GRWR - An Appliance for Growing

Precedent in common household appliances

Introdcution:

GRWR: An Appliance for Growing
In some ways the history of the appliance is the history of the home. Although it contributes to the image that a word like “Home” suggests, this is meant more in the literal sense. The drive to create appliances and harness nature stems from the need to move an uncontrollable, or dangerous natural element into the place where we live. Cooking was once done over open flame in open air, food was harvested fresh, and the river did our washing. The domestication of humans meant that these natural processes also had to be domesticated. When we moved from living in caves to living in shelters built with our own hands we also had to, or decided to, bring the river, the fire, and fresh food with us.

Granted; the transition was not as quick or as immediate as the opening paragraph suggests. Shelter preceded the stove, but, like many other advancements in our history appliances were created to facilitate controlling the natural world and easing our journey as we moved through it. Many of our modern conveniences are exactly that, conveniences. The microwave sped up cooking times, the bread maker took all work out of a loaf of bread, the toaster, well…gave us toast. There are a few appliances however that changed our world so very much but yet we now take for granted. The fire pit transformed into the stove, the cold cellar to the refrigerator, the river became the dishwasher and clothing washer, the wind and sun? the dryer. These appliances influenced and inspired my competition entry and are rooted in the most natural of processes. Like the stove and refrigerator the GRWR tries to bring the natural in to the home. The principle idea is growing indoors. Like modern vegetable hydroponics the GRWR concentrates on edible plant growth for the home. Unlike hydroponics the GRWR seeks to maintain most of the natural aspects of plant growth. Like the modern appliance the form of the GRWR is just as important as its function. The form both supports the act of growing and the efficient and easy use of the end product.

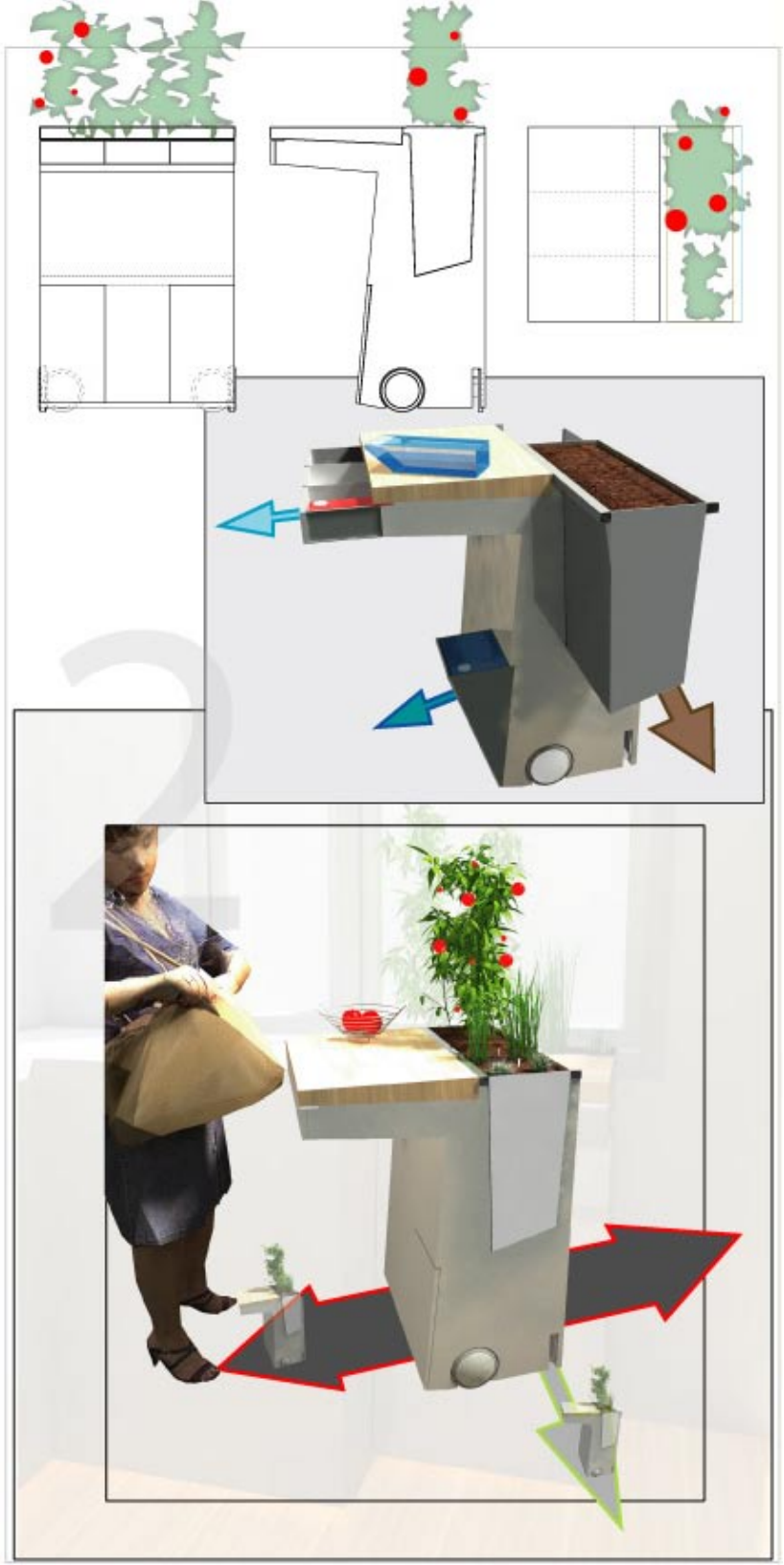
Hydroponics relies on the most part on electric light and applications of concentrated nutrients. In most cases these nutrients are created organically but in other cases an unnatural additive is used. The GRWR is meant to be used in areas of the home such as the kitchen, living room or solarium where there is natural light. Like a potted house plant flourishing on the window sill the GRWR is made to be placed at a window and provide a work surface or shelf space. A typical scenario would include a number of GRWRs arranged along a sunny side of the kitchen, allowing for plant growth and providing drawer storage and a work surface. The harvested fruits and vegetables cut and prepared on the counter top. Similar to hydroponics a continuous water source is provided to the growing plant through the use of a supply vessel and hose system. The water is passed through a timer to the growing medium to the plant roots and then collects in reservoir located at the bottom of the GRWR, this collected water can be re-used or disposed of. A connection to the houses water system is also possible. Misting and general maintenance can be done as needed by hand just as you would with a house plant. The GRWR also has a two way wheel system to allow for easy movement and placement. These wheels also allow the GRWR to be quickly moved for maintenance or to change the growing medium or plant. The GRWR can be moved during the day to take full advantage of the natural sunlight.Unlike hydroponics the growing container is deep enough to support many different plants and root systems. A porous or fibrous light growing medium can be used or a more natural soil mixture. The growing container can be divided into different sections is order to allow for different soil types and consistencies in order to support different plant types. The counter and drawers can be customized to have many different finishes and material types, wood, metal, stone, or made to match an existing condition. The drawers not only support the water supply vessel but also provide a place to store utensils, kitchen needs, gardening supplies etc. Below the drawer is the water reservoir hatch and 2 other swing out hatches good for more storage. It is intended that the GRWR makes up most of the usable counter space in a kitchen, replacing the traditional millwork with a combination of plant growth and needed storage.

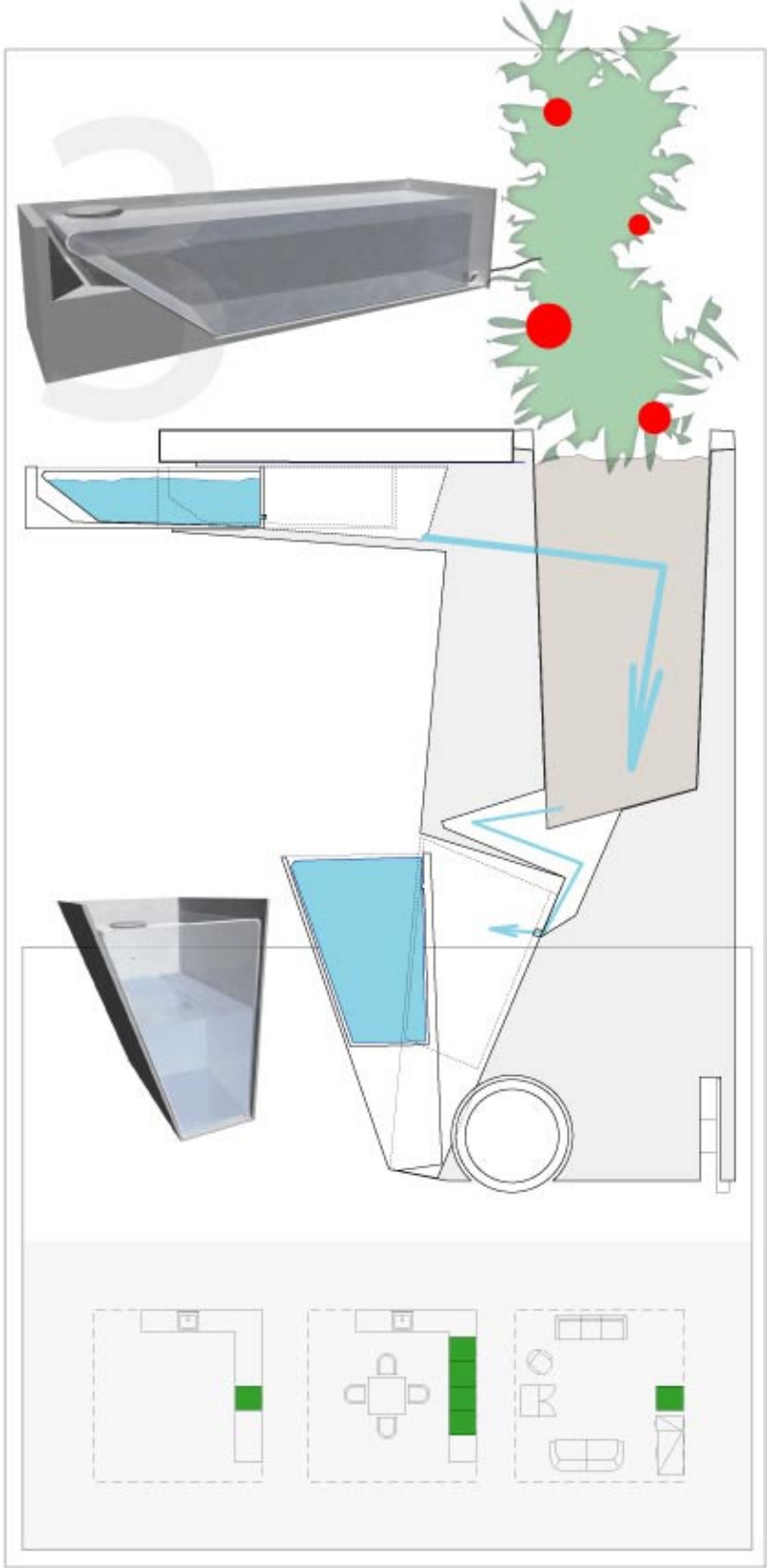
The water supply vessel and the water reservoir are both removable for ease of use and cleaning. The water supply vessel has an insert for composted waste material (stored in a mesh bag) for nutrient infusion. Take your compost and added it to the water supply for the new plants, everything is used and recycled. Numerous water vessels can be used. A vessel container a water, fertilizer mixture,

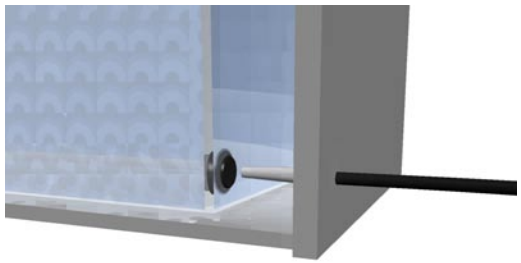
can be inserted 1 day a month or organic fertilizer can be mixed with the normal water supply, adding a drop or two every few days.

The idea behind the GRWR was to create a new appliance that suited the needs of our ever increasingly busy and processed world. People seem to becoming more conscious of what they eat and what they put in their bodies, they seem to be exercising more and eating better. There has been a lot of discussion of organics, a process in place for as long as humans have grown their own food, which has more recently been displaced by convenience but is slowly finding favour again amongst the general population. Movies like Super Size Me and studies into what we eat and how it affects our health have made quality more important than speed in our modern world. More so now than ever before eating healthy is a common pursuit. Supermarkets and food producers are seeing the added value of carrying organics. The typical higher price of organics is being brought lower by market saturation and more efficient growing techniques. Growing and eating healthy food is making its way into our lives and changing the way we live. The GRWR is created to fit into our homes and bring with it vegetable and fruit production. Hydroponics are very useful and are helping many people grow their own food. There is some backlash however as some people see it as an unnatural process. Hothouse tomatoes grown in the middle of winter would seem a treat, and better than tomatoes grown miles away and shipped in trucks, but there is always some group questioning the process used to grow the tomatoes, the energy needed and the quality control in place to protect against disease (Hot house tomatoes are typically grown in large green houses more similar to factories than farms) Still others question how “natural” hydroponics can be if humans coax plants to grow using modified water, electric light and synthesized nutrients, even if most of these processes adhere to organic guidelines. The GRWR allows the end user to grow using more traditional methods or methods common to hydroponics. It allows them to do it indoors and at their convenience. Like its predecessors appliances it serves more than one purpose and incorporates function and form. Like the stove and refrigerator, the dishwasher and dryer it seeks to support a natural process in a manmade environment. Its design is rooted in many of the same ideas used to create other appliances and follows a similar intent. The basic idea of the home appliance may, or may not have, influenced the design of the GRWR but the concept of bringing the natural world into the home is intrinsic to all appliances. To understand this idea better it is important to understand where and why these appliances exist. To better understand the GRWR we must look at the history of other house hold appliances. Some are more important than others in our collective history. The stove, harnessing fire, is probably more important than the dishwasher. It is important to look at all of the most common appliances. The history of some appliances is briefer than others but the roots of the function reach back just as far as the historically oldest in the list. The concept of each appliance is rooted, like the GRWR, in the base natural process it emulates.


grwr







The Stove

The modern stove began as the simple fire. Used to cook food it is estimated that early natural fire was used by homo-sapiens in Africa up to 1.4 – 1.5 million years ago. Recent discoveries in Northern Israel show that controlled fires were commonplace up to 790,000 years ago. Migrating tribes from Africa knew how to harness fire and used it. Native Americans and indigenous peoples used earth ovens, a pit lined with rocks, heated by a fire and then covered with mats of reeds and wood on which roots, meats and tubers were placed and then covered with another mat and finally dirt. Even in the earliest tent structures and Bedouin house a fire pit was used instead of a structured, fixed "appliance"

"The tipi was designed to enable an indoor fire for heat and for cooking. The fire is set in the center of the bare floor. There are two smoke flaps at the top of the tipi which can be adjusted with long poles. These smoke flaps are set at right angles to the wind, so that the smoke is drawn up and out"(http://en.wikipedia.org/wiki/Teepee)

At some point in the history of the world fire needed to move indoors. With the transition from hunter gatherer to farmer the human settlement became more permanent and convenience dictated a more permanent way to cook food. At first the hearth served as the place to cook ones food, food was set in the fire, hung in a pot or stuck on a spit. Dutch ovens used pots sitting in, and covered with, hot embers. Brick fire pits, shelves and stone tops with, or without, inserts of metal, cisterns etc are some of the common ways in which early humans manipulated fire to cook in a shelter. In Pompeii cooking hearths sat in the same room with the water supply and waste shoots, the predecessor to our modern kitchen. Medieval homes used a more traditional chimnyed fireplace with iron work to hold food in place. This is also the time that waist high hearths supported on brick work were constructed so that cooks didn't have to lean over the fire pit. Below these waist high cook tops wood was stored and pots and grills were hung above the fire, or placed on trivets for cooking (Note: similar cooking tops can be found in the Pompeii kitchen)

Fire was a dangerous commodity when used indoors and this prompted inventors to find ways to enclose it. Theses enclosures not only made it safer but increased the efficiency of the fire. Fire enclosed by brick and mortar walls would have iron plates (perforated or not) placed on the top and holes for iron pots were also made, hanging the pot in the fire for cooking. Chinese stoves and Japanese stoves predate these medieval stoves and combine an area for the fire and pots for cooking. The Japanese Kamado (3rd -6th century) comes from the name of the cauldrons used to cook the food, the Kama. They are similar in build and design to the medieval raised hearths, and enclosed cooking stoves.

The idea of enclosure found most of it's innovation in transforming the inefficient, dangerous fireplace. By enclosing the fire place the heat transfer to the home was increased and the more dangerous elements of fire were contained. It wasn't long before cooking surface and enclosed (iron) fireboxes became combined, from there the enclosed cooking stove developed. In the late 18th century Benjamin Thompson's "Rumford" stove is thought to be the first enclosed cooking stove. It had openings in the metal plate to allow pots to be placed in the fire for cooking and could vary the heat to each opening. This Rumford stove was large and meant for use in large estate houses. It took another 30 years for the concept of the enclosed cook stove to be sized for use in the traditional house. These new advances in enclosed stoves continued for some time. The Oberlin stove by Stewart became one of the first mass produced and popular enclosed stoves selling some 90,000 units. Changes to the stove were made incorporating water heating, ovens and round plates covering the holes in the over plate that could be used as a cooking top surface or removed to allow a pot to set in.

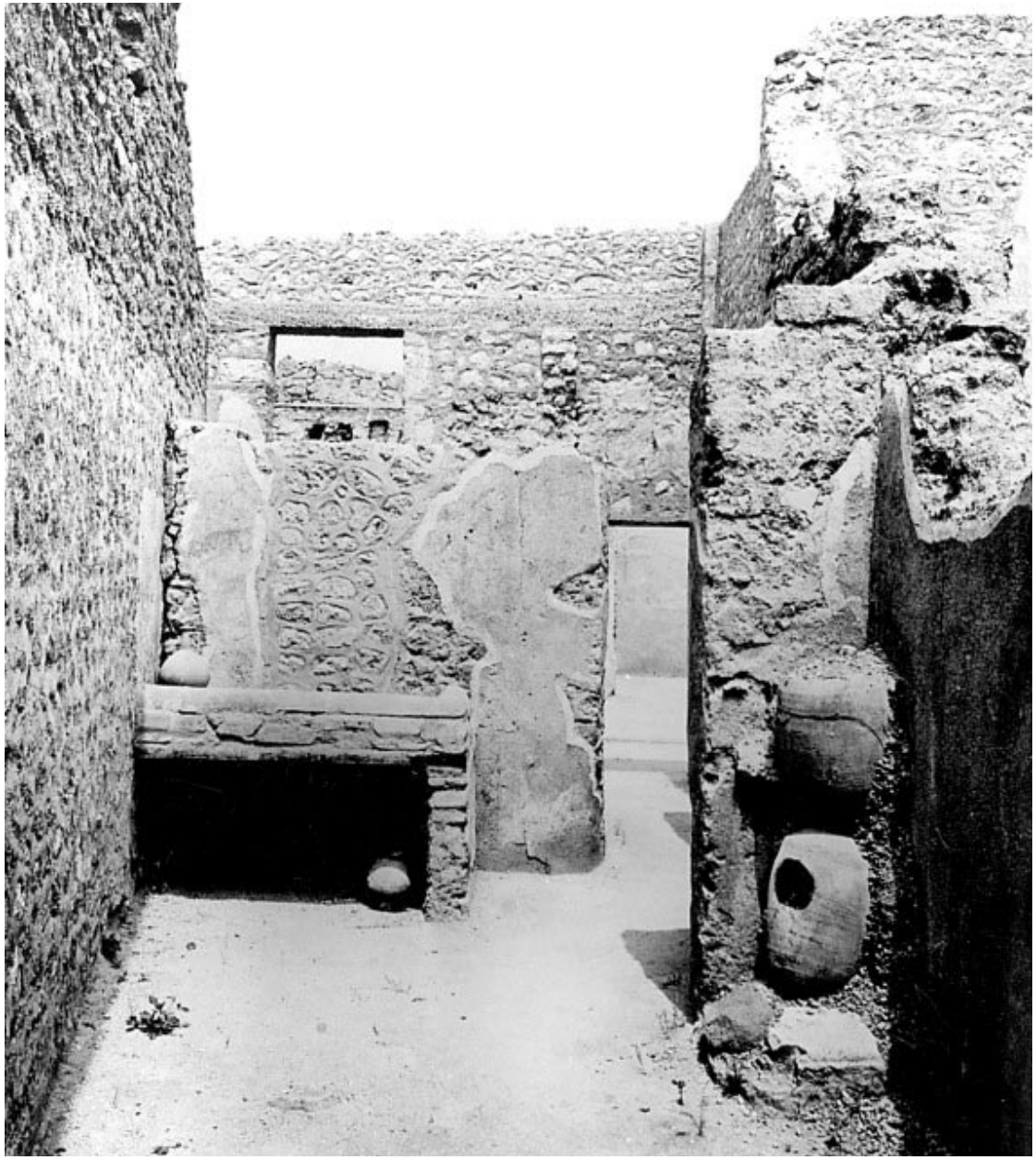
These first enclosed stoves were fueled by wood, coal and charcoal but the first Gas stove was actually created in the early 19th century (1820) at first the gas stove was an experiment but as the gas piping system developed the first commercially available gas stove was created. The gas stove became popular in the 1880's with the reduction of the size of the stove and incorporation of the oven. In the early 20th century manufactures started coating their stoves in enamel for ease of cleaning.

Electrical stoves soon followed and with the first introduction at the 1893 Chicago worlds fair. The development of the electric stove had to wait on the needed infrastructure to become popular with consumers. In the late

19th century electricity was still not commonplace in all cities and towns. The technology itself was still in development. By the 1930s the electric stove had become widespread and found its way into many domestic kitchens.

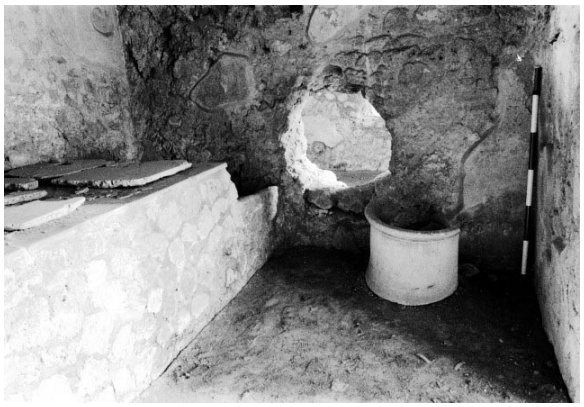
The electric stove continues to develop today. From the resistor based first electric stove to the glass ceramic models of the 1970s and presently with the electromagnetic induction models of today. Although the technology has continued to develop the quintessential image of the stove harkens back to the enameled gas models of the late 19th century. The clean white surfaces have not only continued to be followed in stove design but have also found their way into the other kitchen appliances.

From the first Hearth to the modern Induction stove need and convenience have driven the development of the indoor enclosed cooking stove. Permanent shelter and static communities meant that permanent cooking appliances could be developed. The stove is the harnessing of fire by humankind, using technology to control it.



Right: A typical kitchen in Pompeii. The raised stone is the cooking hearth. The space beneath would have been used for wood storage.

Below: Cooking over an open fire, bottom: another Pompeii Kitchen.

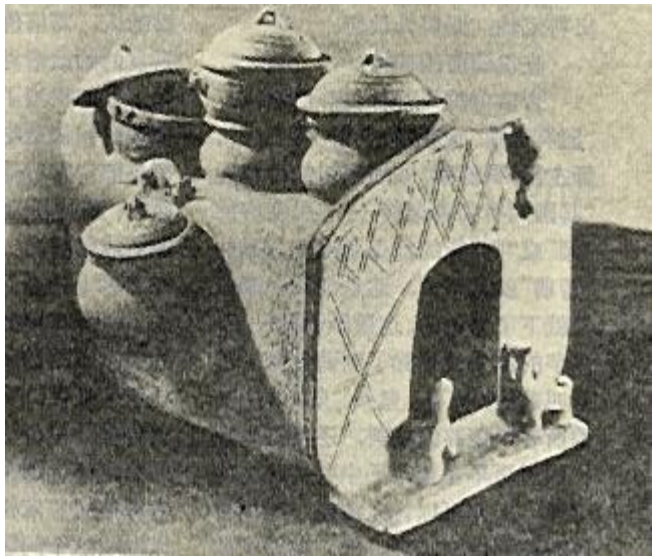


Top Left: Medieval Kitchen

Top Rigth: Dutch Ovens

Bottom Left: Chinese Stove with integrated fire box and cooking pots

Bottom Right: Raised Cooking with fire box.

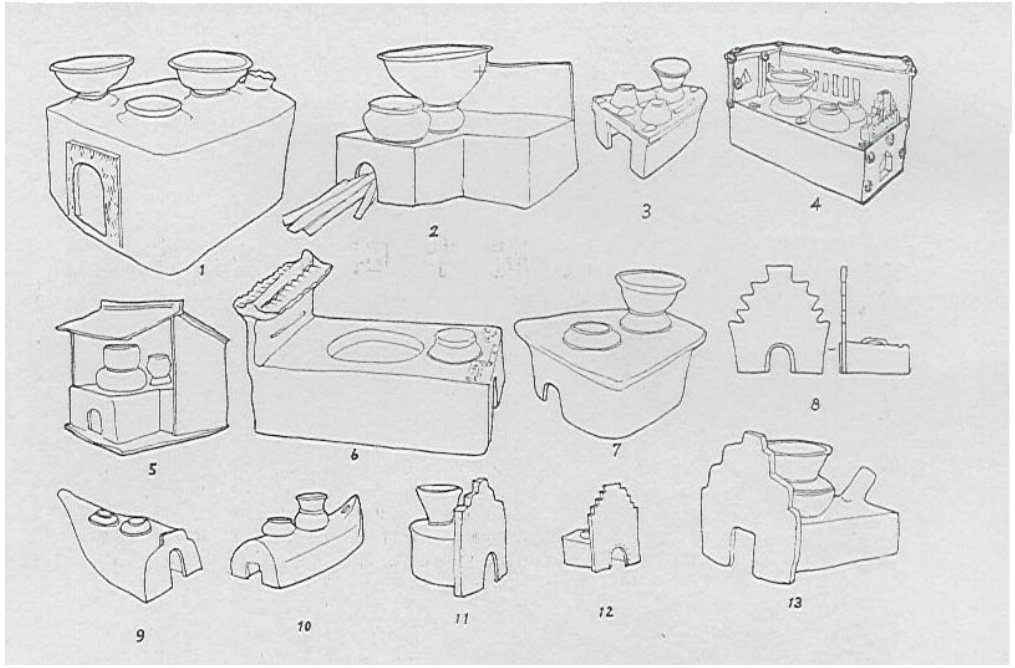


Top Left: Japanese Kamado

Top Right: Integrated cooking heating stove

Bottom Left: Variations on Chinese cooking stoves

Bottom Right: another integrated cooking and heating stove

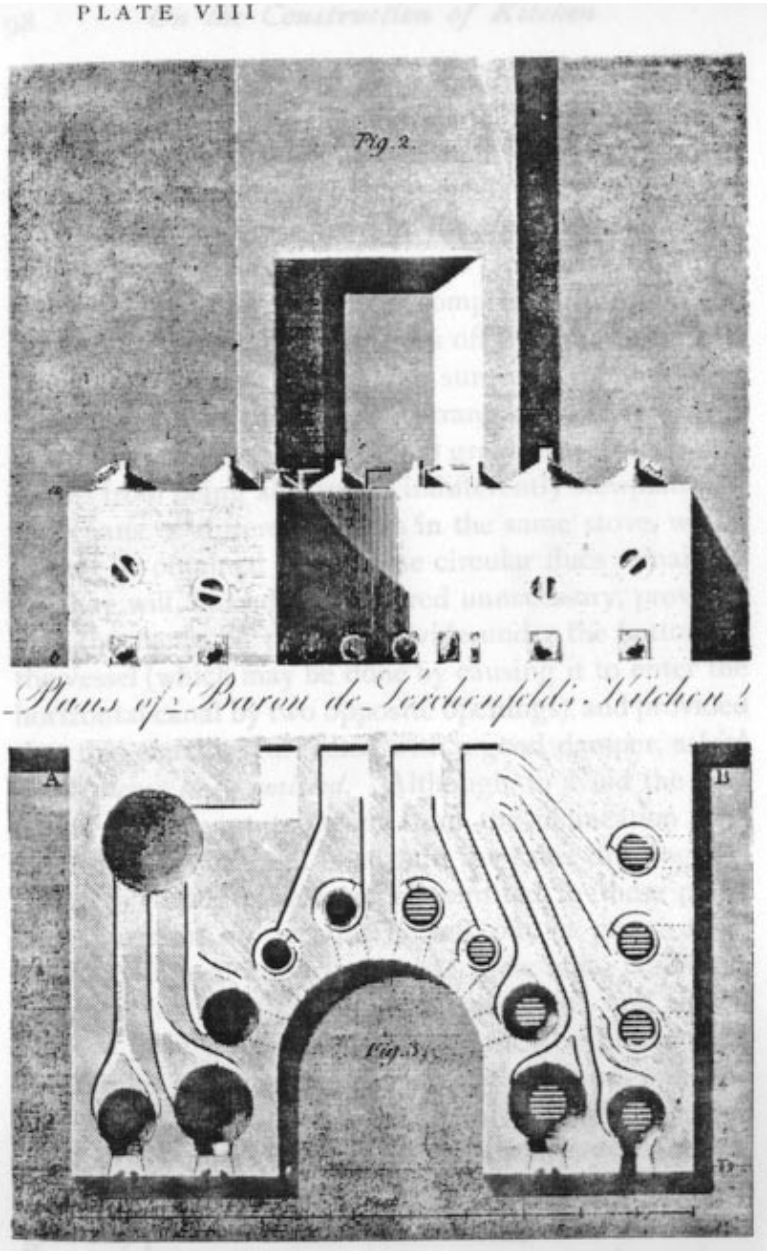


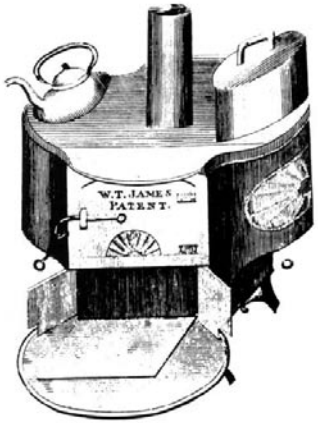
Top Left: Gas Stove

Top Rigth: Rumford masonary Stove

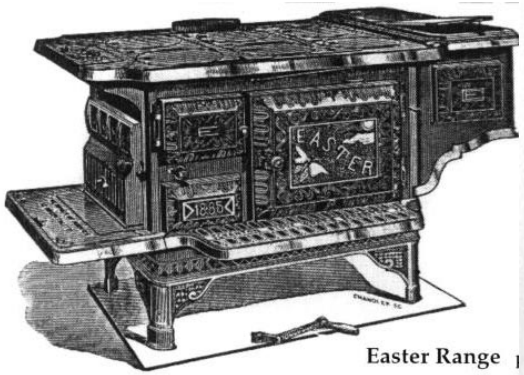
Bottom Left: One of the first Iron Enclosed stoves

Bottom Right: Iron Cooking Range





View of James & Cornell's improved Cooking Stove Sold at their Factory №298 Water St. New York.



Easter Range

The Refrigerator:

The modern refrigerator is probably the next most important kitchen appliance. Although the Chinese are known to have cut and stored ice as early as 1000 BC, most developing civilizations relied on fresh food and simple preservation techniques such as smoking and salting to elongate the life of their food supply. Some civilizations relied on fast running rivers and wells to store their perishable food; submerging meat in a burlap sack or oil skin could preserve the food for a few days depending on the temperature of the water. Again the development of communities and towns and cities created a change in the typical way people prepared food and ate. As towns expanded into cities the local grazing land for wild animals was replaced (and displaced) by homes and farms. Domestic farming and cattle rearing also meant that people no longer had to forage for their own food stuffs, but preservation techniques had to be developed along side the mass production of crops and animals. Cold storage, cold cellars, smoking and salting allowed for some preservation but typically meant that entire batches of preserved foods would need to be used quickly. A single accident could render an entire family's food supply unusable. More importantly preserving food properly meant a reduction in the amount of possible contamination and food borne disease. With the ever increasing density of cities the typical home didn't have the room to grow their own vegetables or raise livestock and city ordinances soon made both almost impossible. Markets and Grocery stores emerged to serve the needs of the populace but the problem of preservation still remained.

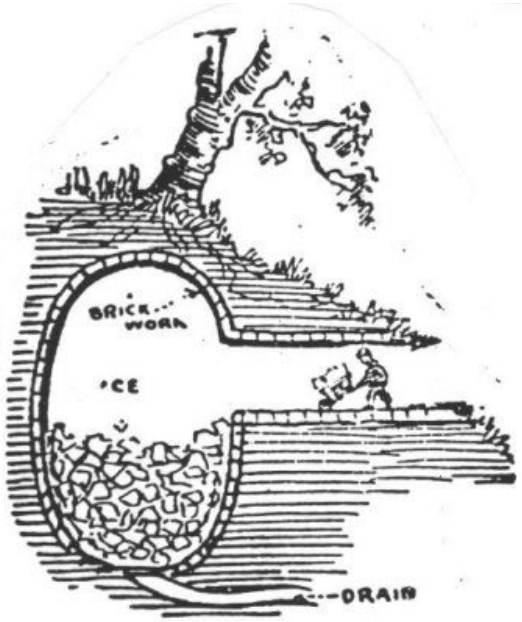
In the 18th century English servants collected winter ice and preserved it cloth and a covering of salt, then buried it underground. The ice was then unearthed and used in the summer months. Of course this was all dependent on a cold winter, a large supply of ice and was prone to many problems. Ice Boxes were used in the early 19th century and were constructed of wood with a metal liner and some sort of insulating material like cork or even sawdust. They were built with a compartment to hold the ice (or the ice was placed in the main chamber) and had a drip pan that collected run-off. They would need to be supplied every few days to one week depending on the supply of ice available. Developments in liquid compression and evaporation of liquids in a vacuum were pursued as early as the 18th century. Advancements in these fields allowed for the development of mechanical cooling techniques. In the late 19th century mechanical cooling was being used in large scale business applications such as meat packing, dairy, fish and brewing industries.

The home refrigerator arrived on the market as early as 1911 but the technology was still in its infancy and ice boxes were still in use. By 1922 models were available that had ice cube trays and a water cooled compressor but cost $714 or $8500 in today's dollars. Other models at the time intended for home use cost $1000, or twice as much as an automobile at the time (a model T Ford cost $450 in 1923), hardly affordable for the typical family. The first electric models followed the development of the stove and were introduced in the late 1920's and early 1930's. Also similar to the electric stove the refrigerator didn't see real popularity until the 1940s when prices came down and the infrastructure was available to support them. Still 1,000,000 units of the Monitor top model by General electric were sold in 1927. Many of these units are still functioning today. Sulphur dioxide was the primary refrigerant until the 1930s when it was replaced by Freon 12. It would be changed again in the 1970s and 80s when fears about Chlorofluorocarbons (CFCs) and global warming prompted a change to a system that did not rely on CFC based refrigerant systems. The 1950s and 60s saw the introduction of automatic defrost and automatic ice makers.

The modern refrigerator is now the most popular home appliance with 99.5% of American homes owning at least one. The refrigerator allows people to consume more fruits and vegetables, prepare and store food, preserve meats and keep liquids such as milk safe from spoil. The refrigeration techniques used in the home also find their way into large scale food preservation and storage making it possible to ship large amounts of food around the world. This has led to better nutrition and better health and a reduction in hunger and sickness. Modern refrigerators even help preserve and store medicine, medical specimens and other items at risk of spoil.

Modern refrigerators vary from a simple single door model to the double door model with glass insert and varied temperature settings per compartment. Some have integrated ice makers and water supplies in the door and still others incorporate televisions,

LCD screens and even computers. Modern models with RFID sensors embedded in the machine that track how long a product has been in the refrigerator, say for example milk, are being developed. These models would know when the milk was too old to drink and let the consumer know, or better yet, order new milk and have it delivered.

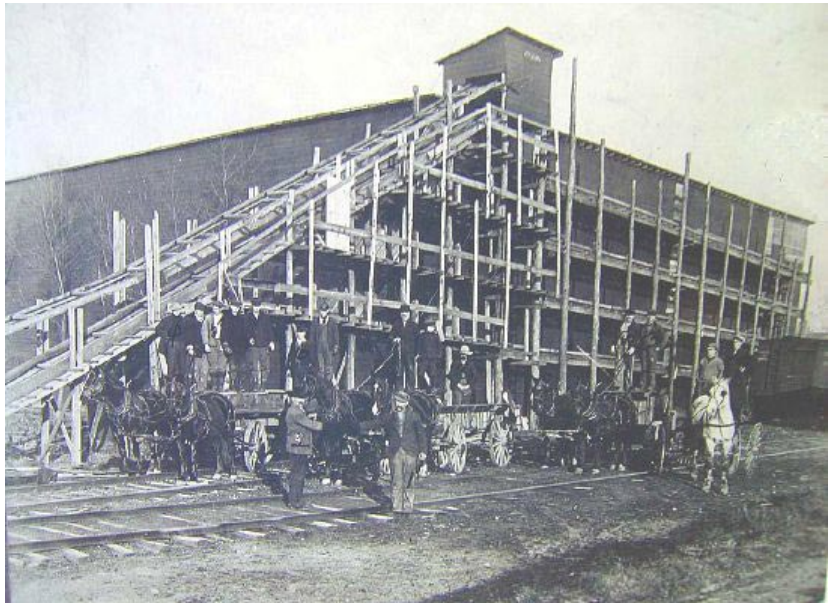


Top Left: Underground Ice House

Top Right: Smoke House

Bottom Left: Ice House

Bottom Right: Chinese Water wells used for preservation.



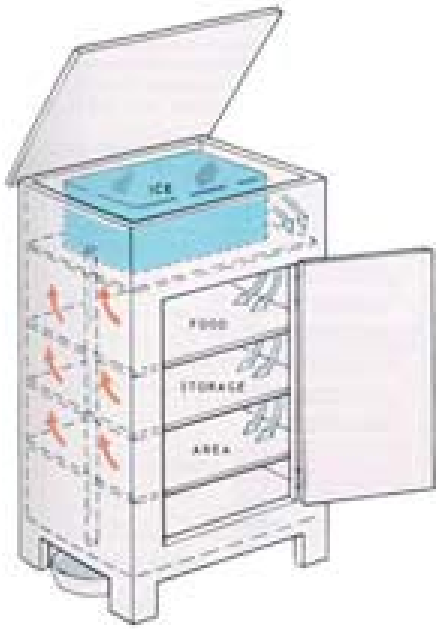
Top Left: Cylinidrical Ice Box

Top Rigth: Multi-compartment Ice Box

Bottom Left: Ice Box Diagram

Bottom Middle: Wall Mounted Ice Box

Bottom Right: “Monitor Top” Refrigerator



Washing machine

It's hard to determine what comes next. The dishwashing machine? or the clothes washing machine? Both perform similar functions and harness the same natural element, but, which is of more importance to our world and which has a deeper history? The first clothes washing machine patent predates the dishwashing machine by almost 200 years. Does this indicate that washing clothes was more important to society than washing dishes? They both share a similar process and natural element and, for all intents and purposes, work in a similar manner. What else do they share? One could assert that, unlike the stove and refrigerator, they share a common goal more rooted in convenience then necessity of survival. The refrigerator and stove serve the same purpose of preserving and preparing food, a required element in our survival that we wouldn't be able to live without (arguments about the need to store and cook our food instead of eat it raw and have it fresh aside) Whereas the dishwasher and clothes washer take the tedium out of the task. Yes the stove sped up the process of cooking (and the oven) and the refrigerator allowed for the purchase of large amounts of food at one time. Agreed, these two functions also involve some level of tedium but that is not their primary function. Both the dishwasher and the clothe washer took the back breaking labour and repetitiveness out of a daily (or weekly etc) chore. Both involve large numbers of objects being combined and cleansed at the same time. Are they of use? Certainly they are. Can we live without them? Yes of course we can. Still both the dishwasher and the clothes washer encompass a natural element ported to the home and both appliances are in some ways precedent for the GRWR. Water plants and seasonal growing can also involve a lot of tedious work. Like the dishwasher and clothe washer the GRWR incorporates function and a level of convenience.

The earliest clothes washing machine (referred to now as the Washing machine) could be thought to be the scrub board (1797) People would lather up their clothing with soap and scrub it back and forth on the corrugated metal or glass board. Prior to that people would use abrasive sand and gravel and pound their clothing on rocks at the river side. They would wash away the soil in the river or stream.

The first washing machine is said to be a washer patented (Britain) in 1691 and a drawing of a "Washing machine" appeared in a magazine in 1752. Another patent was issued to Henry Sidgier in 1782 for a rotating drum washer. In the US Nathaniel Briggs is credited with the first patent in 1797 but the patent office burnt down and little is known about what the actual machine looked like or how it operated. In 1851 James King patented the first washing machine to use a drum however it was still hand powered. In 1858 Hamilton Smith patented the rotary washing machine. Indeed there seem to be many patents and many different types of system with nearly 200 washing machine manufactures in the United States alone in the last century. The first automated (although still hand powered) washing machine is credited to William Blackstone in 1874. He built his wife a washing machine as a present. It was made of wood, had a small wooden wheel with pegs attached to it that was moved back and forth by a hand crank and a series of gears. It would pull the clothing through hot soapy water to clean them. Blackstone began producing and selling his machine and soon moved his operation from Indiana to Jamestown New York where it still exists.

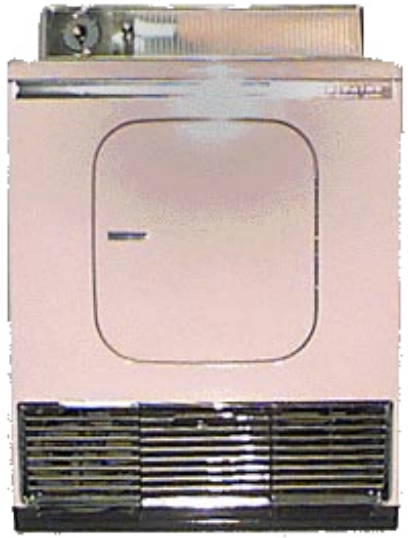
Soon improvements were made to Blackstone's invention and through the early 1900's metal tubs replaced wooden tubs, and the hand crank was replaced by motor driven turning. An agitator was introduced by the Maytag Company in 1927. Instead of dragging the clothing through the water it forced the water through the clothing. Today agitation is one of two common methods used for washing clothing.

Alva J Fisher is credited as creating the first electrical washing machine however there is one patent issued before Fisher's August 9th 1910 patent. The Maytag Corporation began in 1893, the Whirlpool Corporation was started in 1911 as the Upton Machine Company and produced electric motor driven wringer washers.

Although the first washing machines enabled the user to wash larger loads of laundry at a single time the automated features were the best addition. Now a machine could be loaded, set to wash and left until done. The earlier machines still needed a lot of assistance to wash a load of laundry but much of the labour and tedium was removed from doing the weekly wash. Convenience is the ultimate result.

One additional appliance that we know as closely tied to the washing machine is the dryer. The most common model developed in England and France in the 1800s was a barrel type dryer. The barrel was perforated with holes and turned slowly over a fire.

In 1892 George T. Sampson was granted a patent for clothes dryer that used a rack and the heat from a stove. The first electrical clothes dryers appeared around 1915. Wringing systems and an outdoor line were most commonly used. Both the European ventilator barrel dryer and Sampson's model seem combined in what we now as the modern dryer.



Top Left: Blackstone Washing Machine (1874)

Top Right: Handcrank Washing Machine (1900)

Bottom Left: Motor Driven Tumble Washer

Bottom Middle: Mid Century Electric Washing Machine

Bottom Right: General Eletric Washing Machine Ad

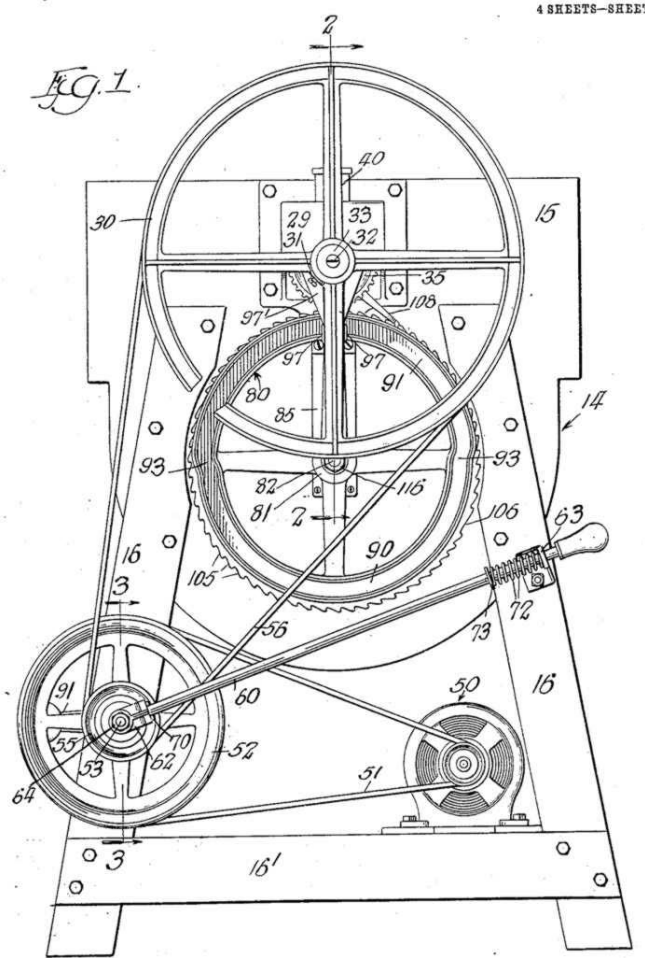
Left: Fisher's Patent Application for Eletrical Washing Machine

Right: Sampson's Patent for Clothes Dryer.

A. J. FISHER.
DRIVE MECHANISM FOR WASHING MACHINES.
APPLICATION FILED MAY 27, 1909.

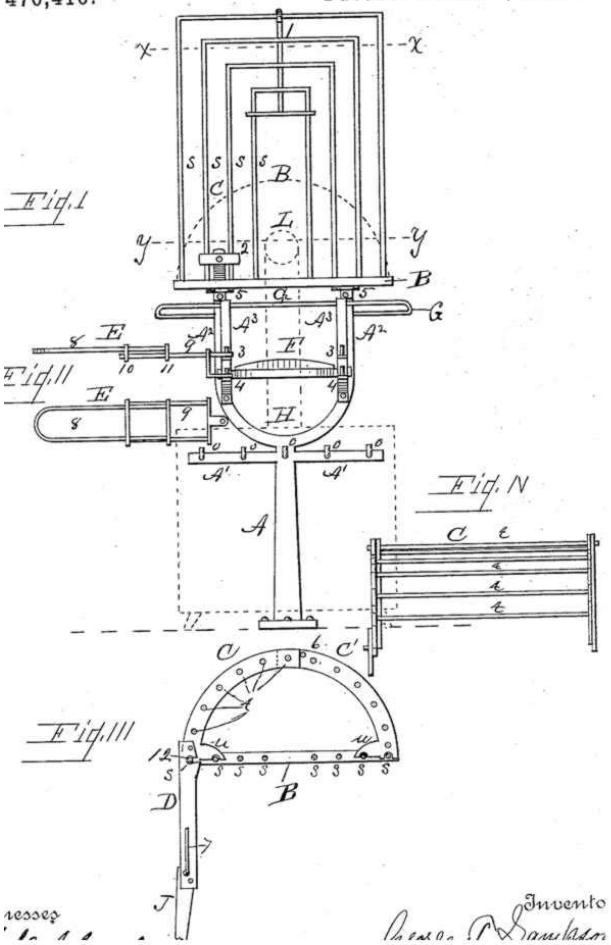
966,677. Patented Aug. 9, 1910.

4 SHEETS—SHEET 1.



G. T. SAMPSON.
CLOTHES DRIER.

476,416. Patented June 7, 1892.



Dishwasher

Similar to the washing machine the dishwasher started out as a wooden, hand cranked machine. Joel Houghton is credited with the first invention of the dishwasher in 1850. By all accounts it didn't really work very well but was the first patent. LA Alexander obtained a patent for another wooden machine that had a hand cranked wheel that splashed water on the dishes. Again, this didn't work very well. A wealthy woman named Josephine Cochrane invented the first automatic dishwasher. The story is that she was upset by her servants chipping dishes as they washed them and wanted an automatic method that was faster and preserved her dishes. She designed and built a model that had wire cages for her dishes, these cages sat on a turning wheel inside a boiler. The boiler would shoot hot soapy water on the dishes as they turned. At the 1893 Chicago Worlds fair Josephine Cochrane introduced her invention. It was received with praise and one top honors but was still very expensive. At first only hotels and restaurants could afford and had need of the machine. As other companies began to build dishwashing machines other advancements were made. Permanent plumbing was added in the 1920's and electric drying elements were added in the 1940s. The dishwasher was primarily used in hotels and restaurants up until the 1950s when advances in technology and manufacturing allowed for the creation of a smaller home model. By the 1970s the dishwasher was fairly common in single family homes. It is interesting to note that Josephine Cochrane's company still exists today and is better known by the name KitchenAid.

Like the washing machine the dishwasher seems to be created more out of a need for convenience than anything else. Also like the washing machine it provided a way to take a tedious task and automate it.

Josephine Cochrane

Left: Cochrane Patent for Dish Washer

Right Bottom: Cochrane Washer Section

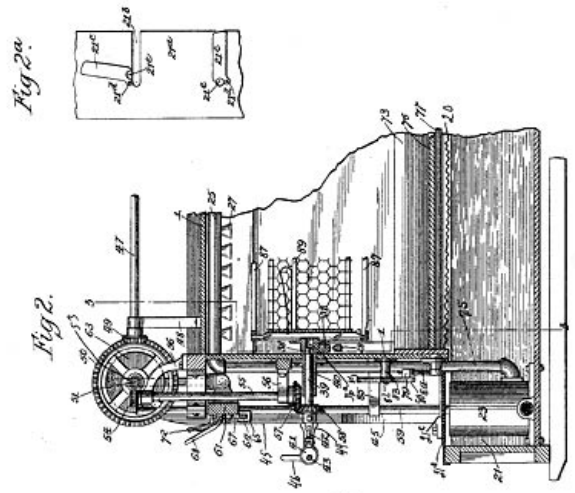
Right Top: Early Electric Dish Washer

(No Model.) 3 Sheets—Sheet 1.

J. G. COCHRANE.

DISH CLEANER.

No. 512,683. Patented Jan. 16, 1894.



Witnesses
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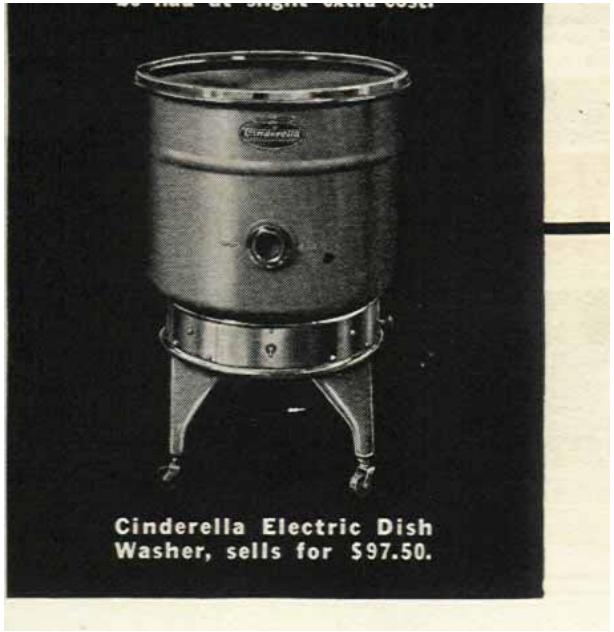

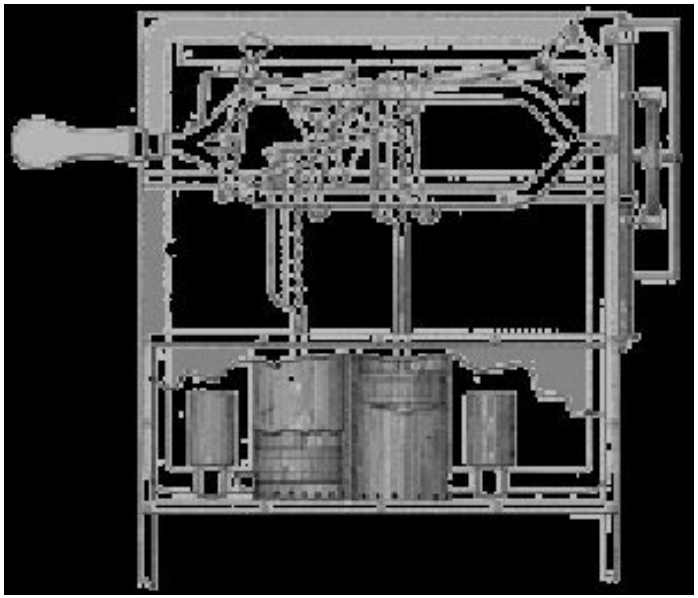

Conclusion:

There are many other modern appliances that have, in some way, influenced the design of the GRWR. The microwave, the convection oven, the blender, the toaster the bread maker are all modern appliance that assist us in our daily lives. These smaller appliances are not derived from a naturally occurring process brought to the home through invention. Their form may influence the design of the GRWR but their basic intent is to provide convenience. As we move further into the new century there is no doubt that innovation and need will drive these other appliances further. Indeed, the stove the refrigerator, the dishwasher and the washing machine will most likely go through more iteration as new technologies are developed.

The GRWR is designed to allow the user to grow fruits and vegetables for consumption indoors and with ease. The precedent for this design rests in the design and innovation of the stove, the refrigerator and the washer and dryer. The specific form of the GRWR does not necessarily take its cues from the form of these appliances but some connection is obvious, whether it's the common form derived from the appliances and transposed to the kitchen or the form of the kitchen transposed to the appliances. The GRWR mimics these appliances in that it intends to be one fully contained object, meant to serve a specific purpose and function. Like the stove and the refrigerator the GRWR takes a naturally occurring process and enables it in the home. In some ways the GRWR reduces reliance on the stove and refrigerator. Fresh vegetables can be left on the plant until eaten removing the need for refrigeration. Fruits and Vegetables can be eaten raw, reducing the need for the stove. It is possible to argue that the GRWR is the evolution of our common everyday kitchen appliances. Those appliances that were needed to manipulate or preserve food have transformed into the GRWR. Fresh food is grown and eaten when picked, left to continue ripening if not needed.

If the stove is fire, the refrigerator is ice, the dishwasher and washing machine the river and the dryer the sun and wind then the GRWR is the earth and plants. Everything natural has it's counterpart within our homes.

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