserting the basket in an outer receptacle or withdrawing the basket from the receptacle.

The present invention further contemplates a driving connection between the spinner or basket and the motor which will not be disturbed or disrupted either by the rotation of the basket or by the vertical and horizontal component of movement.

With the foregoing and other objects in view, the invention will be more fully described hereinafter, and will be more particularly pointed out in the claims appended hereto.

In the drawings, wherein like symbols refer to like or corresponding parts throughout the several views:

FIGURE 1 is a perspective view of the machine constructed in accordance with the present invention with the lid in open position;

FIGURE 2 is a sectional view taken on the line 2—2 of FIGURE 1;

FIGURE 3 is a sectional view taken on the line 3—3 of FIGURE 2;

FIGURE 4 is a sectional view taken on the line 4—4 of FIGURE 1;

FIGURE 5 is a diagrammatic view of a utensil handling and sterilizing system showing the various stations thereof in sequential flow direction and including the food and utensil processing and dehydrating machine of the present invention;

FIGURE 6 is a diagrammatic view of the electric wiring system;

FIGURE 7 is a fragmentary perspective view of the machine showing parts broken away and parts in section;

FIGURE 8 is a fragmentary elevational view of a modified form of locking means for the cover, and

FIGURE 9 is a sectional view taken on the line 9—9 of FIGURE 8.

Referring more particularly to the drawings, 10 generally indicates the food and utensil processing and dehydrating machine which includes a structural supporting framework 11 comprising six upstanding shock absorbing legs or standards 12 which in turn support two rectangular side frames generally indicated at 13. Each of the rectangular side frames 13 comprise two vertical upstanding posts 14 which may be of angle iron construction in cross section. The posts 14 are joined by upper brace members 15 and lower brace members 16 which also are illustrated as of angle iron construction in cross section.

The rear post 14 of each side frame 13 is connected by upper and lower rear brace members 17 and 18, and an intermediate rear brace member 19 also of angle iron construction in cross section. The front posts 14 of the side frames 13 are connected together in a similar manner by upper front brace member 20, lower front brace member 21 and intermediate front brace member 22.

The rectangular side frames 13 are also strengthened by intermediate side brace members 23 which are connected to the posts 14 of the respective side frames.

Load bearing members or brackets 24 are mounted in each of the four corners of the supporting framework 11 by being secured as by welding or the like to the ad-

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jacent intermediate brace members of the framework. A spool or spacer 25 of rubber or other resilient material rests upon each of the brackets 24 and supports a plate 26. The spools 25 are held in position by a bolt 27 which extends through an appropriate opening in the plate 26, through a through passageway in each spool 25 and through an appropriate opening in each bracket 24. Each bolt 27 has its lower end extending beyond the lower face of the bracket 24 and is screw-threaded to receive a nut 28.

A cylindrical receptacle 29 is supported by the plate 26 and rests upon a plurality of circumferentially spaced-apart shock absorbing blocks 30. The receptacle 29 has at its upper end an opening 31 which is defined by an outwardly extending flange 32 which may, if desired, be welded or secured in any appropriate manner to the underface of the horizontal flanges of the upper brace members 15 of the side frames 13. The bottom 33 has a centrally disposed thickened portion 34 which is provided with a through opening 35 through which extends a drive shaft 36.

The drive shaft 36 also extends downwardly through a suitable opening in the plate 26 and is supported by being mounted in two pairs of anti-friction bearings 37 and 38. The inner race of each bearing is carried by the shaft 36 and the outer race of each bearing is carried by a housing 39 through which the drive shaft extends and from which the lower end of the shaft projects. A cup 40 surrounds the upper portion of the housing 39 and is secured as by welding or the like to the lower face of the plate 26. A conventional water-tight seal 41 is attached to the cup 40 and entirely surrounds the drive shaft to effect a water-tight seal for the opening 35 in the bottom of the receptacle 29.

A single V-groove sheave or pulley 42 is carried by the lower end of the drive shaft and a V-belt 43 is entrained over the pulley 42 and a V-pulley 44 mounted on the drive shaft 45 of an electric motor 46 which in turn is carried by one of the brackets 24.

The upper portion of the drive shaft 36 extends upwardly into the receptacle 29 for substantially half the height of the receptacle and is provided with a slot or socket 47 which opens outwardly through the upper end face of the shaft 36.

A basket or spinner 48 is adapted to be positioned within the receptacle 29. This basket is cylindrical and has a reticulated or perforated side wall as indicated at 49 and a reticulated or perforated bottom as shown at 50. The basket has a hollow tube or center post 51 extending upwardly from the center of the bottom of the basket. The upper end of the tube is closed and its lower end opens downwardly through a suitable opening in the bottom of the basket. The tube 51 receives the upper end portion of the drive shaft 36 when the basket is positioned in the receptacle and a drive pin 52 which is carried by the tube 51 adjacent its upper end is received by the slot 47 in the shaft 36 to set up a drive connection between the shaft 36 and the basket 48. The drive pin is of the conventional expansion type and is held in suitably aligned holes in the sides of the tube. Conventional water-tight seals 53 and 54 are provided around the drive shaft 36 and the tube 51.

The tube 51 is secured to the bottom of the basket as by welding or the like and a plurality of separators 55 are secured as by welding to the center post 51 and the side of the basket. The number of separators may be of any desired number and are angularly equally spaced around the basket and add considerable strength to the perforated bottom of the basket. Each separator 55 comprises a V-shaped member secured at its closed end to the center post and having the outwardly diverging legs 56 and 57 extending outwardly to the side of the basket and being secured thereto.

A removable cover 58 is provided for the basket. The side wall of the basket has its upper end portion over-

turned upon itself to provide a thickened part as at 59 and the cover 58 has a depending flange 60 which is cut away at angularly spaced-apart points to form a plurality of spring tongues 61 to grip frictionally the thickened part 59 of the basket when the cover is in its basket closing position.

A lid 62 is hingedly mounted on the receptacle 29 which closes a safety switch 63 when the lid is closed to permit a timer 64 to function. FIGURE 6 of the drawing illustrates diagrammatically the electric circuit which is connected to a suitable source of electric current. A manually operated switch is shown at 65.

A motor and belt safety grating is shown at 66 to prevent fouling of the belt and motor.

Each shock absorbing leg 12 includes a standard having a downwardly opening socket 67 provided with a bottom wall 68. The socket 67 houses a resilient element 69 which substantially fills the socket. The intermediate portion of the lower surface of the element 69 is cut away to provide a recess 70 to receive the reduced in diameter part 71 of a suction cup 72 which is retained in place by a screw-threaded fastening element 73.

A drain pipe 74 is carried by the bottom 33 of the receptacle 29 and communicates with the lower portion of the receptacle.

A modified form of means for locking the cover to the basket is illustrated in FIGURES 8 and 9 of the drawings.

In order to secure cover 110 to the basket 148, the cover 110 is placed upon the rim 148' of the basket 148 with the peripheral flange 111 of said cover in a downward position overlapping the rim 148'.

The four diametrically opposed and evenly spaced, inwardly disposed, locking tabs 112 on the flange 111 should be placed adjacent to the recess or opening 114 in the locking cam member 113 and ready to be rotated in a clockwise direction looking at FIGURE 8 of the drawings.

When rotating the cover 110 clockwise, an adjacent locking tab 112 will engage the projecting finger 115 of the latch member 116 and force said member to rotate in a counterclockwise direction. Latch member 116 is provided with a bushing 117 in which pivot pin 119, the outside end of which is formed into a retaining head 120 and the opposite end of which is riveted over or "set," as indicated by numeral 121, is free to rotate.

Additionally, the member 116 is formed with a recessed portion 118, inwardly disposed toward the basket body, to receive the coil spring 122, one arm 123 of which is retained within the recess 118 and the other arm 124 being wedged against the inner and lower leg of locking cam 113.

The force exerted by the spring 122, thusly disposed, retains the latch member 116 and forces same in a counterclockwise direction about pivot pin 119.

The rotation of cover 110 as heretofore described upsets the latch 116 and allows the tab 112 to enter the recess 114, thusly becoming captured or locked when latch 116 returns to its normal position indicated in full lines in FIGURE 8.

The lock cam member 113 is provided with an arcuate cut-out or relief 125 in order to allow the projecting finger 115 to clear the body of the upper arm of cam member 113.

The latch 116 is also provided with a relief or notched portion 126 to allow the arm 124 of the spring 122 to pass between the latch 116 and the rim 148' of basket 148.

When cover 110 is thusly secured, the cover will be locked against rotatable opening by the latch member 116 and is retained from being removed in a vertical direction by the action of the tabs 112 against the underside of the upper arm of the locking cam 113.

In order to remove the cover 110, the latch member 116 must be moved in a counterclockwise direction of

rotation by the operator and the cover 110 rotated in a counterclockwise manner so that the tab 112 clears the cam 113 and the cover 110 can then be lifted off the basket 148.

The operation of the device is as follows:

Looking particularly at FIGURE 5 of the drawings, the soiled articles which may be eating utensils, such as silverware and the like or surgical instruments, will be picked up at station 75 which might be a dining area or an operating room of a hospital. The soiled articles will then be scraped at station 76 to remove most of the debris and will then be placed in the basket 48 which will be treated at the station 76 which is also the pre-soak station. The basket 48 will then be placed in station 77, the washing machine tray or container from which the basket will be moved to the automatic washing machine and/or hot rinse station 78. The basket 48 will then be placed in the receptacle 29 at station 79.

Assuming that the electric circuit is connected to a suitable source of electricity and that the manual switch 65 is closed, the closing of the lid 62 will close the door-lock switch 63 which will allow the power to be turned on the motor 46 when the timer 64 is activated. This causes the motor 46 to rotate shaft 36. As container gains speed, pure centrifugal force is, momentarily, present; however, due to expected imbalance and because of the nature and construction of spools 25 and shock absorbing legs 12, connected to suction cup feet 72, a distinct and predictable amount of vertical and lateral shaking takes place, in addition to the centrifuging, thus shaking or bouncing water, fluid or condensation from all utensils or foodstuffs held in the basket 48. This fluid falls into receptacle 29 and is conducted away by gravity flow through drain pipe 74.

The now dry and clean utensils will be passed to the sorting and/or wrapping station 80 and then to the storage station 81.

Although I have disclosed herein the best form of the invention known to me at this time, I reserve the right to all such modifications and changes as may come within the scope of the following claims.

What I claim is:

1. A food and utensil processing and dehydrating machine comprising a supporting frame, a stationary receptacle carried on said frame, a reticulated basket for receiving the food or the utensils to be processed and dehydrated adapted to be disposed within said receptacle, and means for rapidly rotating the basket within the receptacle so that the moisture on the food or utensils is forced through the reticulations of the basket into the receptacle by centrifugal force, the supporting frame including means for imparting to the basket in addition to the centrifugal action a movement having a vertical and horizontal component induced by the means for causing the centrifugal action so that the fluid on the contents of the basket is shaken and bounced from the contents of the basket, said means for imparting said vertical and horizontal component of movement comprising a plurality of shock absorbing legs each of which includes a standard having a downwardly opening socket therein, a resilient element within said socket, a suction cup carried by said resilient element and a portion thereof extending into said socket having a diameter less than that of the socket so that the standard can telescope upon the resilient element and the cup to permit the said vertical and horizontal component of movement.

2. A food and utensil processing and dehydrating machine comprising a supporting frame, a stationary receptacle carried on said frame, a reticulated basket for receiving the food or the utensils to be processed and dehydrated adapted to be disposed within said receptacle, and means for rapidly rotating the basket within the receptacle so that the moisture on the food or utensils is forced through the reticulations of the basket into the receptacle by centrifugal force, said basket comprising a

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reticulated side wall, a reticulated bottom, a hollow center post secured to said bottom, extending through said bottom and opening outwardly thereof, said means for rotating the basket including a shaft adapted to be received by the center post through the opening there-through, and means carried by said post adapted to connect the shaft to the post, a cover for the basket, said side wall of the basket having its upper end portion overturned upon itself to form a thickened part, said cover having a depending flange provided with a plurality of spaced-apart spring tongues frictionally engaging said thickened part of the side wall of the basket when the cover is in place to retain the cover frictionally in place on the basket.

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