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(54) **COMBINATION LAUNDRY WASHER DRYER**

Publication Classification

(76) Inventors: **Andrew Kegler**, Ripon, WI (US);
Carl Crawford, Milwaukee, WI (US)

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(57) **ABSTRACT**

Correspondence Address:
Andrew Kegler
926 Watson Street
Ripon, WI 54971 (US)

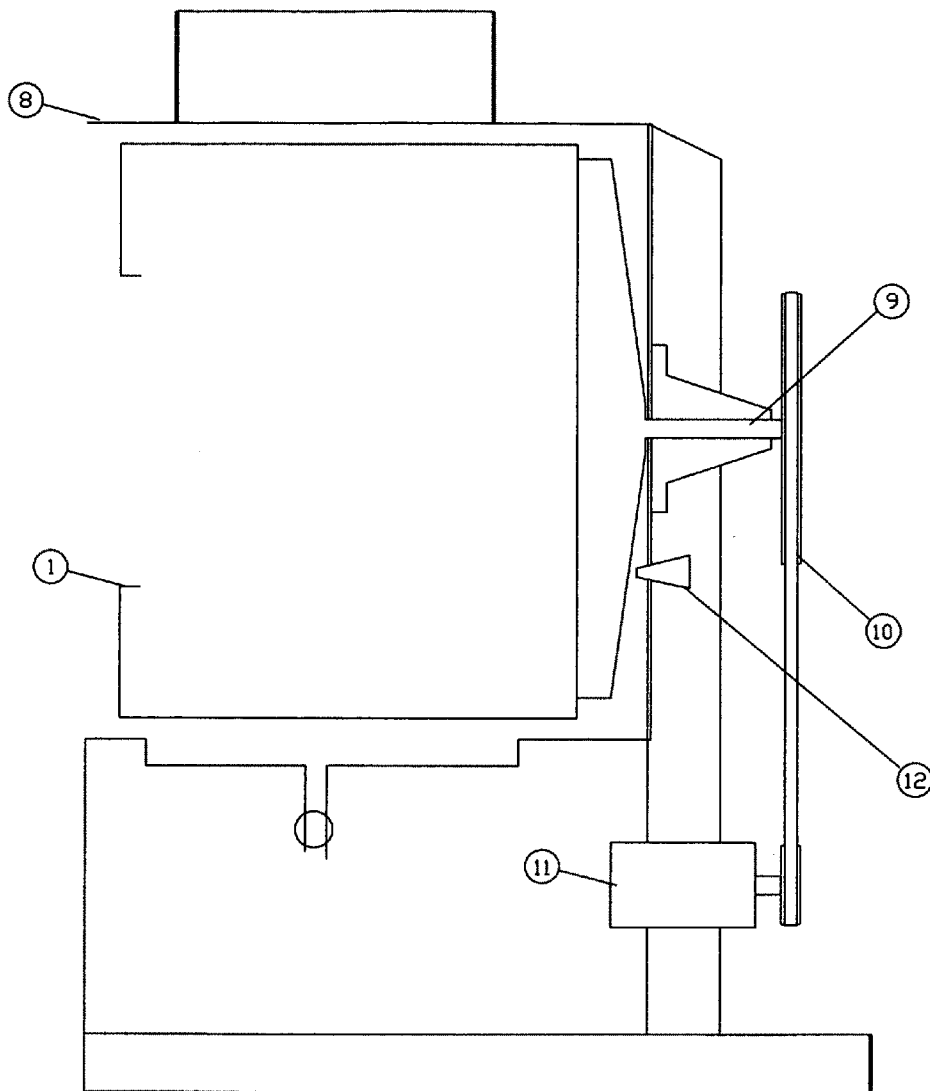
Method and apparatus for a novel apparatus to perform the task of washing and drying laundry in one machine is described within. There have been many attempts to create a practical combination laundry machine because the space and potential time savings to have all of the processes happen within one machine is beneficial. The problem created with most previous attempts is a machine that is sized for a wash load which will not properly dry the clothes in less time than a traditional two machine system. The underlying issue is the fact that a properly sized machine for washing is considerably smaller in internal volume than a dryer with the same load capacity. This invention uses a basket which has the capability to change the basket volume to maintain the proper ratio for both washing and drying cycles.

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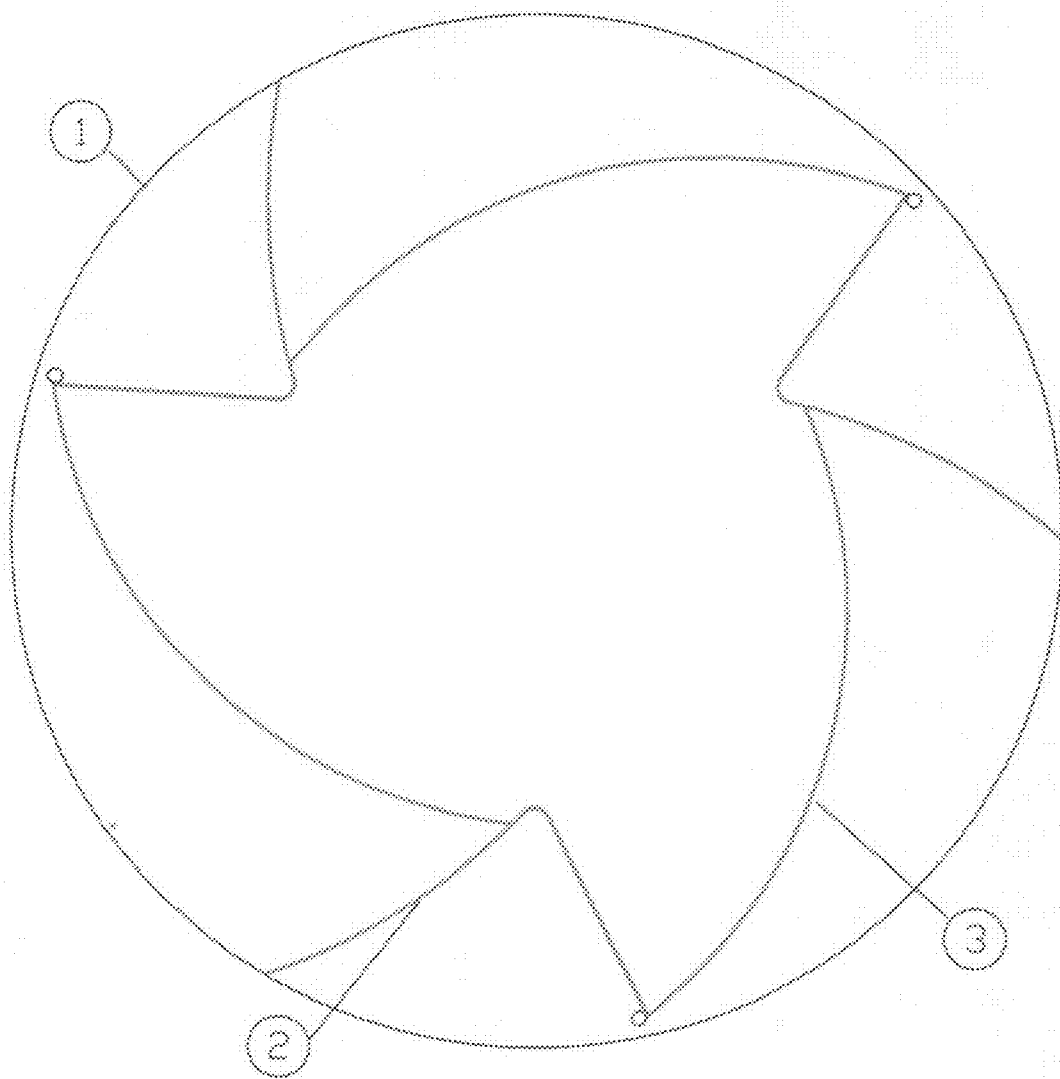


FIGURE 1

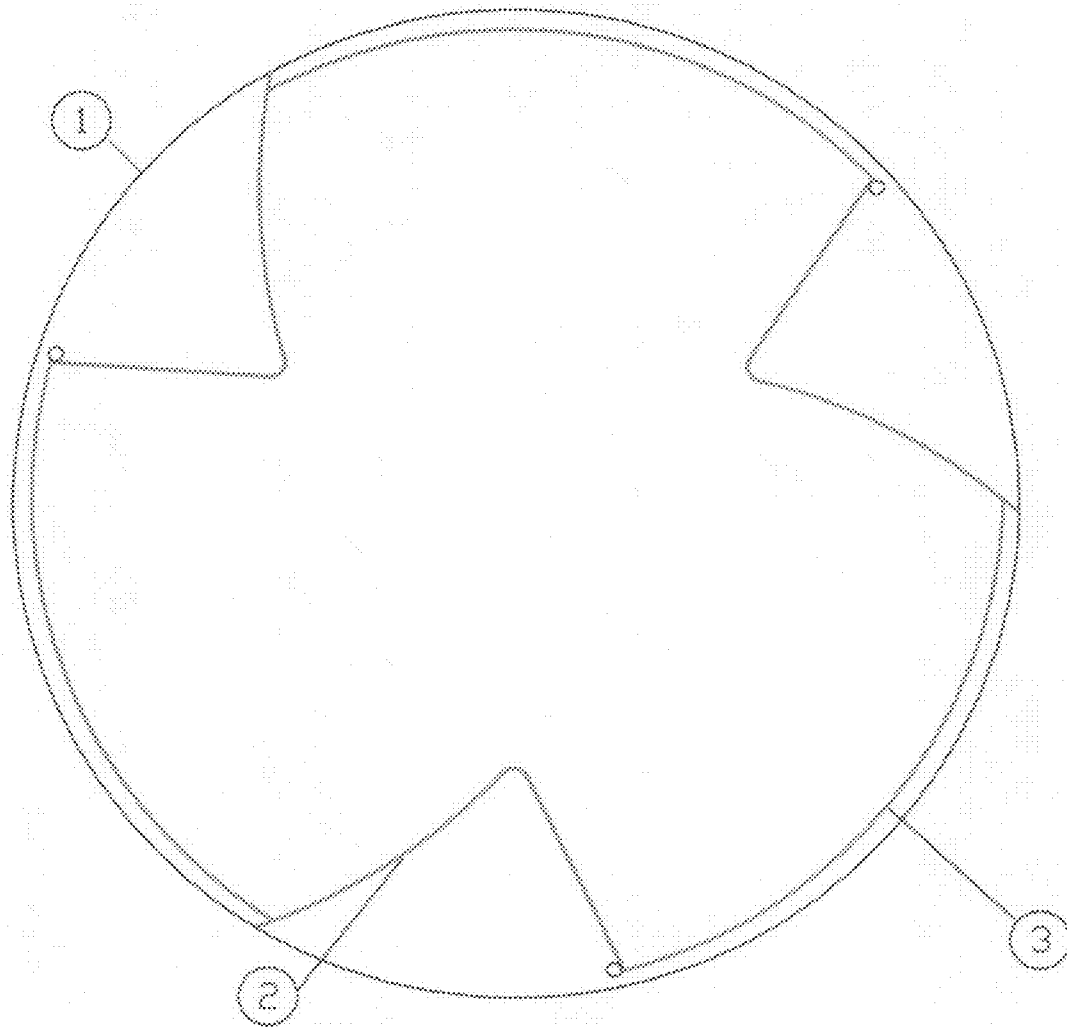


FIGURE 2

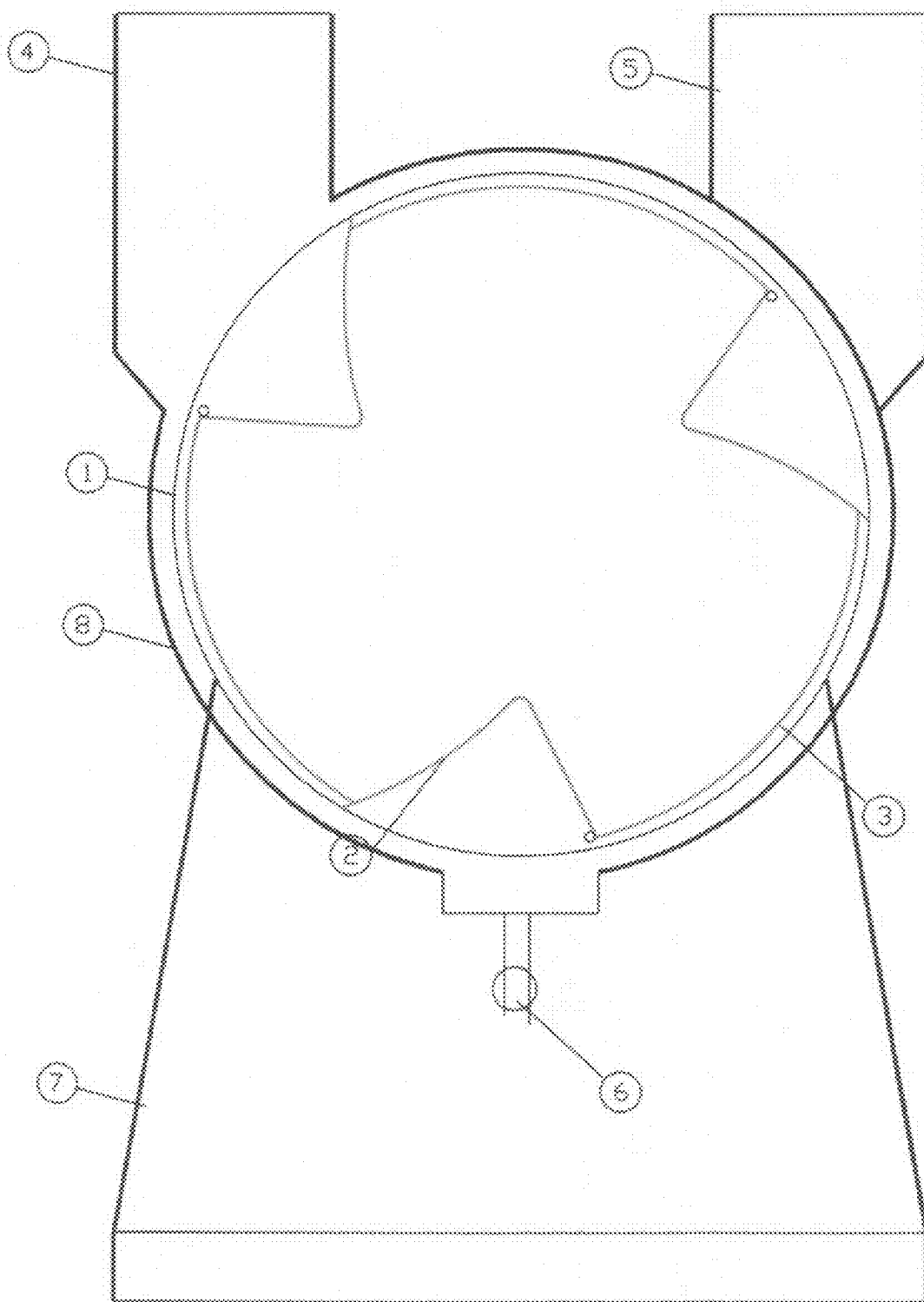


FIGURE 3

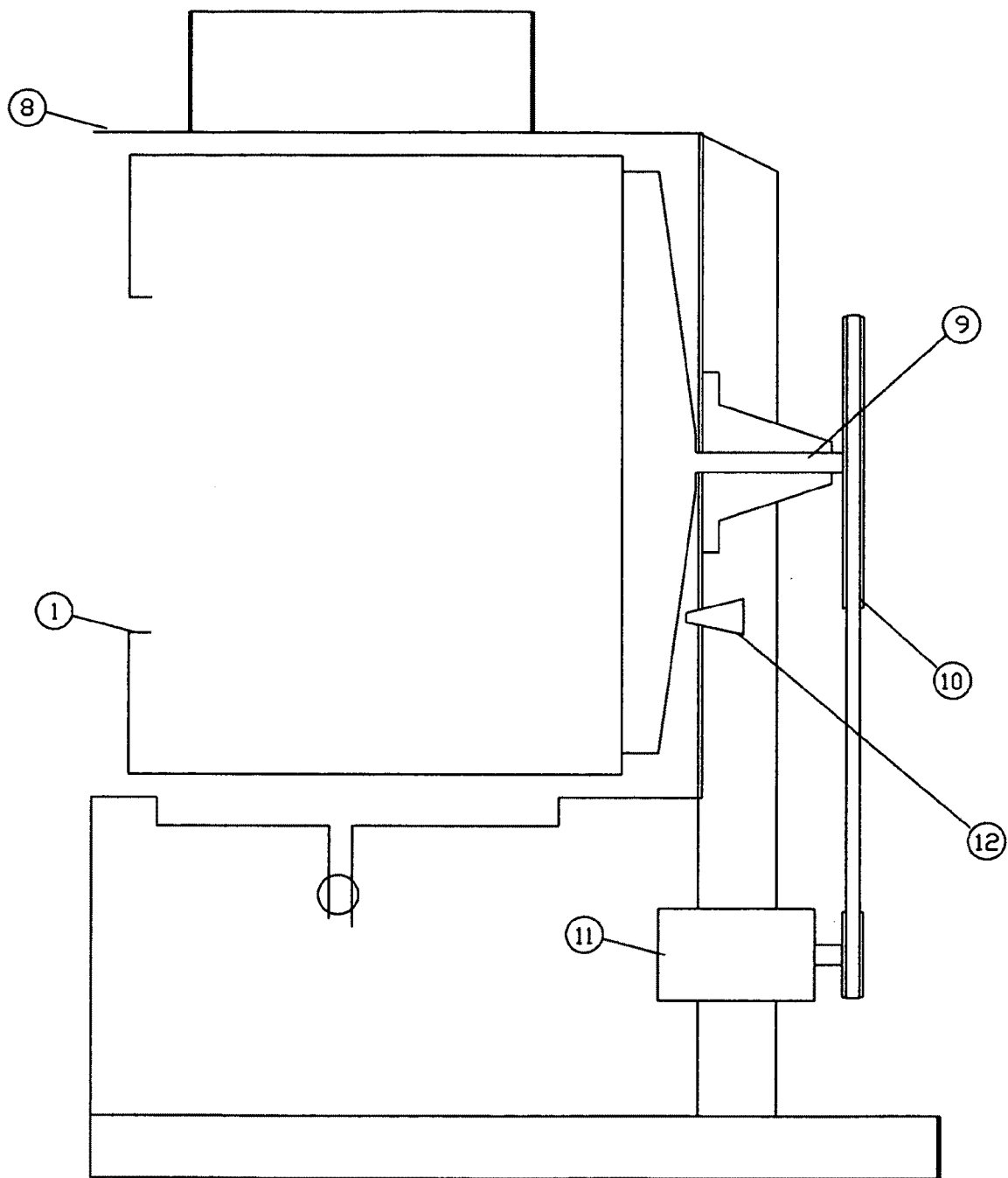


FIGURE 4

COMBINATION LAUNDRY WASHER DRYER

TECHNICAL FIELD

[0001] This invention relates generally to combination clothes washer/dryers, and more particularly to a system in a clothes washer/dryer for altering the internal volume to provide the correct ratio of washer volume to dryer volume for the same load of clothes.

BACKGROUND OF THE INVENTION

[0002] A clothes washer/dryer typically has a rotating basket into which clothes are loaded, and water and detergent is passed through the basket to wash the clothes, excess water is removed from the clothes, water is again typically used to rinse any excess detergent from the clothes, excess water is removed again, hot air is passed through the clothes to dry the clothes. In separate washer and dryer systems, clothes must be removed from the washer and placed in the dryer, not only does this increase the labor associated with cleaning clothes, it also requires two pieces of machinery to complete the task. In previous attempts by others to combine the washer and dryer into one machine, they have failed to compensate for the ratio of basket volume in a washer to the basket volume of a dryer sized to a pre-determine clothes load size. This failure results in either an oversized washer basket which is prone overfilling by the operator, or an undersized dryer basket which increases the drying time due to poor air circulation within the basket. To prevent such an event, a combination clothes washer/dryer with a movable internal volume is described within. The movable basket allows the operator to properly load the machine with clothes to be cleaned, the machine then increases the internal volume of the basket at some point into the cycle to dry the clothes in an appropriate basket volume for better drying efficiency.

[0003] The basket volume is set to provide the proper volume for a wash load of a given size for that machine, such as a 30 pound load. The basket has a plurality of moveable outer plates which reduce the internal volume while the clothes are being loaded. The operator loads the machine with 30 pounds of dirty laundry in the same manner as a typical washing machine. At some point after the start of the cleaning portion of the cycle, the outer basket plates move outward creating a larger volume within the cleaning chamber. This action provides the proper basket volume for proper tumbling and air flow for a 30 pound clothes load.

[0004] The cycle time to complete the tasks of washing and drying the clothes are reduced from a two machine system because the operator is not required to remove the clothes from the washing machine and place them in the dryer. This creates another advantage over a typical two machine system in that there is no possibility for the wet laundry to remain in the machine, which can lead to mold growth and other water born organism issues.

[0005] The machine requires less space for operators since the basket volume, drive motor, and controls are all located within one cabinet. The redundant use of these common parts may also prove to reduce the overall cost of the combination unit as compared to a typical two unit system.

BRIEF DESCRIPTION OF THE DRAWINGS

[0006] FIG. 1 shows the front view of the clothes basket (1) when it is in the initial setting for loading the dirty clothes. The clothes basket is made up of a plurality of moveable outer

plates(3). The plates (3) rotate about an axis at the base of the adjacent rib(2). The ribs(2) within the basket(1) act as both a lifting mechanism for the laundry and the edge for the moving portion of the basket plates(3). The drawing is shown with three basket ribs and moving plates but more or less could be considered.

[0007] The shape of the rib (3) follows the arc created by the outer edge of the movable basket plate (2). This provides a consistent gap to allow free movement of the plate without creating a large gap for small laundry items, buttons, snaps, hooks, or other objects which may be in the clothes load to get caught or snagged which would result in damage.

[0008] FIG. 2 shows the clothes basket(1) when the moveable outer plates(3) are placed in the dryer cycle setting, or fully extended outward. In this position the basket volume has increased which allows the clothing to properly tumble while hot, dry air passes through the basket. The hot, dry air flow through the basket removes the moisture from the clothing which can then be vented to atmosphere or condensed to provide a ventless drying operation.

[0009] FIG. 3 shows the front view of the machine with the basket (1) placed within an outer tub (8). The outer tub creates a space to contain water during the wash mode and hot air circulation around the clothes in dry mode. Water would be held to a level in the basket (1) until the end of a wash cycle. The dirty water is drained through a valve (6) located at the lowest point in the outer tub (8). After the wash mode is complete and the water has drained, the machine will begin the dry mode.

[0010] FIG. 4 shows the side section view of the machine. The basket is held in place via a bearing (9) mounted on the frame of the machine. The shaft of the basket (1) is connected to a pulley (10) and a motor (11) which rotates the basket for wash cycle to impart agitation for loosening particulate from the garment, high speed spin to extract excess moisture prior to drying mode, and rotation to tumble the clothes during the drying cycle which allows maximum contact of hot, dry air to the clothes for final moisture removal. The basket internal volume change is activated when the device (12) is controlled to cause such volume change. This device may be magnetic, a direct linkage, a spring retain wheel, a valve for pressurized fluid, or other such methods to impart a change to the basket plate position.

The invention claimed is:

1. A combination clothes washer and dryer with basket which can reduce or enlarge the internal volume of the basket to provide a basket volume specific to the washer or dryer function of the combination washer/dryer machine.
2. A clothes washer/dryer as in claim 1, wherein the functions of both a clothes washer and clothes dryer are all contained within one machine.
3. A clothes washer/dryer as in claim 1, where movable side walls are arranged to reduce or enlarge the internal volume of said basket during washing and drying cycles of said washer/dryer.
4. A clothes washer/dryer comprising: a chamber; an axial rotating basket disposed inside said chamber; a set of moveable side walls disposed in said basket of the clothes washer/dryer; at least one mechanism to move said side walls; and a control circuit for the operation of the moveable side walls.
5. A clothes washer/dryer basket as in claim 4, where the internal volume changes by 15 to 60 percent by moving said side walls.

6. A clothes washer/dryer basket as in claim 4, where the side walls include a front loading door, a rear basket head, two or more cylindrical sections, and two or more lifting baffles.

7. A clothes washer/dryer basket as in claim 4, wherein the rear wall of the basket can move axially within said basket to reduce or enlarge the internal volume of said basket.

8. A clothes washer/dryer basket as in claim 4, wherein the side walls can move radially within said basket to reduce or enlarge the internal volume of said basket.

9. A clothes washer/dryer basket as in claim 4, wherein the side walls are moved by a motor and mechanical linkage to a pre-determined range of motion. The motor may be fixed to the chamber about said basket with a linkage in contact with said rotating basket

10. A clothes washer/dryer basket as in claim 4, wherein the side walls are moved by pressurized bladder or bladders, or sealed pressure cylinder or cylinders fixed to said basket.

11. A mechanical linkage system as in claim 9, wherein multiple linkages are used to move side walls to compensate

for out of balance load conditions during a water extraction step used to remove excess water before rinsing or drying clothes.

13. A pressurized bladder as in claim 10, wherein the method of inflating said bladder is water.

14. A pressurized bladder as in claim 10, wherein the method of inflating said bladder is air.

15. A pressurized bladder as in claim 10, wherein multiple bladders are used to compensate for out of balance load conditions during a water extraction step used to remove excess water before rinsing or drying clothes.

16. A pressurized bladder as in claim 10, wherein multiple bladders are used to compensate for out of balance load conditions during a water extraction step used to remove excess water before rinsing or drying clothes by using air to inflate one or more bladders and using water in inflate other bladders.

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