From Cave to Microwave

Michael J. Lawler

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A HISTORY OF DOMESTIC COOKERS AND RANGES

SUBMITTED BY : MICHAEL J. LAWLER.

FACULTY : INDUSTRIAL DESIGN.

NATIONAL COLLEGE OF ART AND DESIGN, DUBLIN.

NATIONAL INSTITUTE FOR HIGHER EDUCATION, LIMERICK.

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INTRODUCTION

This Thesis looks at the changing shape of the domestic cooker, from cave to microwave. How changing technology and social habits have affected their design. Domestic cookers are the main topic but early developements in the ranges history stems from the fireplace grate, this in itself is subject matter for further study.

The history of the kitchen as we know it today is largely bound up with the growing concentration of its heat sources. The open flame of the hearth, coal within the cast-iron range, gas and finally electricity followed one and another as the heating agents. Their eras were of unequal length. For ages, the open flame reigned supreme. During a half century between I830 and I880, the cast-iron range became prevalent. Between I880 and I930 the gas range won acceptance. Then, in ever rising tempo, began the era of the electric range. We are speaking here of things in flux, not of rigid dates. The different forms compete side by side, and before a heating agent triumphs it must usually pass through a prolonged incubation period.

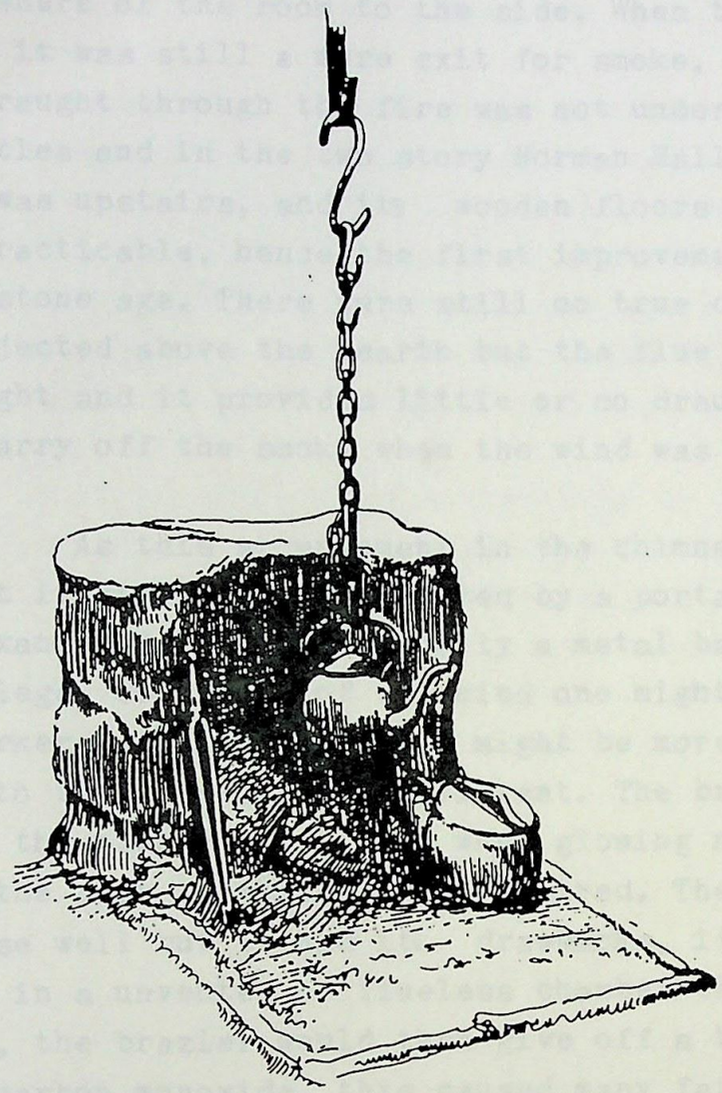
PREHISTORIC COOKING

The environment, so unpredictable and so changable, the variance of climate and temperature with each season. Fire, shelter, food, man's protective shield, without them the fragile human would be exposed to the unmercilful wrath of the elements and perish within a short time. With this shield man could adopt to and conquer his environment, developing civilizations and finally inhabiting all the Earth.

Early man soon found the perserving qualities of fire, this enabled him to avail of spare time; it is difficult to ponder on the mystries of the Universe when chasing your next dinner. Fire produced a social gathering place, besides stimulating innovation and material progress, it must have increased the density of the population, further exerting its influence on man's evolution.

From tree, to cave, to hut,man shaped his new environment and living habits to adopt to his surroundings. In winter the camp fire would have been moved nearer his dwellings, then some especially cold night some bright spark, one might say, dragged the embers indoor and there the hearth was born. A hole in the top of the hut solved the problem of fumes and smoke, the fire was always placed in the middle of the hut, its occupants with their feet gently toasting towards its radiance.

When the nomadic hunters were superseded by settled cultivators and stock-breeders, who moreover now made pottery, cooking improved. Instead of being roasted or parboiled in water heated indirectly by dropping hot stones into it, food could be boiled over the fire, soups and stews appeared. Permanent settlements went up, with substantial rectangular timber houses of wattle and daub, each with a central fireplace or even a combined hearth and baking oven in an outer kitchen.



Example I. 'Reredos' or primitive stone hearth from the Shetlands.

COOKING AND HEATING METHODS I300 - I500 CENTURY.

Before the thirteenth century the main cooking was executed in the open, at least in summer, up to now the hearth was still set in the middle of the room, then came the movement of the hearth from the centre of the room to the side. When the chimney was first introduced it was still a mere exit for smoke, its powers to create a draught through the fire was not understood. In many Norman castles and in the two story Norman Halls, the principal apartment was upstairs, and its wooden floors made a central hearth impracticable, hence the first improvement in the hearth since the stone age. There were still no true chimneys as such, a hood projected above the hearth but the flue was not carried to any height and it provided little or no draught, it would not even carry off the smoke when the wind was unfavourable, example 2.

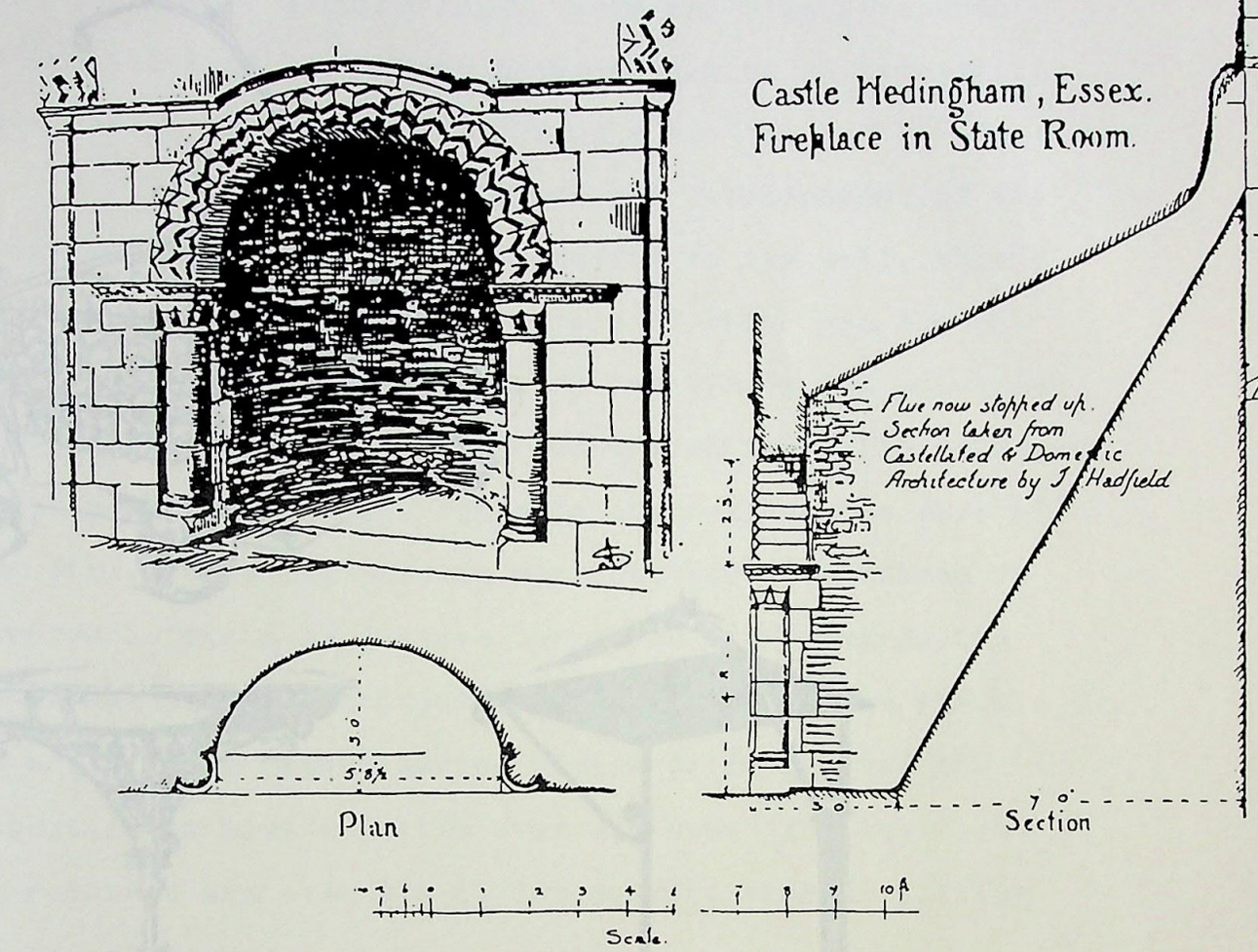
As this arrangement in the chimney did not provide enough heat it might be supplemented by a portable charcoal brazier, example 3. This was usually a metal basket or pierced bucket on legs, something of the kind one might see today used by road workers, ancient braziers might be more decorative than these but to that extent less efficient. The brazier would be started in the open air and then when glowing nicely, carried or pushed to the room in which it was desired. The brazier served its purpose well but it had its drawbacks, if it were left unattended in a unvented or flueless chamber the oxygen level would drop, the brazier would then give off a blue glow that indicates carbon monoxide, this caused many fatalities through its use. The charcoal from which the brazier takes its name (Braise 'Hot charcoal') is still an almost perfect fuel, it gives plenty of heat, little or no ash and no smoke or smell. It is still the proper fuel when cooking for epicures.

In the fourteenth century castles, the kitchen usually had two or more fires, one for cooking the meats and boiling and the others were for baking.The oven played an important part in fourteenth century cooking. Generally shaped in the form of a large oval, it was built into the thickness of the wall with an arched roof over it. When it was to be used a bundle of faggots were placed inside and lighted, then an iron or stone door closed in front. Once the faggots had burned out,

making the air in the oven and the surrounding brickwork very hot, the door was opened and the ashes raked aside, then the bread and cakes would be placed inside and the door closed. When the oven cooled down the baking was done, this generally took about one hour.

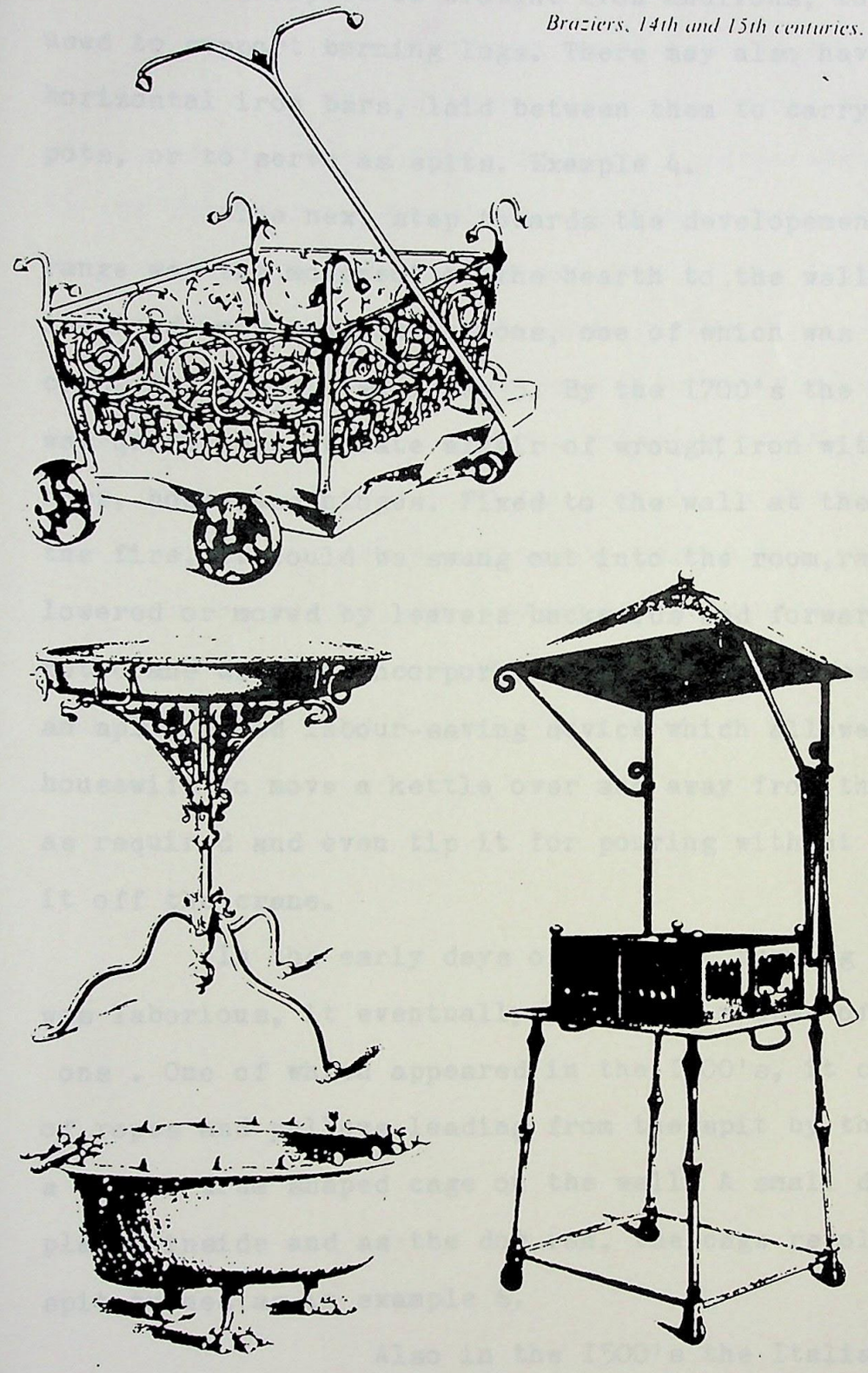
The material used for the door varied from region to region. A magnificent example made of oak was found at Chard in Somerset and is now in the city museum, Birmingham. The block is carved one side with the figure of a mermaid combing her hair. It measures 390mm X 290mm high and dates from the seventeenth century. Such a door would have been dropped into a grove in the brick sill of the oven floor and secured at the top by a turn button.

Very primitive ovens were used in connection with the open fire, where logs were burnt and the ashes allowed to accumulate, the ashes are then cleared away and the food to be cooked placed on the hearth, it is then covered with a rough iron cover this in turn is covered with the hot ashes. In some primitive parts of the World today, cooking is still executed in this manner.



EXAMPLE 2. A Norman fireplace from Castle Hedingham, Essex, illustrating a primitive means of getting rid of smoke.

Braziers, 14th and 15th centuries.



EXAMPLE 3. Braziers from the I4th and I5th centuries.

ACCESSORIES FOR THE HEARTH

To examine the developements leading up to the early ranges it is necessary to go back to 2000 BC, to the iron age. We find here examples of wrought iron andirons, these were used to support burning logs. There may also have been horizontal iron bars, laid between them to carry cooking pots, or to serve as spits. Example 4.

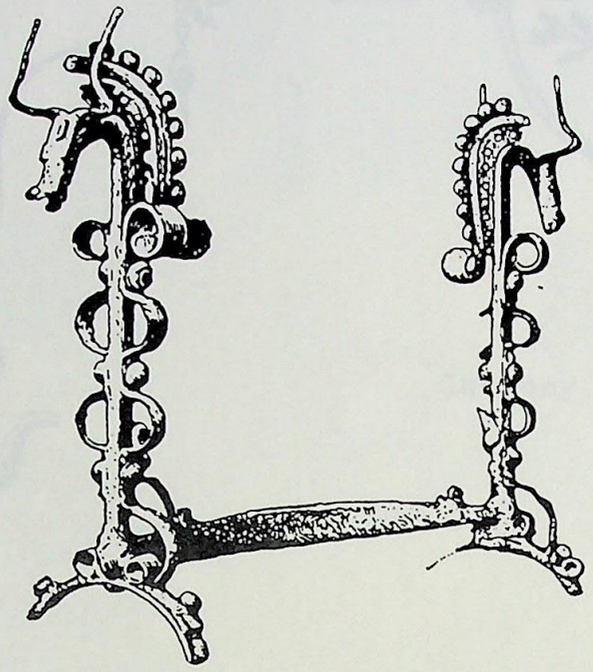
The next step towards the developement of the range was the movement of the hearth to the wall, this inspired many new innovations, one of which was the pot crane as shown in examples 5. By the I700's the pot-crane was quite an elaborate affair of wrought iron with ratchets, bars, hooks and hinges. Fixed to the wall at the side of the fire, it could be swung out into the room, raised or lowered or moved by leavers backwards and forwards. The pot-crane usually incorporated an idle back, (see example 5), an aptly named labour-saving device which allowed the housewife to move a kettle over and away from the fire as required and even tip it for pouring without lifting it off the crane.

In the early days of cooking, turning the spit was laborious, it eventually lead to a number of new invent ons . One of which appeared in the I500's, it consisted of ropes and pulleys leading from the spit by the fire to a wooden drum shaped cage on the wall. A small dog was placed inside and as the dog ran, the cage revolved and the spit turned as in example 6.

Also in the I500's the Italian, Leonardo da Vinci invented a self-turning spit, worked by the heat of

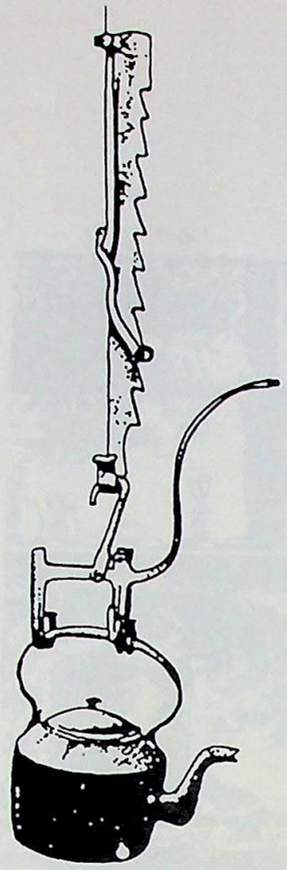
the fire going up the chimney with rods and cogwheels connecting it to the spit, as the heat ascended, the wheel turned, fast or slowly according to the strength of the fire. Example 8.

The clockwork mechanism was also applied to the spit. It was wound by a key and turned the spit slowly as it unwound. This idea was incorporated later in the Dutch oven, example 9, this was a dome-shaped metal box enclosed on three sides and open at the front, where it was placed with its open side to the fire. It had a hook inside for hanging the meat with the clockwork spit jack above for turning it. The interior of the oven was kept bright, this reflected the heat on to the meat. There was a double version which had a superheated oven hung inside a larger one, the larger one concentrated its heat on the back of the smaller one. Usually made from tin, the Dutch oven is sometimes known as the 'tin kitchen'.

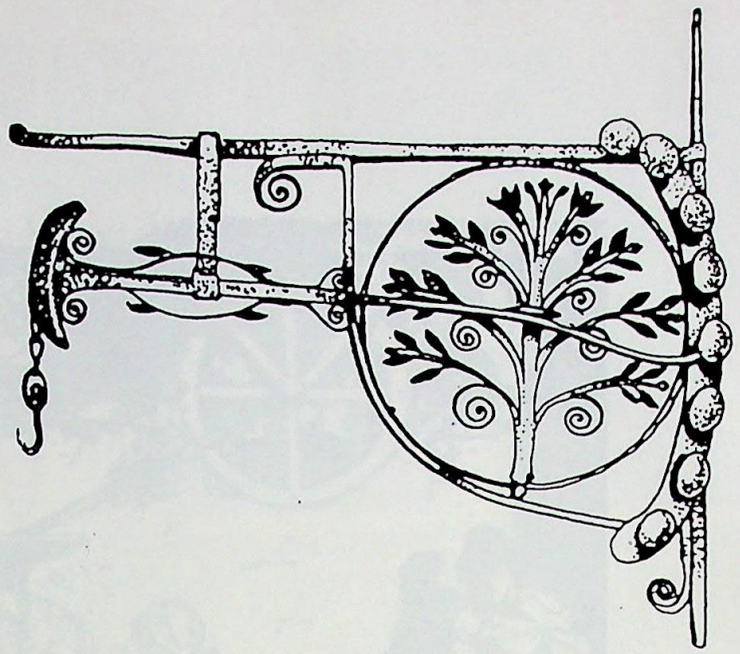


Example 4.

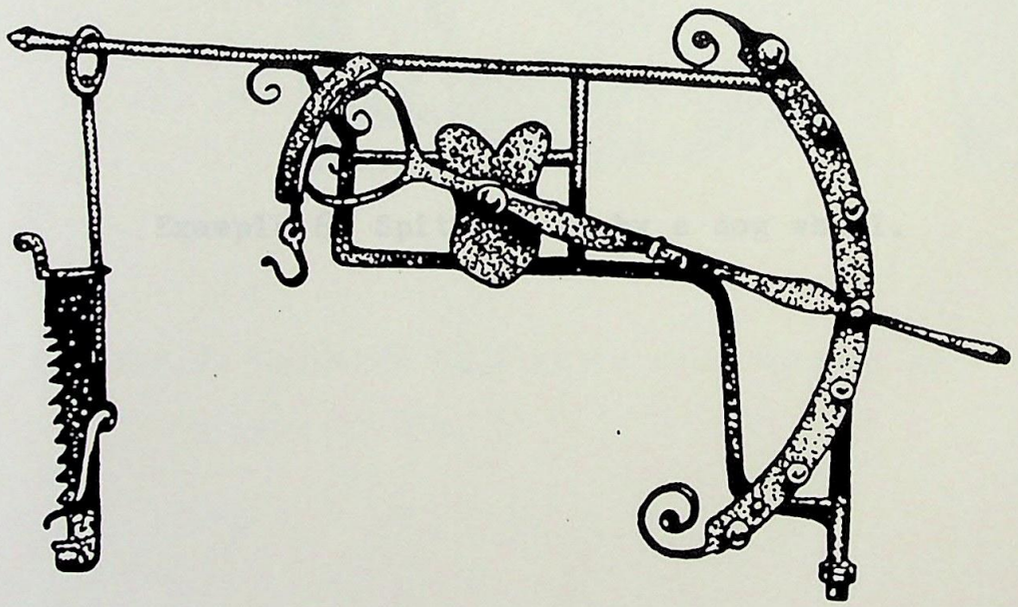
Celto - Roma n firedog from Carreg Coedog,near Bettwys-y-Coed.



Idleback



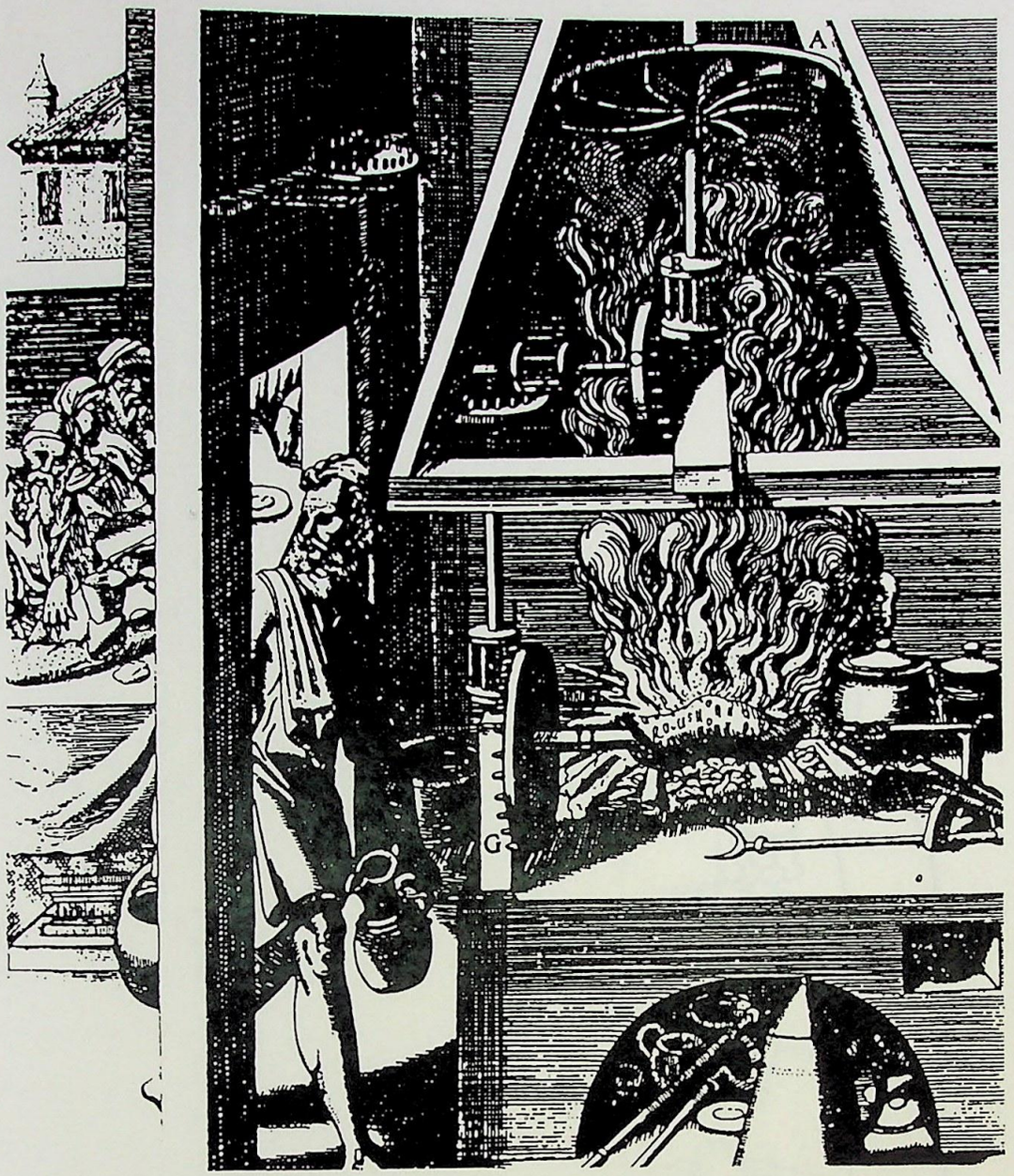
Chimney Crane.



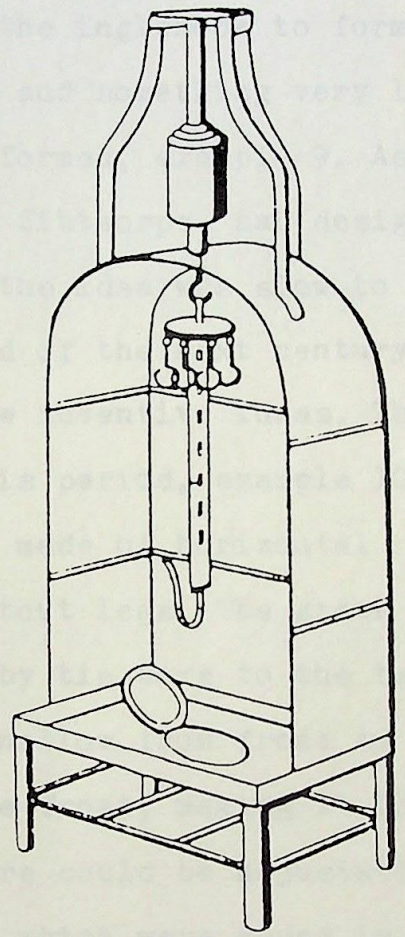
Chimney Crane.

Examples 5.

Example 6. Spit turned by a dog wheel.



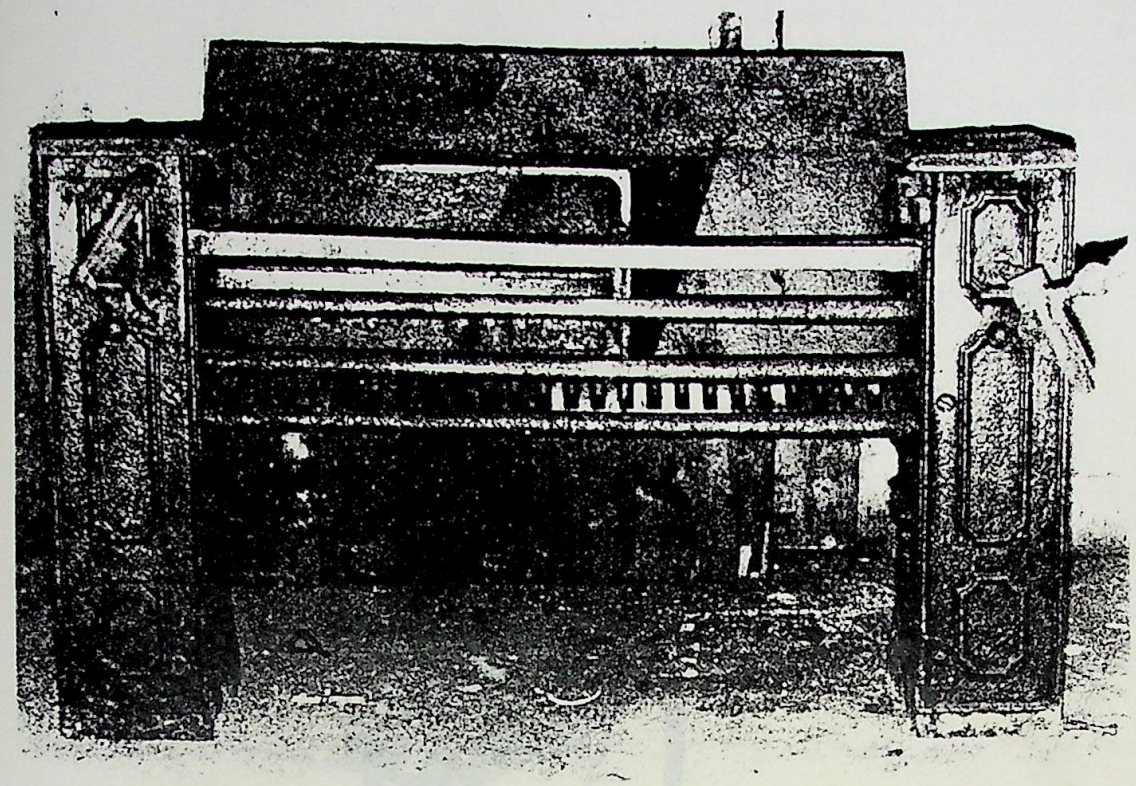
Example 7. Leonardo da Vinci's self turning spit from the I500's.



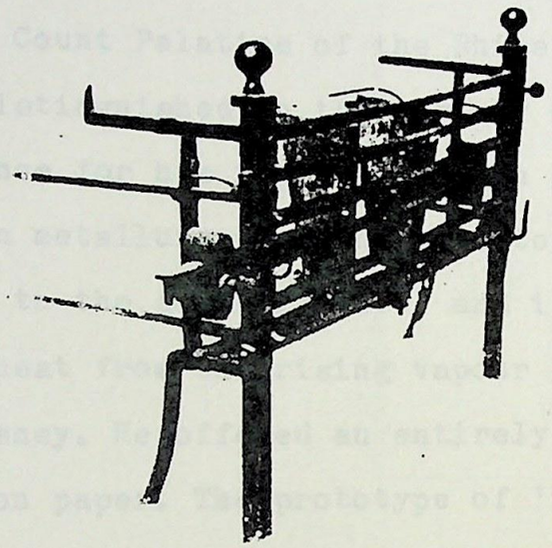
Example 8. Dutch oven.

INVENTIVE INPUT I600-I800

The idea of the range started with the gradual replacement of wood by coal as a domestic fuel. Wood will burn on an open hearth, supported by a pair of firedogs, but coal needs to be contained in a compact mass so that enough heat will be generated for it combustion. So the grate evolved as a container raised above the hearth with a bottom grating so that the ashes could fall away and prevent the fire from choking. After this it was only a matter of bricking up parts of the inglenook to form hobs either side of the firegrate and something very like the basic kitchen range had been formed, example 9. As early as I630 an Englishman, John Sibthorpe, had designed an oven to be used with coal but the idea was slow to c ch on. It was not until the end of the next century that there was any activity in new inventive ideas. The usual type of cooking grate at this period, example IO, consisted of a cradle-like grate, made of horizontal wrought iron bars fixed to four stout legs. The grate was not freestanding but secured by tie bars to the back of the fireplace. The grate was shallow from front to back but high and broad across the front, making it ideal for roasting. The width of the fire could be adjustable by movable sides known as cheeks, which were wound in and out by a rack and pinion. On some examples, the top front bar folded down when a deep fire was not required. This fall bar provided a convenient place for pots and kettles to simmer in front of the fire. Trivets, circular iron



Example 9. A late eighteenth-century kitchen grate with cast iron hobs.

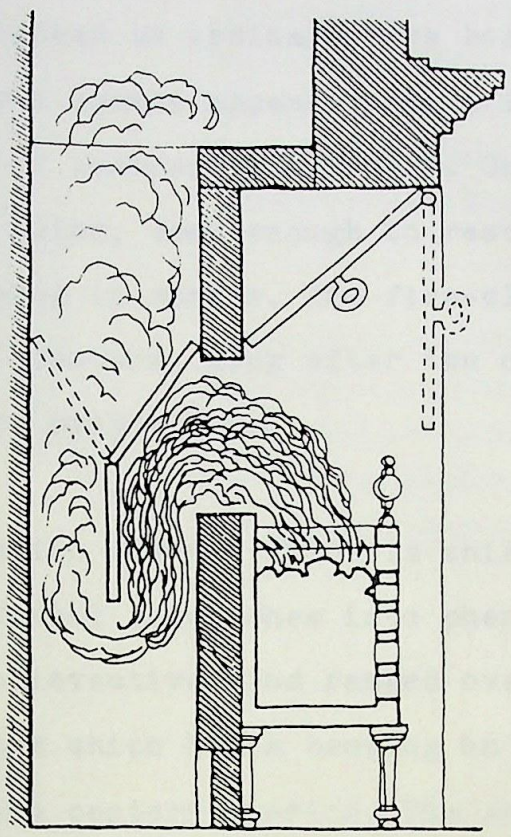


Example IO. A kitchen grate formerly in the Old Beams Restaurant, Market Square, Aylesbury, Buckinghamshire. The grate stands 8IOmm (32 inches) high and is I090mm (43 inches) wide. The cheeks are adjustable.

rings big enough to support a kettle were attached to the top of the cheeks and made to swing out over the fire.

Thermal efficiency needed to be improved in the cooking grate, much of the fuel used wàs wasted up the chimney. This problem lay beyound the craftsman reach. fromthe I700's onwards the role of the stove-designer was a matter for the physicist.

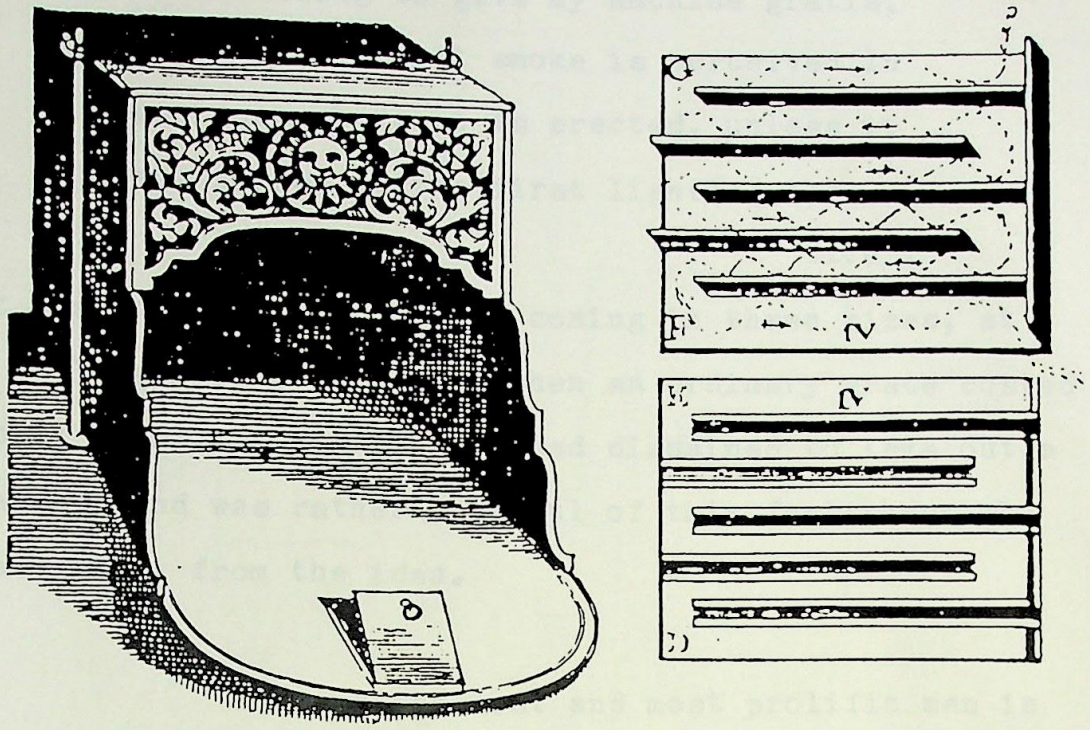
The first of these physicists was Prince Rupert, Count Palatine of the Rhine and Duke of Bavaria. He is distinguished in the history of art as a mezzotinter; in science for his improvements in guns, gunpowder and shot; in metallurgy, as the inventor of 'prince's metal'. Turning to the domestic fire, and its problem of extracting useful heat from the rising vapour before it escaped up the chimney. He offered an entirely new solution,and not merely on paper. The prototype of 'Prince Rubert's Fire -place' was fitted in his own chamber,example II. The opening into the flue was, as in all efficient fireplaces thereafter, very small. It was very low, just above the fire, an iron baffle plate behind this opening forced the smoke down behind the fire back before it could rise into the flue. When first lit, with a cold flue, the fire could not be expected to 'draw' through this roundabout passage, so the baffle was hinged, to open directly into the flue until the fire was going well. It is suspected nevertheless that the Prince's chamber was not always free from smoke, for he had to warn users to stoke sparing ly and often, and to use charcoal or chared coal (coke)if



Example II. Prince Rupert's Fireplace of I678.

possible. He also had to add a 'fire door' to mask the main opening when starting up. Mr Bingham, a bricklayer who advertised and built these fireplaces, said that the 'fire door' was not needed if the baffle was cleverly managed, but suggested instead an ordinary fire board or fire cloth. This last was a common appendage to a fire-place, a sort of pelmet of leather or tapestry. One form was like a venetian blind, deep enough to reach the hearth and close the opening in summer. The fire-cloth survived as an ornamental feature, long after the opening had been reduced to modern proportions.

Benjamin Franklin (I706 - I790) is chiefly celebrated for his fundamental researches into phenomena of static eletricity, his inventive mind ranged over a whole multitude of problems which had a bearing on contemporary life in eighteenth century America. The severe winters suffered by Pennsylvania and the New England Colonies caused much hardship and discomfort. This stimulated Franklin to design a cast iron stove in I740, which could be placed in the fireplace, example I2. The stove was an assembly of relatively simple iron casting which could be manufactured cheaply and in appreciable quantities. Its principal advantages were economy in fuel and a greater thermal efficiency, it incorporated an air box in which cold air was drawn in and heated by the flue gases before being discharged into the room. Designed for wood, it tended to smoke with coal, and it's ducts to choke with soot. In I753 a Mr J Durno of Jermyn St., Piccadilly, imported one to London, adopted it to coal



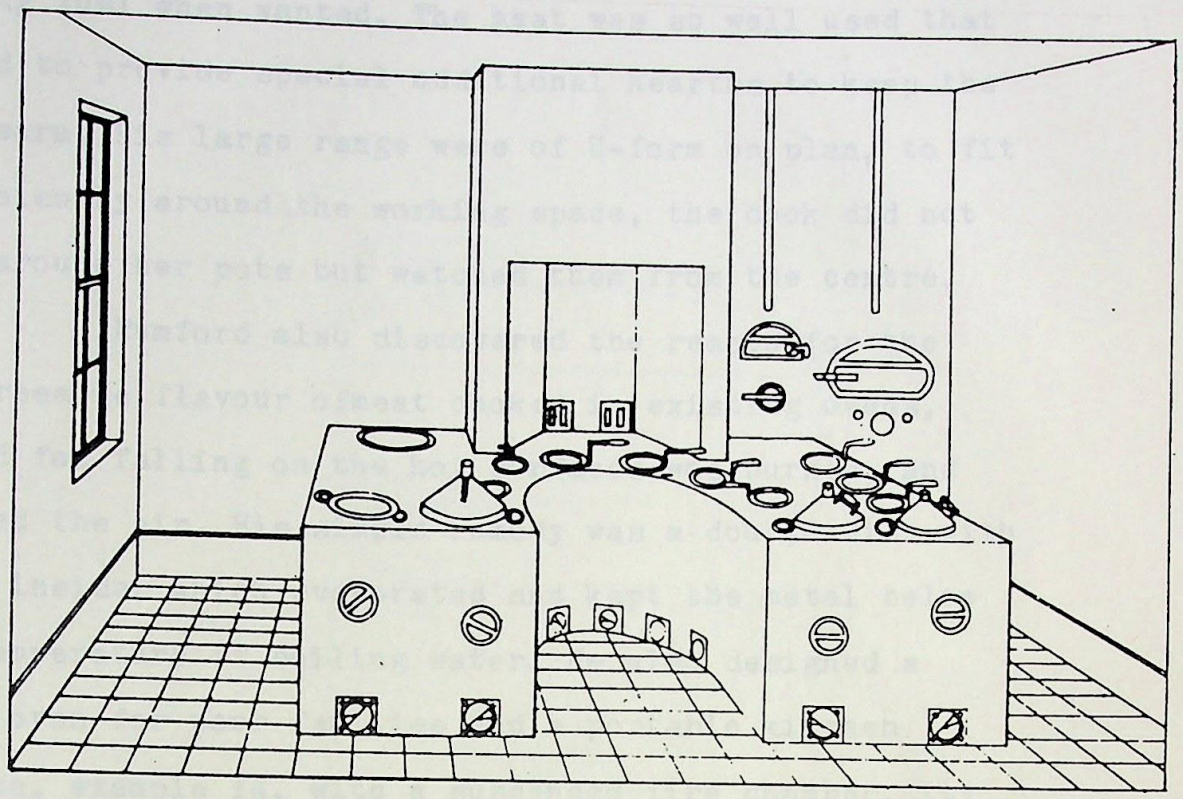
Example I2. The Franklin Stove, I740. A further step towards the cast-iron stove of the I9th century. Thermal efficiency is improved by passing the combustion gases through flues.

by making a wide brick chamber in place of the narrow ducts and confidently offered.

> "I am willing to give my machine gratis, if ever the least smoke is perceived in any room where it is erected, unless it may happen at the first lighting the fire".

It was costly for it's day, coming in three sizes, at 7 to I5 guineas, at a time when an ordinary grate costed about 5 shillings. Franklin had disdained to take out a patent, and was rather scornful of this Englishman who made money from the idea.

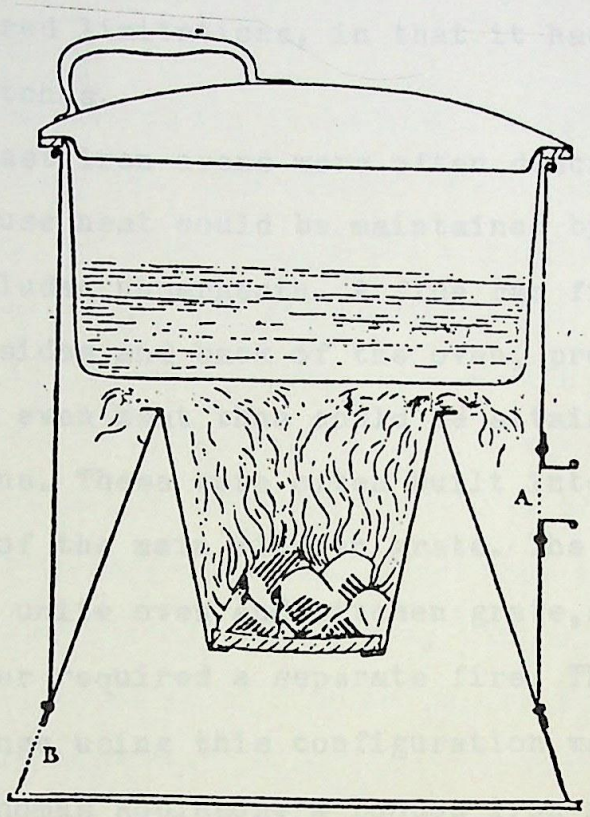
One of the most and most prolific men in the developement of the range was Benjamin Thompson, (I753 - I8I4) otherwise known as Count Rumford. Raised in Colonial America, Rumford was a British officer, Bavarian statesman and Commander in Cheif of the Bavarian army. One of his many interest lay in large scale military catering. He was horrified at the enormous quanity of fuel which was consumed in the large open grates.Too much heat went straight up the chimney without serving any purpose. In his estimation,"More fuel is frequently consumed in a kitchen range to boil a tea kettle, than with proper management would be sufficient to cook a dinner for fifty men." To over come this problem he designed a range quite unlike anything seen before,example I3. A massive brickwork construction, its flat top had a large number of small aper tures, into each of which, one cooking pot was accurately fitted. Below each pot



Example I3. Rumford's cooker of I8oo foreshows the economical insulated solid fuel cooker of today.

there was a small seperate fireplace, comprising a grate, an ashpit and a door to regulate the air. Only the larger fireplaces were refueled from below, the others were given burning fuel when wanted. The heat was so well used that he had to provide special additional hearths to keep the cook warm. His large range were of U-form on plan, to fit conveniently around the working space, the cook did not walk around her pots but watched them from the centre.

Rumford also discovered the reason for the disagreeable flavour ofmeat cooked in existing ovens, melted fat falling on the hot surfaces was burned, and tainted the air. His simple remedy was a double dish with water inside, which evaporated and kept the metal below the temperature of boiling water. He also designed a small oven for poor families and a portable kitchen furnace, example I4, with a suspended fire chamber, its heat channelled around the stew-pan. Although his range was ahead of its time, it was a costly design and never really adopted. Nonetheless some of his principles were incorporated in the closed ranges, which were the principal developement of the nineteenth century.



Example I4. Rumford's portable sheet iron stove with tapering firebox, I800. Note thesunken saucepan with cleverly designed handle. The heat source is concentrated in a perforated conical fire chamber.

OPEN RANGES I750 - I850.

As the field of metalurgy and processes around the end of the eighteenth century improved, there were now a large number of iron foundries capable of producing good quality but cheap castings. Iron baking ovens began to appear. The traditional beehive oven, which was discussed earlier suffered limitations, in that it had to be reheated between batches.

The new cast iron ovens were often described as "perpetual" because heat could be maintained by the grate which was included underneath. A flue ran from the grate , around the sides and back of the oven, providing a more constant and even heat than could be attained with the traditional ovens. These were often built into a fire-place to one side of the main kitchen grate. The logical developement was to unite oven and kitchen grate,so that the former, no longer required a separate fire. The earliest description of a range using this configuration was a patent taken out Thomas Robinson, a London iron-monger in I780, example I5. The oven was fitted in the space formerly occupied by one of the side hobs. Soon after the space of the other hob was replaced by a boiler. The patent of Joseph Langmead, another London ironmonger, which was taken out in I783, was the first to specify this type of range.

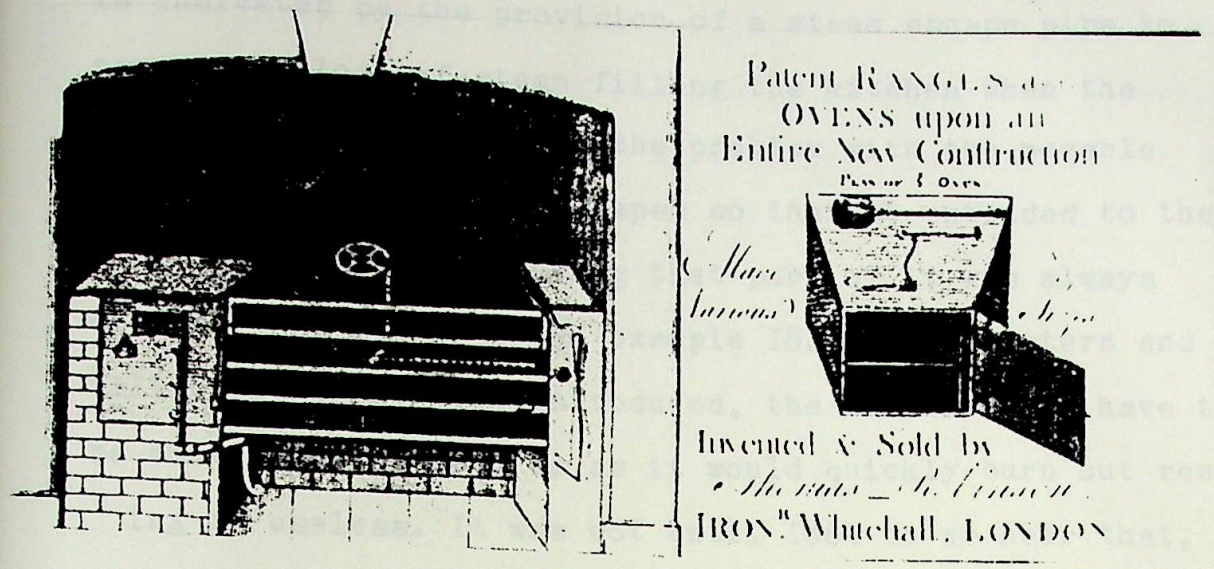
This comple ted the basic developement of the open kitchen range familiar in so many kitchens for the next hundred years. As the fire remained open to the chimney a crane was still required to suspend pots and kettles.The swinging trivet and fall bar were also retained.

The range continued to be used for open-fire r sting, although the restricted width of grates in smaller ranges made it necessary to roast on a vertical axis. The Dutch oven was idealy suited to this type of range. However, wide roasting ranges complete with smoke jacks continued to be used in large establishments into the twentieth century, example I6.

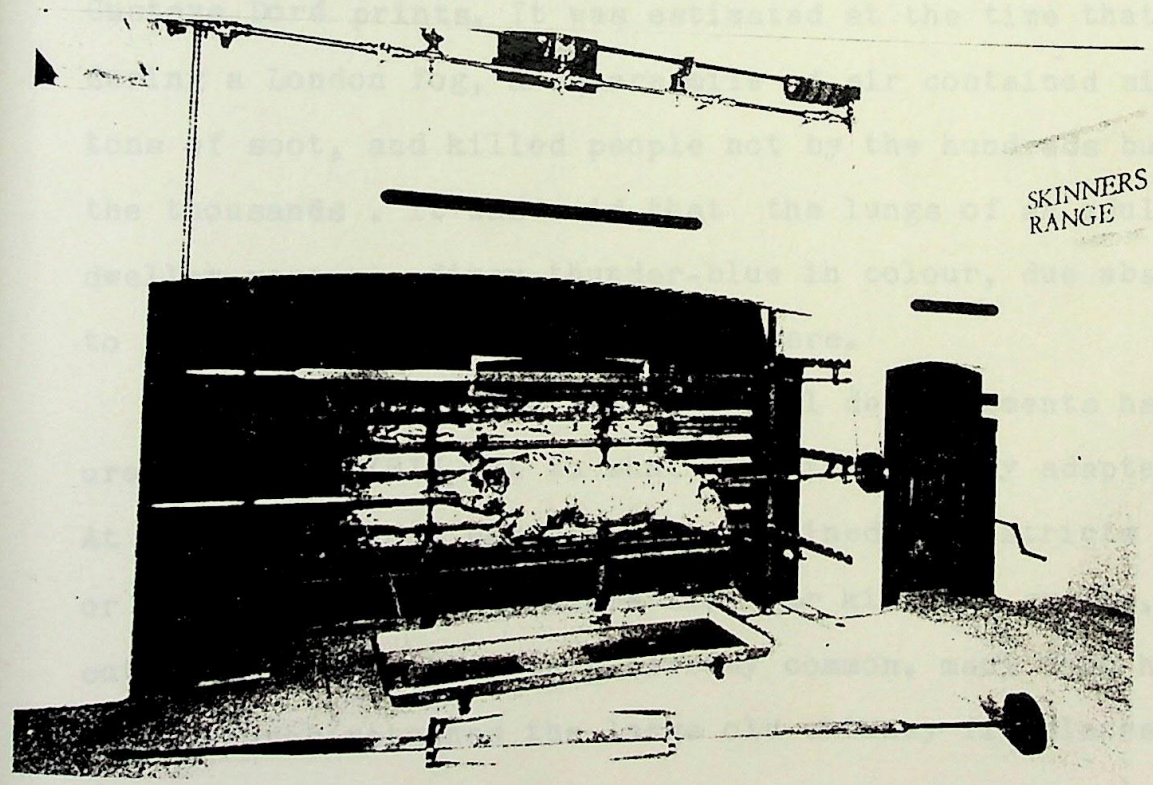
The oven described in Robinson's patent of I780 was heated through the side always in contact with the grate. The ovens of some ranges had a projection of solid cast iron attached to the side nearest the fire to improve the conduction of heat. They were sometimes known as "poker ovens ", but they tended to heat unequally, the side nearest the fire being scorched while the other remained cool. A better arrangement was to provide a flue around the oven. These hot-air ovens were controlled by dampers sliding or pivoted metal plates, operated by hand, which could be opened to draw the hot air through the flue or closed to shut it off.

The addition of a rectangular boiler to the kitchen range was a great improvement in the provision of hot water, previously it had been necessary to place a large portable boiler of iron or copper over the fire. The simplest boilers attached to ranges were filled and emptied through a lid on top, but others were provided with a tap. Many ranges retained a movable cheek on the boiler side of the grate, if this was wound in to reduce the fire it would prevent heat reaching the water.

Harrisons Economical Derby range of I846,example I7, was convertable into a close stove, semi-close stove, or an



Example I5. Thomas Robinson's range of I780.



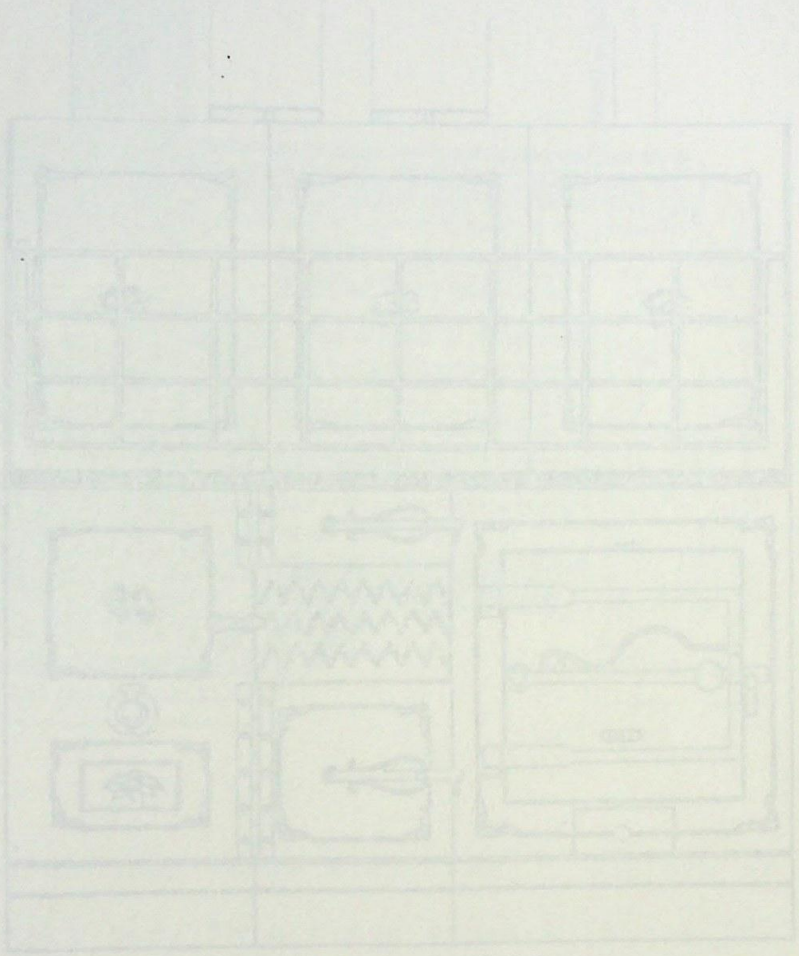
Example I6. This large roasting range was installed by Benham and Sons in the Skinners' Company Hall in Dowgate Hill, London EC., as recently as I907.

open fireplace. A troublesome feature of hand-filled boilers is indicated by the provision of a steam escape pipe to prevent a cloud of steam filling the kitchen when the cover is lifted. To solve the problem with the movable cheek, boilers became L-shaped so that it extended to the back of the grate, insuring that part of it was always within reach of the fire, example I8. As the cistern and ball-cock was not yet introduced, the boiler would have to be continually topped up as it would quickly burn out rendering it useless. It was not until I864 do we hear that, to prevent the trouble of supplying the boiler every day with water by hand. Some of them are made self filling and are supplied from a small cistern in the kitchen with a ball tap.

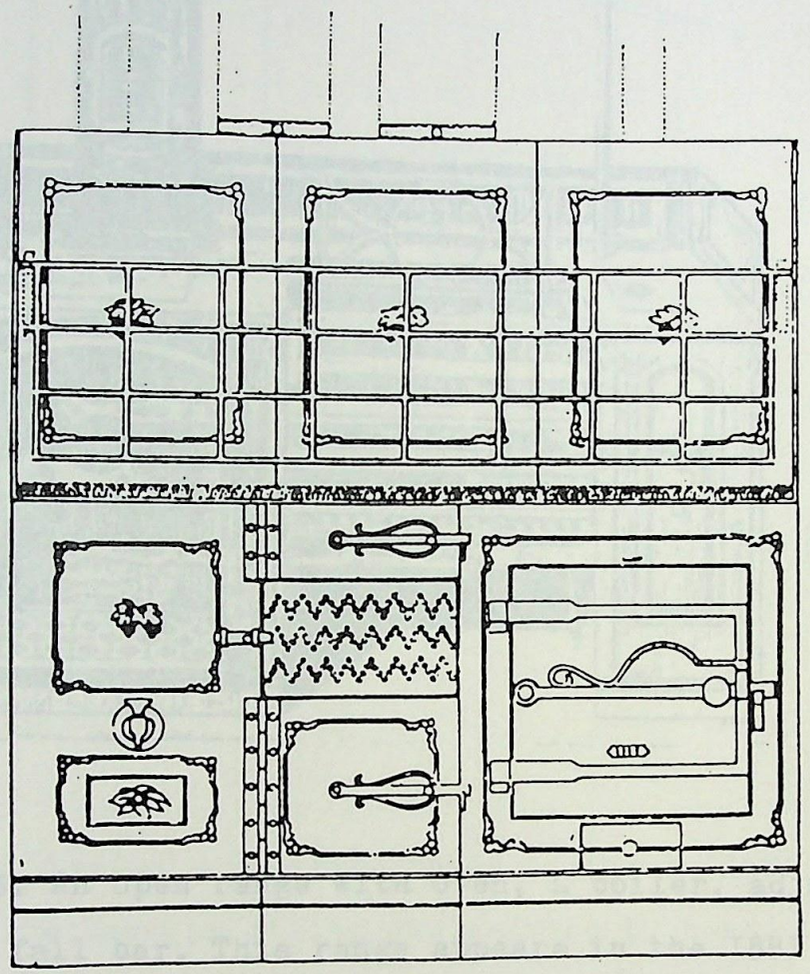
It was these open ranges that devoured coals and poured out the smoke that made the ninteenth century London fogs, of which one could see usually depicted in Gustave Doré prints. It was estimated at the time that during a London fog, a square mile of air contained six tons of soot, and killed people not by the hundreds but by the thousands . It was said that the lungs of an adult city-dweller were dingy thunder-blue in colour, due absolutely to the dirt and soot in the atmosphere.

These essential technical developements had occured by about I8I5, but to what extent were they adapted ?. At first their use was probably confined to districts in or near to coal fields where similiar kitchens grates, without ovens and boilers were already common. many farm houses and cottages retained the large old chimney fireplaces, cooking being done over the open hearth. Coal gradualy became

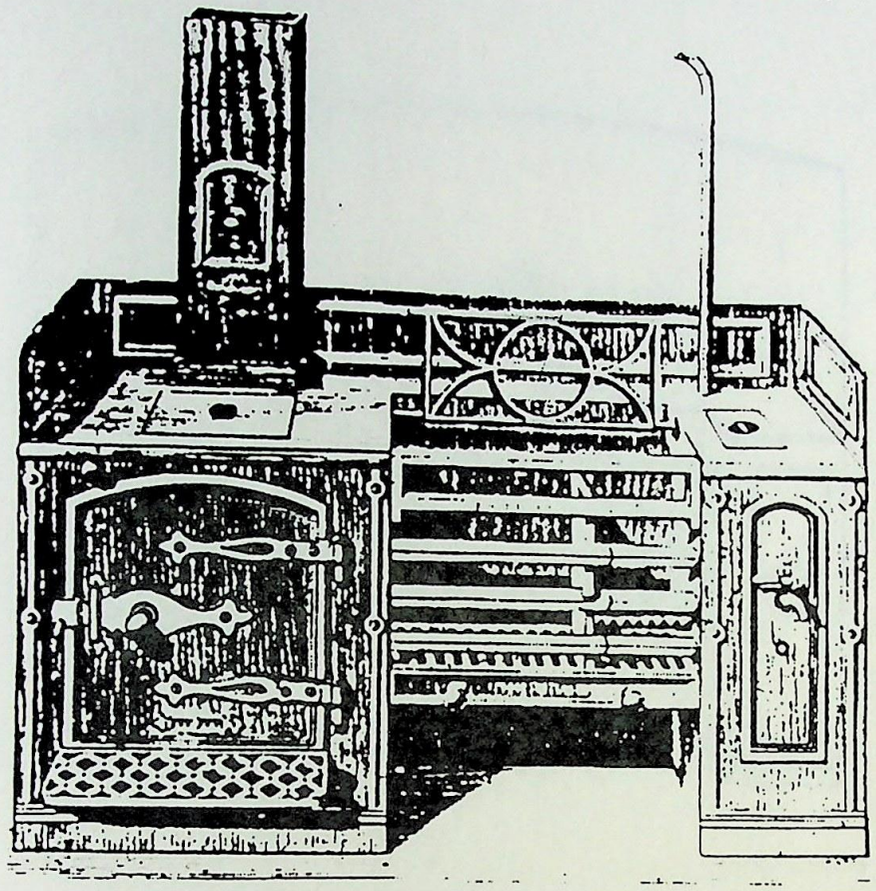
more widely available in the ninteenth century as improvements in transport brough about a reduction in its price, but the introduction of the range and its wider usage was governed by other factors which will be discussed in the chapter on social changes.



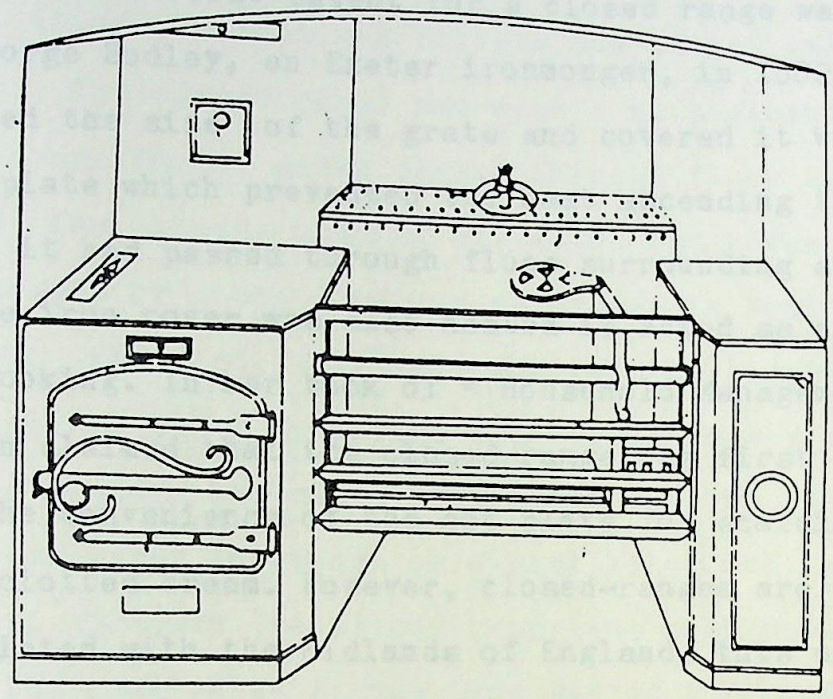
Example 17. Morrison's range of 1846.



Example I7. Harrison's range of I846.



example I8. An open range with oven, L boiler, adjustable cheek and fall bar. This range appears in the I88I catalogue of Barnard, Bishop and Barnards, Norwich, but apart from a few details is identical to those of the early I9th century.



Example I9. Typical open-fire range of about I850: this boiler at the back is filled and emptied by hand.

CLOSED RANGES.

Rumfords cooking range never came into wide use, his notions lay dormant until a century after his death, meanwhile kitch -ens were still dominated by a dirty inefficient labour-making fuel devouring monster, that made the kitchen unbear-able in hot weather.

The first patent for a closed range was taken out by George Bodley, an Exeter ironmonger, in I802. Bodley reduced the size of the grate and covered it with a cast-iron plate which prevented the heat ascending the chimney until it had passed through flues surrounding an oven boiler. As the iron cover was also heated it acted as a hot plate for cooking. In her book of * Household Management, Mrs Beaton claimed that the closed range was first used in Devon for the convenience of the hot plate for scalding milk to make clotted cream. However, closed-ranges are more usually associated with the Midlands of England, this area became one of the cheif centres for their manufacture. William Flavel who established a foundry in Leamington Spa, in the early nineteenth century, began making closed ranges under the name of"Patent Kitchener" in the I820, example 20. The name endured and closed ranges were generally known as Leamington Kitcheners. Flavel no doubt named his range the kitchener because of its versatility. The large fires of open ranges were suited only to roasting. In some houses

*Beeton Isabella. Mrs Beeton's Book of Household Management. Ward Lock and Bowden, I907.

the range had to be supplemented by a brick stove burning charcoal which provided a gentler heat suitable for stewing. However, stews could simmer gently over the fire of a Kitchener, protected from too intense a heat by the hot plate. For fast boiling, circular holes with removable lids were provided which exposed the vessels to a higher temperature. Chimney cranes and trivets therefore were no longer needed. The closed range was also a much cleaner cooking apparatus. As the smoke passed through flues under the hot plate, the chimney opening above the range was closed off by a register door. Food was no longer in contact with the grime of the fire. Pots and pans were no longer blackened by soot and being protected from the strongest heat they lasted longer. The clean back above the hot plate was lined with cast-iron coverings or glazed tiles and used for warming plates. Although the closed range was much more ecomical than the open range, it was less suited for roasting, due to the reduced grate.

Oven-roasted meat was held to be greatly inferior to meat roasted before the fire because the absence of circulation of air prevented the surface of the meat from drying up and browning. Instead the meat was left sodden and it obsorbed unplesant flavours which was caused by melting fat burning in the oven. To over-come this, roasting ovens were provided with a ventilator at the front and an outlet at the back to provide the required circulation. Manufacturers also adopted closed ranges by making the grate bottom adjustable so that it could be lowered to increase the size of the fire. These grates were operated by a ratchet which

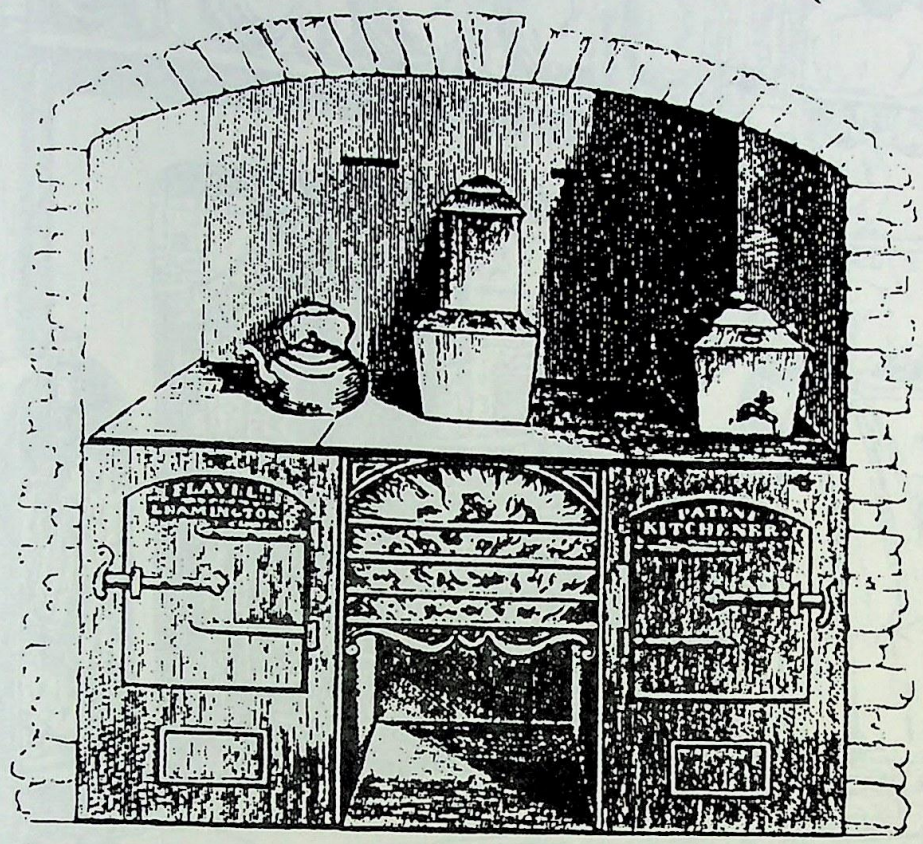
enabled the fire tobe reduced if less heat was required, example 2I.

The typical kitchener consisted of two ovens, one each side of the grate and a boiler behind, each heated by a seperate flue. To promote a strong draught, a door in front covering the top was added. This was closed when heat was required in the flues, but otherwise left opened to prevent the fire burning away too quickly. The flues were controlled by dampers which enabled the heat of the fire to be directed to any part of the range, to heat up the water in the boiler quickly, the door in front was closed, the boiler damper was drawn out andthe other flues were shut. As domestic plumbing increased in the nineteenth century the range was increasingly required to supply hot water for all the house. These conflicting demands remained as long as ranges were used, although boilers placed over the fire and which required no separate flue were applied to some of the later ranges.

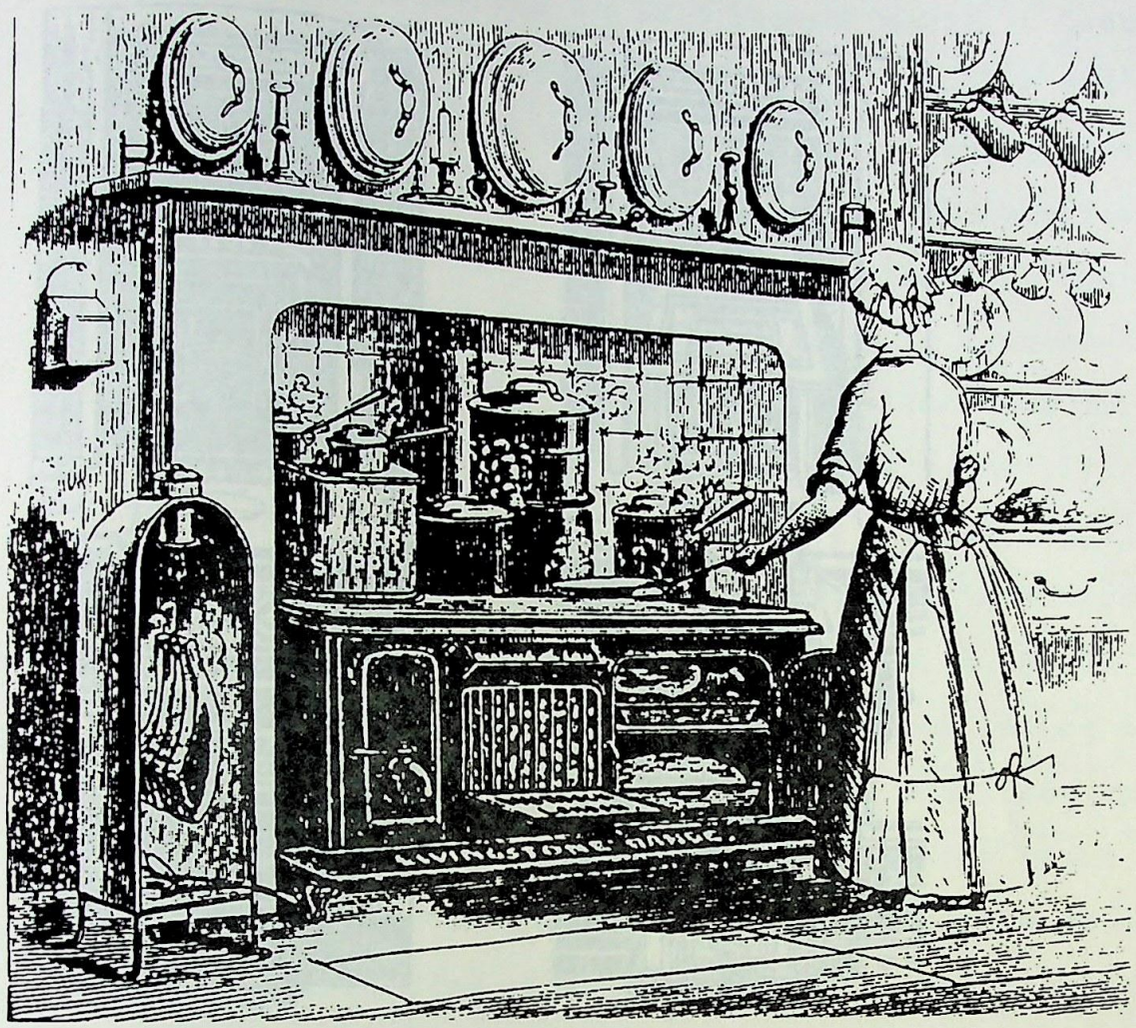
On close scrutiny the kitchener was found to be far from economical. To some extent, this was the fault of careless operators. The flues promoted a strong draught and if left unchecked this caused an unnecessarily high consumption of coal. But even with correct management, the fire would often burn too strongly. Coal consumption was high and parts of the range directly in contact with the fire was prone to wear and much expense was incured in repairs. To overcome this, some closed ranges, were convertible to an open type as in example 22. A patent taken out in I866 by William Carter and Company of Bermingham, pioneered this development. The central portion of the hot plate was slid

back so that the smoke passed directly into the chimney, the flues were therefore bypassed and the draught reduced. By the I880's most closed ranges were made on this principle.

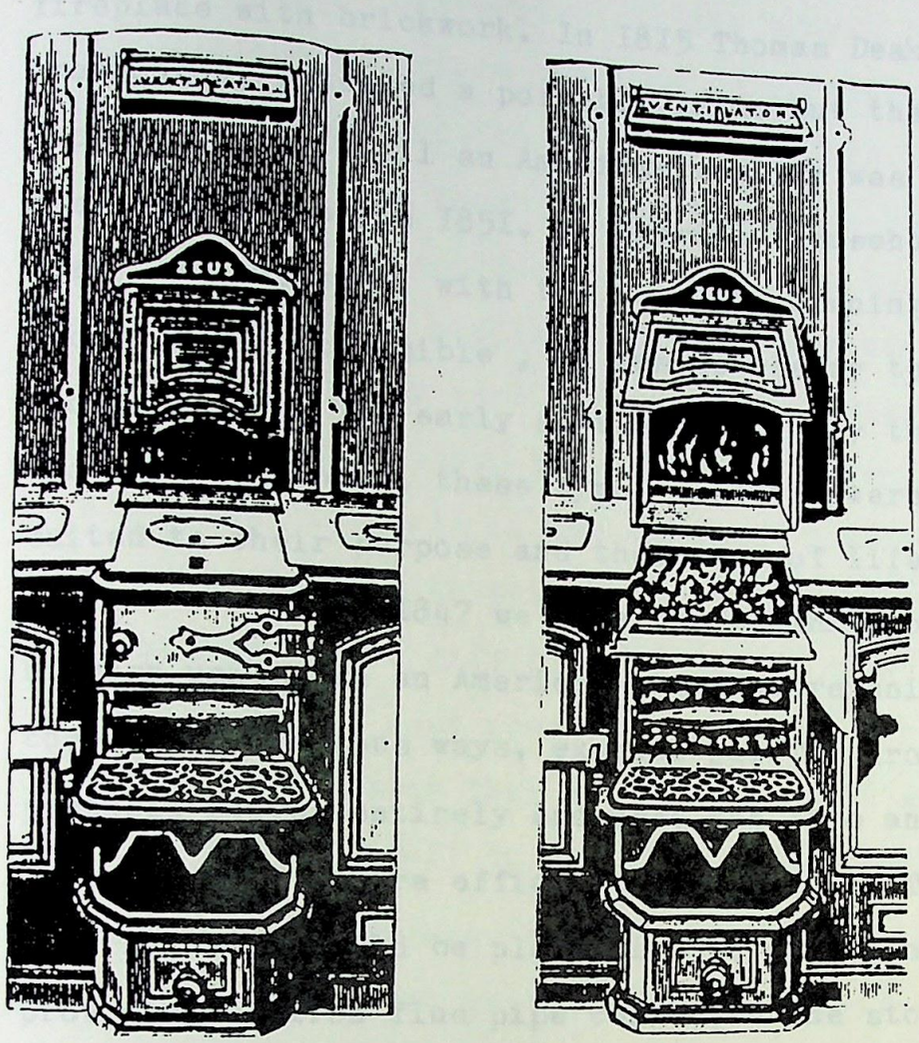
Another problem experienced with kitcheners, was ventilation of the kitchen. In open ranges the steam and smells from cooking were drawn up the chimney with the smoke but in closed ranges the chimney opening was sealed by a register door. If this was opened to expel the air it was likely to interfere with the performance of the flues. Ventilators were added which did not require opening the register, but it was essential their exit was above the flue if the draught was not to be interupted.



Example 20. William Flavel's Patent kitchener, of I820.



Example 2I. The Livingston range, manufactured by Murdock and Company. It had a fire open at the front which could be used for open roasting, a Dutch oven, complete with bottle jack and roasted meat, stands to the left of the range.



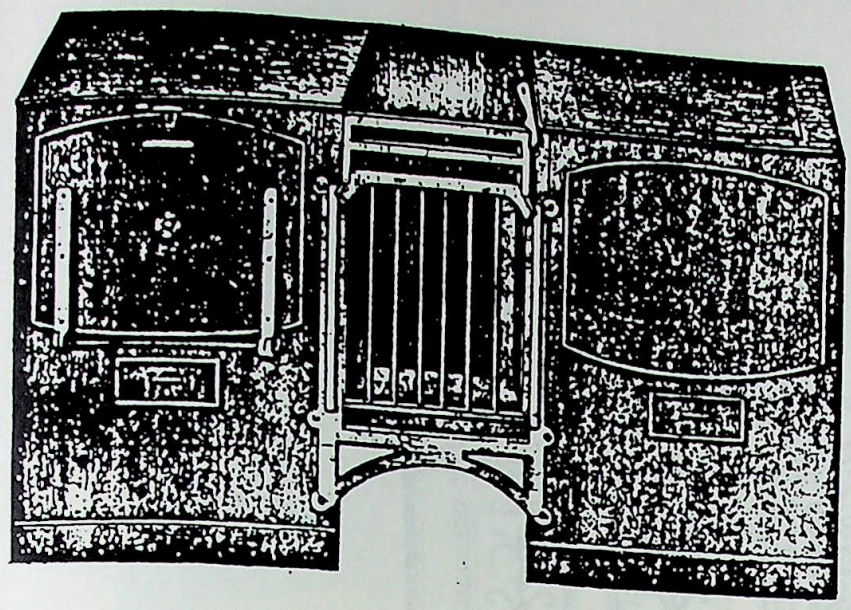
Example 22. Taken from an ironmongers catalouge of I896, these two illustrations show how a closed range was converted to an open type.

PORTABLE RANGES.

All the ranges so far described require setting into the fireplace with brickwork. In I8I5 Thomas Deakin, a London ironmonger, patented a portable range but the type did not become popular until an American version was shown at the Great Exhibition in I85I. In America, household appliances were less massive, with the West now opening its doors and becoming accessible , it was necessary to transport stoves easily. The early settlers had only the open fire and the brick oven, these type of stoves were ideally suited to their purpose and their way of life.Eg. 23.

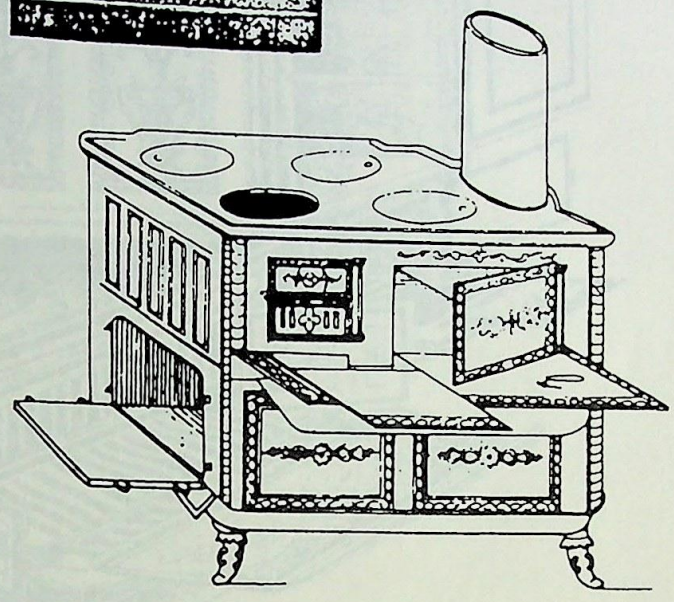
In I847 we see the begining of standardized kitchen units, in an American range where units can be combined in various ways, example 24. The iron casing of portable stoves entirely enclosed the fire and flues, and this promoted a more efficient use of heat. They stood on four legs and could be placed in the middle of the room, providing an iron flue pipe connected the stove with they chimnet or out side wall. Although small and compact portable stoves usually had an oven , boiler and a hot plate on top. However the English predilection for open fires restricted their popularity. Although their manufactures were chiefly in Scotland, their popularity after the Great EXhibition of I85I, consequently associated them with America, therefore they were often known as American stoves. By I9I4 portable ranges were still in demand as shown in examples 25. Until I920 the coal range was a standard fitting in almost every home, even when there was a suplementary gas or electric stove, and still in I939 about two million homes in Britain, I7 %, of the total housing stock had a coal range as their

only cooking source. In the working class household its advantage was that for the Landlord:it was inexpensive to install and also inexpensive for the tenant because it could provide the triple function of cooking, space heating and water heating for the price of one fire.The smaller versions which were found in working class houses were relatively inefficient for all functions. Larger ranges which were found in middle class houses preformed better because they usually were more highly insulated, but they still had disadvantages. They would not stay in overnight, and so had to be lit early in the morning by members of the household who would have to get up especially early; they created dirt, and they were difficult to clean, becausethe only treatment for the cast iron of which they were made was to blacklead it. Finally they were inefficient at cooking since it was difficult to control oven or hob temperature; though on the other hand they were relatively well-suited to certain tasks such as baking which required steady low heat. By the begining of the twentieth century, gas and later electricty were becom ing serious rivals to solid fuel ranges, yet developements continued. Portable ranges burning anthracite were introduced. One popular type was the"Kooksjoie" made by the London Warming Company. Although more expensive than ordinary fuel anthracite produced very little ash and soot, but burned slowly.

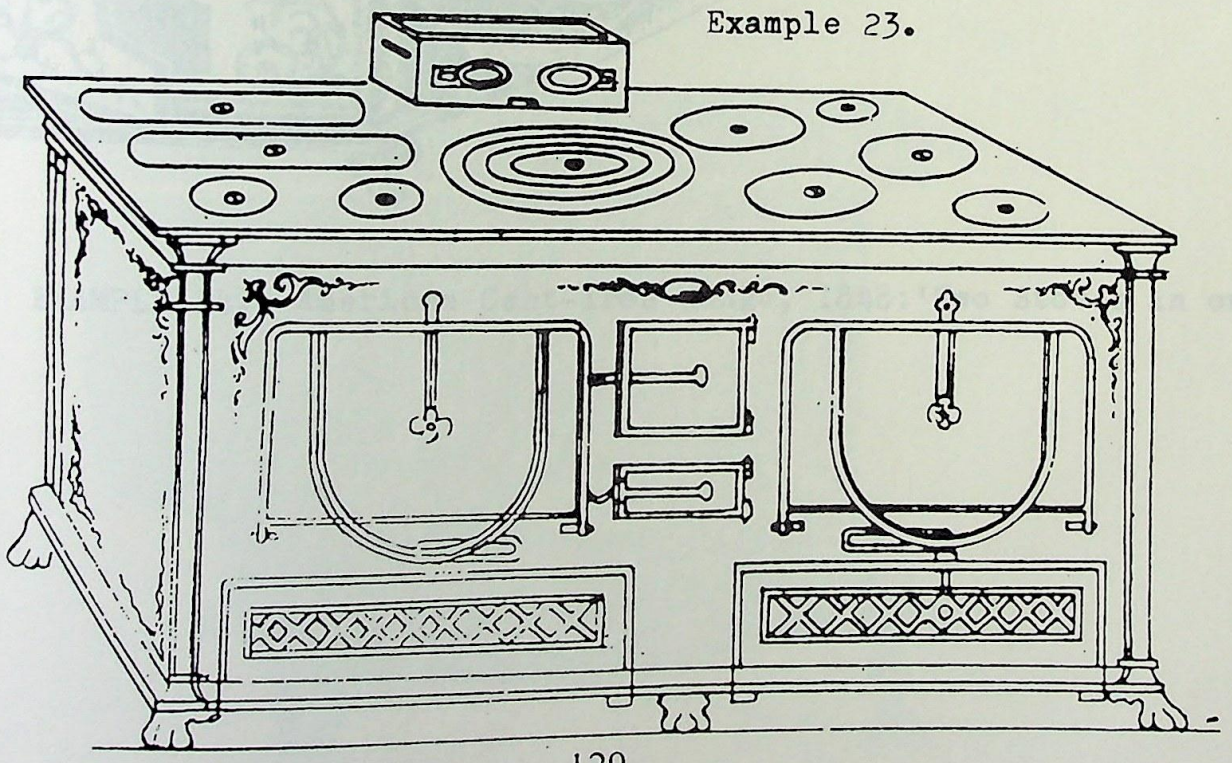


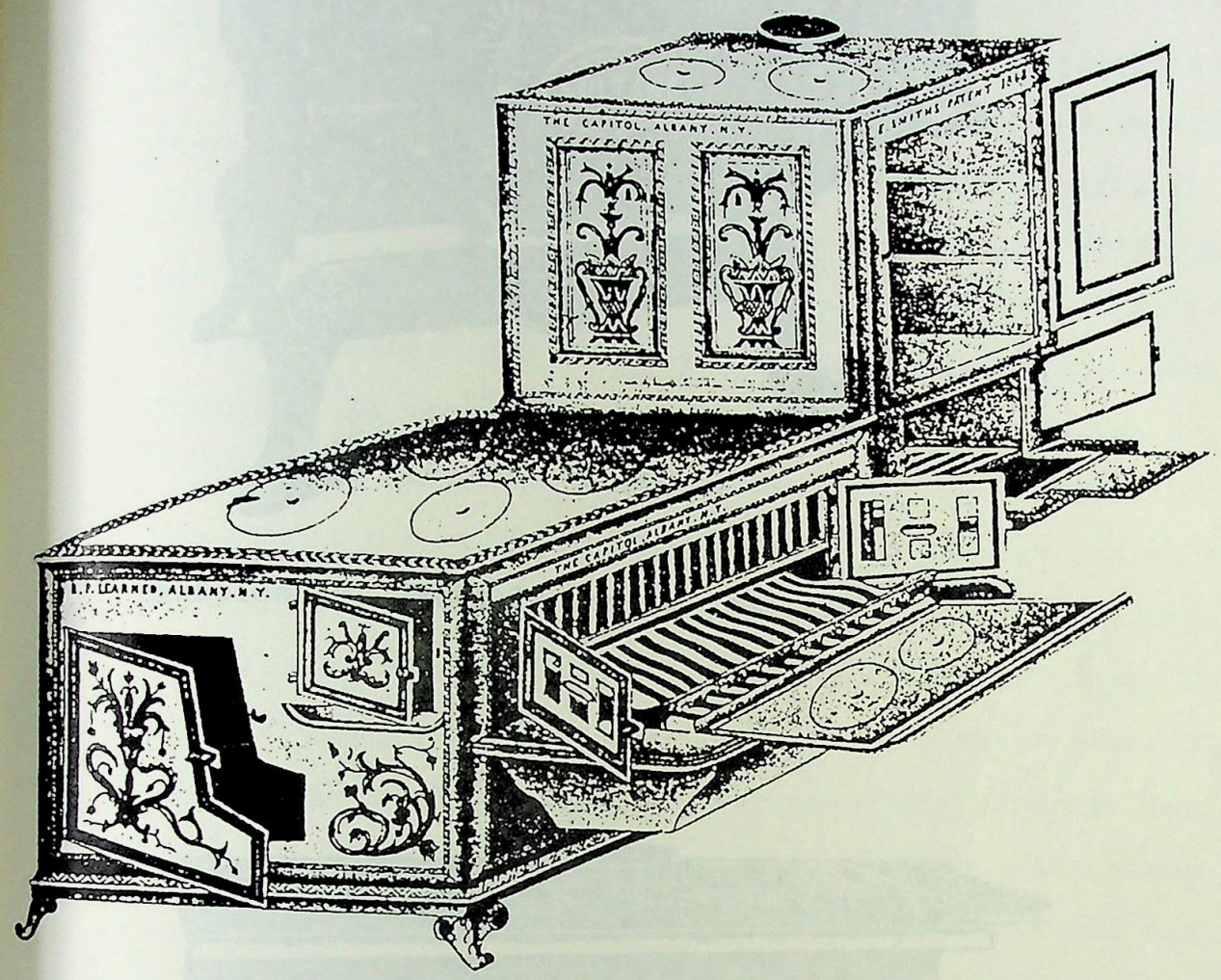
The 'Newark' Cottage Range, 1848. The boiler lid is flush with the cooking-top. Price complete, 25s. to 40s.

An American cooking stove shown at the Great Exhibition of 1851: . Lyman D. Burch's 'Excelsior'. Imported, then made, then copied in England.
Below: Norwegian cooking stove, 1869.

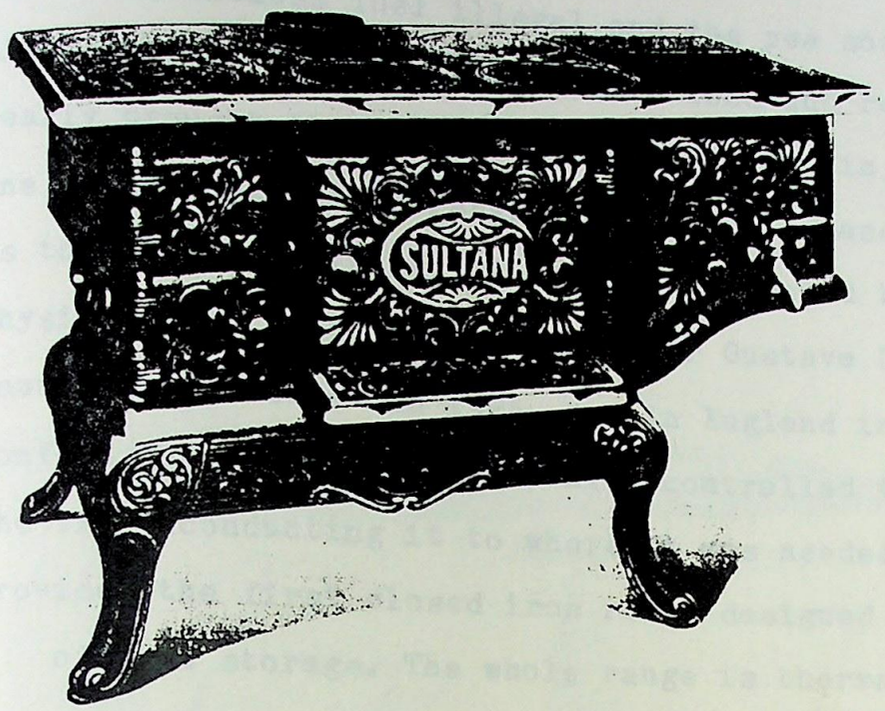


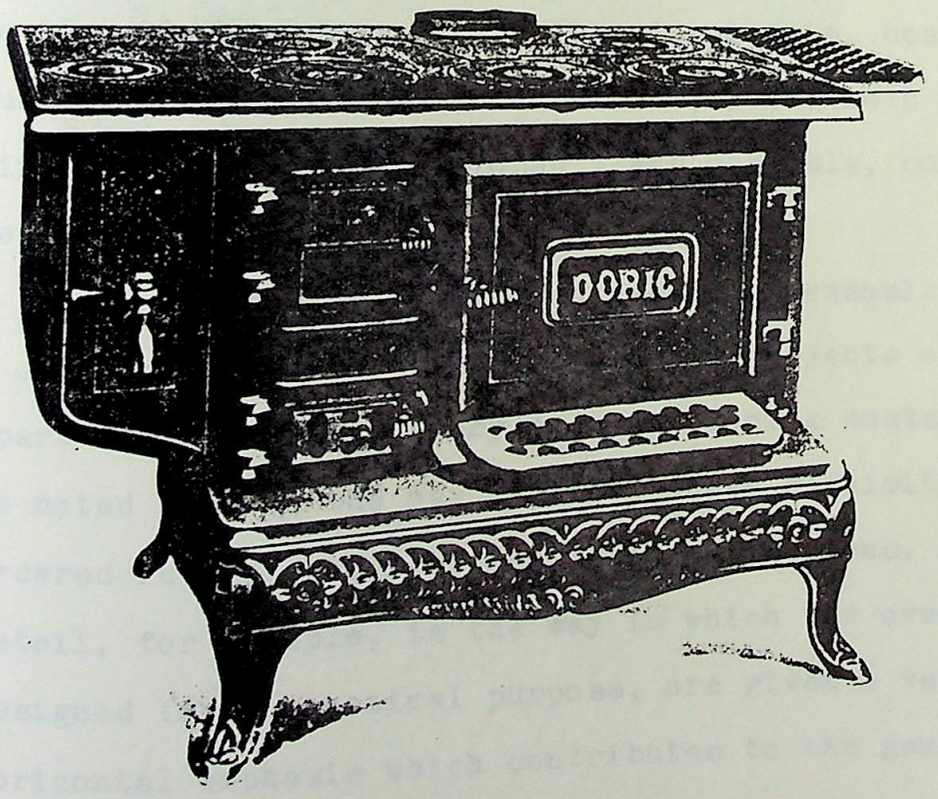
Example 23.





EXAMPLE 24. American Cast-Iron Range, I848:'Two Stoves in one'.

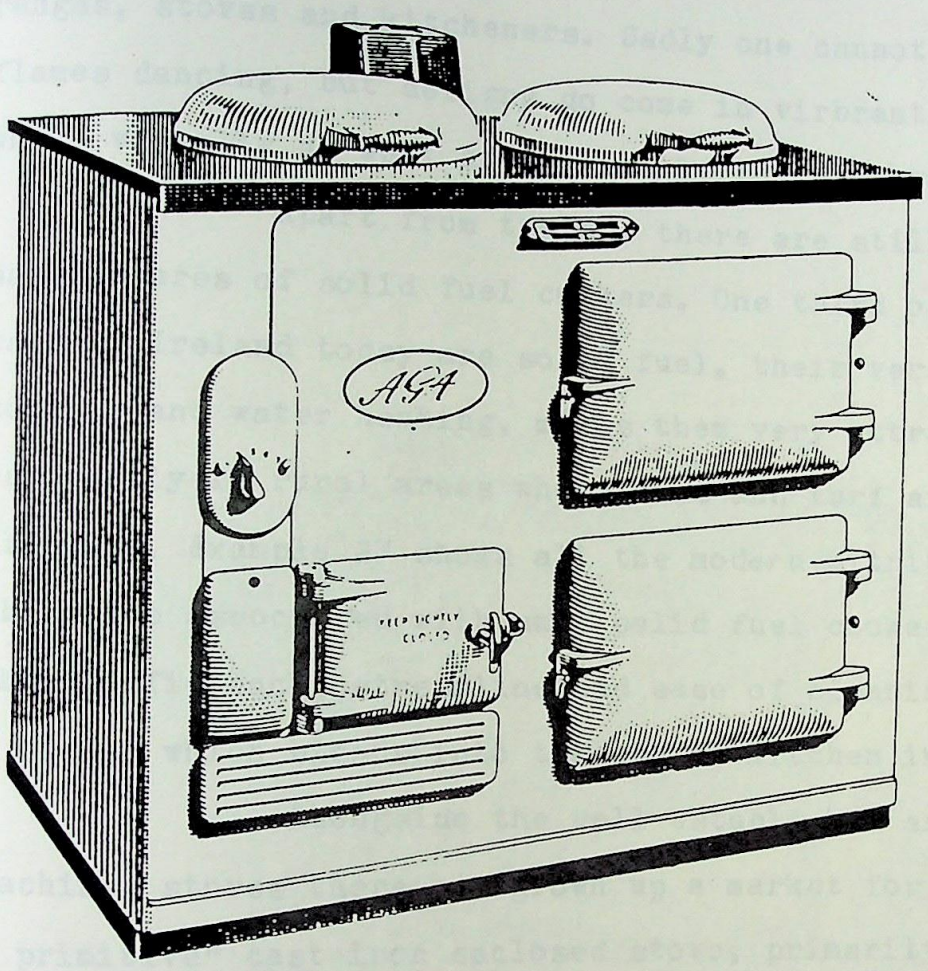




Examples 25. Portable ranges from 1914.

The use of solid fuel declined steadily through the first half of this century. Many British Cities made the use of all but smokeless fuel illegal and the pea soup fogs disapeared completely. These conditions and regulations nearly brought the kitchen range to an end in the cities. One of the solid fuel ranges which remains and flourishes is the Aga, example 26. The Aga was invented by a Sweedish physicist and Nobel prize winner, Dr Gustave Dalen. It was launched in Sweeden in I924, and in England in I929. Count Romford had proposed ranges which controlled the heat from the fire, conducting it to where it was needed. Dr Dalen provided the first closed iron range designed on the principle of heat storage. The whole range is thermally lagged and the only way the heat can escape is through two circular apertures on the top surface, on which the pots and pans are placed. Heavily insulated hinged lids cover these holes when no cooking is being done. There is also an oven, and arrangements can be made to heat water for domestic use, up to 90 gallons a day. With better insulation, continuous burning (originally anthracite nuts, later both oil and gas fired versions were developed) was possible, consuming a modest quantity of fuel.

The cooker is also an excellent example of archite ural principles of design applied to objects of daily use, apart from its efficiency and low-running costs, what should be noted here is the way in which these requisites have been ordered into a design of admirable proportions. A pleasant detail, for example, is the way in which the oven doorhinges designed for a practical purpose, are given a very definite horizontal emphasis which contributes to the general harmony



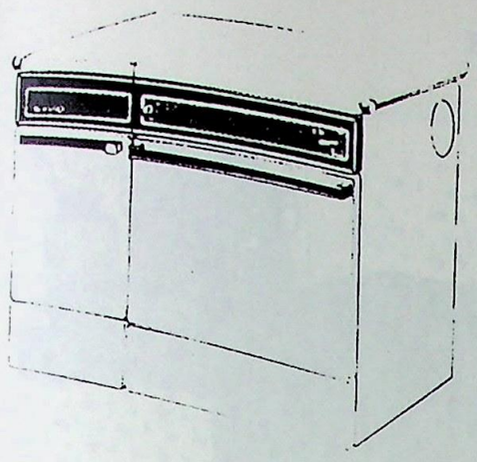
Example 26. The Aga cooker, designed by Dr Gustave Dalen in I924.

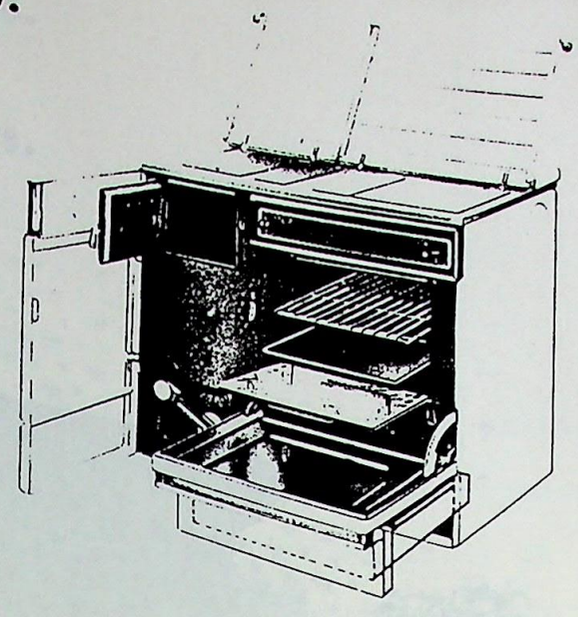
of the structure.

The Aga served to re-establish the kitchen fire as the hub of house-hold activity and a focus of family life, for family meals are always eaten in the warmest room, which with an Aga, is invariably the kitchen. Here the fire returns to it's ancient purpose, where either the Aga or Rayburn is apotheosised as a sleek Cheshire catversion of all past ranges, stoves and kitcheners. Sadly one cannot see the flames dancing, but designs do come in virbrant colours, which visually as well as physically radiates warmth.

Apart from the Aga there are still many manufactures of solid fuel cookers. One third of cookers used in Ireland today are solid fuel, their versatility in cooking and water heating, makes them very attractive, especially in rural areas where wood and turf are still abundant. Example 27 shows all the modern attributes which are associated with many solid fuel cookers today. Their efficiency, streamline and ease of cleaning, produces a cooker which blends into the modern kitchen interiors.

Alongside the well-established and well-machined stoves there has grown up a market for the "neo - primitive" cast iron enclosed stove, primarily as room heaters, although most of the stoves have hot plates for heating one or two pans. Most of these stoves are insulated and the mouldings are not highly finished, relying on an "antique" finished as a characteristic. Some of these stoves are fitted with back boilers, example 28.





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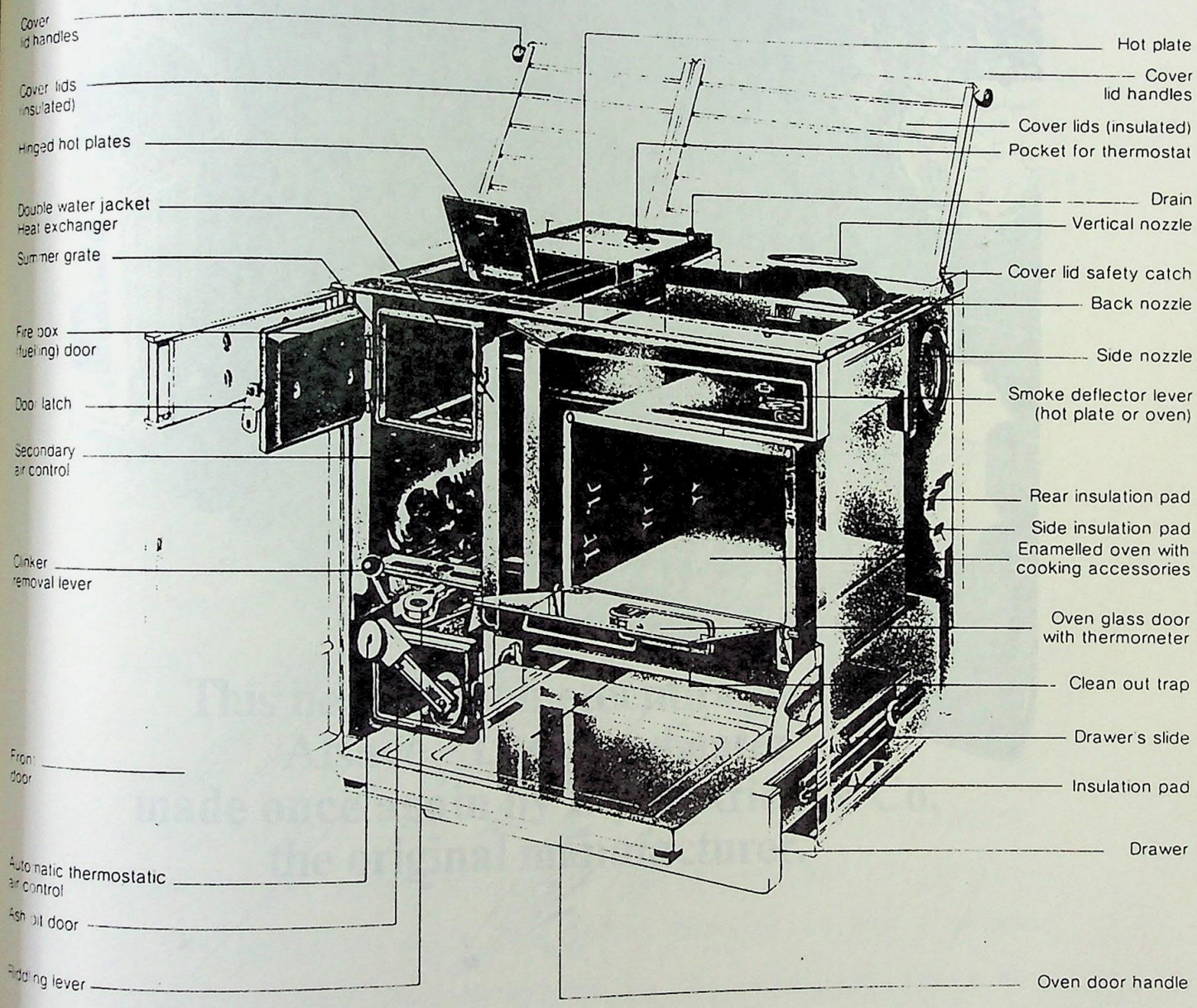


Example 27.

Example 28.

This beautiful nineteenth - century Alsace - Lorraine heater made once again by De Dietrich & Co, the original manufacturer.

SOCIAL CHANGES.

The Social Status of the Range.

In working class homes before I850, the progress and adoption of the range was slow, mainly because they were too expensive but also because the large open ranges had an affinity in homes of the middle and upper classes, they were regarded as a Landlords fixture and therefore a status symbol of their life-style. Poor families, in towns and country alike, often had to make do with the iron pot, suspended over the simple open fire. Nevertheless, after about I850 with the introduction of the closed and portable ranges, new working class homes were usually fitted with such, which at least had a small oven. The adoption and wider use of the range was now becoming more prevalent in working class homes breaking down the status symbol which the larger ranges had brought about.

Decline of the Domestic Servant.

It is often thought that the developement of a market for household appliances is that appliances replaced servants. Although this idea sounds convincing, and the names of the appliances themselves, eg "Daisy" vacuum cleaners, would lead one to believe that this was true, it is something of a myth when it is seen in the light of the following three facts. Firstly, even in the golden age of servants, in the I870s not more 20% of the population had a servant living in, and the percentage in the inter-war years was about 8%. Yet domestic appliances of a more or less sophisticated kind were in use in the majority of homes by the I930's

so clearly it has not been a matter of straight forward replacement.It is true that there were more daily helps' after I9I8, so bringing up the proportion of households that had some kind of service, but the total was still no more than 20% of the I87o's. Secondly, most of the appliances with which we are now familiar, were developed before the big decline in servant numbers occurred, so the vanishing servant cannot be accuced as a cause. Contrary to popular belief, the First World War did not end the system of domestic service, but was simply a temporary interruption, there were only I0% fewer domestic servants in I9II, and the major decline in servant numbers did not occur until the Second World War. The shortage of servants, which began before the First World War was not the result of a straightforward decline in numbers, but occured for quite different reasons that we will consider shortly. The third fact which destroys the myth, is that most of the early labour-saving appliances were expensive and were bought principally by people who had servants, for use by servants and not to replace them. In womens' magazines and the popular press of I9I0's and 20s the servant problem was discussed. What did this mean ?. Briefly the problem, as women of the class who employed domestic servants saw it, was that it was increasingly hard to find servants who would give a high standard of work at traditional wage. The best way to explain this is to look at it from both the employers and servants positions. To start with the servants, there is no doubt that most women only went into service because there was no other work for them to do and that the work itself was laborious and the relationship of

servant to employer an unpleasant and patronizing one. Margaret Powell who was a servant in the I920's, describes in her book*"Climbing the Stairs", their positions as folows, "servants were not real people with minds and feelings, they were possessions". Women who could do so, understandably looked for other jobs, of which there were an increasing number in shops and offices in the early decades of this century. As these jobs required some level of skill, those with least education tended to be left to work as domestic servants and this accounts for the complaints of employers about the deteriorating quality of service.

The fall in servant numbers between I9II and I93I was small, only about I0%, nothing compared to the increase in the size of the middle class over the same period. The number of salaried workers grew from I.7 million in I9II to 2.7 million in I92I, and if we accept salaried work as an indication of middle class status, we can see that a very a large number of people saw themselves for the first time as middle class. One of the essential marks of middle class status had always been to employ a servant, but because the number of servants had not increased, this became an impossible aspiration. What in that case was the real reason for the"servant problem"?. Clearly the servant problem was not the result of declining servant numbers so much as of growing prosperity, and a rapidly expanding middle class, which expected to be able to keep servants. The real solution was not to encourage more and more reluctant girls to go into service, but to develop the concept of the " servantless home", as a way of making life without

*M. Powell, Climbing the stairs, London, I969.

servants respectable. The servantless home only made sense in the middle class value system, because almost no working class home had servants it could do without, the argument for the servantless home was that servants if obtainable, were expensive and probably inefficient, so that it was cheaper to buy some labour-saving appliances, with which the housewife would carefully manage, both the housework and still be left with sufficient leisure time to enjoy the benefits of middle class life. The design of kitchens changed, gone was the huge black kitchen range (swallowing tons of coal) with the kitchen table in front of it, round which the cook and the maids would sit, and the separate scullery with its tilled floor. The new kitchen was built for the housewife. It had flat topped equipment, a small compact gas or electric cooker, all easily cleaned and fitted into a small compact space.

COOKING WITH GAS.

Gas heating and cooking did not emerge until long after gas lighting. Experiment with gas lighting took place as far back as I6I8 with Dr Tardin of Grenoble, he used both natural and home made gas. John Clayton of Wigan was covering the same ground about I69I. William Murdock, a Scot, was lighting his cottage and offices in Cornwall by gas in I792, and a factory in Birmingham in I803. In I806, a Mr Warner proposed that cottages and farm-houses in England should be lighted as well as heated from one stove by means of wood-gas. Wood was put in a retort above the fire chamber, and the gas from it could, after passing through filters be carried by pipes to other rooms. Burners were formed by the simple process of piercing the pipes. If not needed for lighting, the gas could be fed back to assist the fire.

The Gas Light and Coke Company of England was granted a Royal Charter in I8I2, and by I823 its lamps were lighting 2I5 miles of London streets. Even quite small communities soon aspired to a local gas works. Though the gas jets were still mere holes in the pipes, these gave a better light with the coal gas of those days than they would with modern gas, which has a very different chemical composition .Coal gas is not a single chemical substance of constant composition, like hydrogen (though about half of it is hydrogen). Unlike hydrogen, if burned in a closed space it gives a sooty flame, and if in air, produces poisonous carbon dioxide. Modern town gas is made less and less from coal, coming partly from natural gas and increasingly from the distillation of petroleum. It is not intended for

lighting, except indirectly by the obsolescent way of heating and incandescent mantle. The old coal gas had a good enough potential heating value but the early fires and cookers burned it unmixed with air, save what it could find at the outlet, and they proved smokey, smelly and expensive to run. A Mr Winzler proposed a gas cooker in I802, example 29, it was an adaptation of a laboratory furnace, and contained its own gas generator, with the gas pressure kept up by bellows. If it was ever used in the kitchen the cook had to tend the generator as well as the food, and pump the bellows between whiles.

The first authentic use of gas cooking in the home seems to have been at a demonstration by James Sharp in his house at Northampton between I830 and I832, and his cookers went into production. A period prolific of patents followed. Hicks Patent Gas Roaster of I83I is described by it's inventor."The object of this invention is to roast meat by the flame of ignited gas that heat being confined under a conical, which is placed as a screen over a circular burner, and the meat to be cooked is mounted upon a vertical spit in the centre of a circle of gas flame. We shall find this method still in use, and found unsatisfactory a generation later. Wellers Gas Cooking Apparatus of I839, for boiling or baking, is made to stand in a fire place or a recess. It is for summer use when a fire is not wanted except for cooking. A gas ring stands in a double shelled oval container, with an oval opening at the top. Into this opening is fitted one of a set of oval rims, each with a hole the exact shape and size to take the

particular vessel chosen for boiling. For baking, an iron plate on short legs is inserted above the burners. One modern safety device is anticipated, in the provision of a key for the gas top, to prevent children and others from interfering. Example 30.

Grahams Gas Range, made in Glasgow in I85I, example 3I, is on fairly modern lines, with it's five spiral burners above, and oven with hot cupboard below. This design was shown at the Great Exhibition of I85I, in the Crystal Palace. Bowers Reg stered Gas Cooking Stove of I852, example 32 , has the basic features and the rectangular form, of the modern cooker in the layout of the air-insulated oven, its shelves, and cooking top.

There was no future in relying on flame alone to generate heat. Efficient gas heating and cooking had to await the adoption of a simple device, the "Bunsen Burner". The cre-dit for the Bunsen Burner should go to one Peter Desdga, if not to Faraday who had previously designed an adjustable burner on this principal. Nevertheless one day in I855, Baron Bunsen noticed the effect of a puncture in an upright gas tube, the gas did not leak out from the puncture but drew air in to mix with it, and a correct mixture burned with a clean hot blue flame. Within a year, Pettit and Smith had applied the principle to a gas fire in which a row of Bunsen Burners heated a rafactory material. This gave a large amount of radiant heat, instead of a small amount of convected heat and some unwanted light. It was and still is the answer to the use of gas.

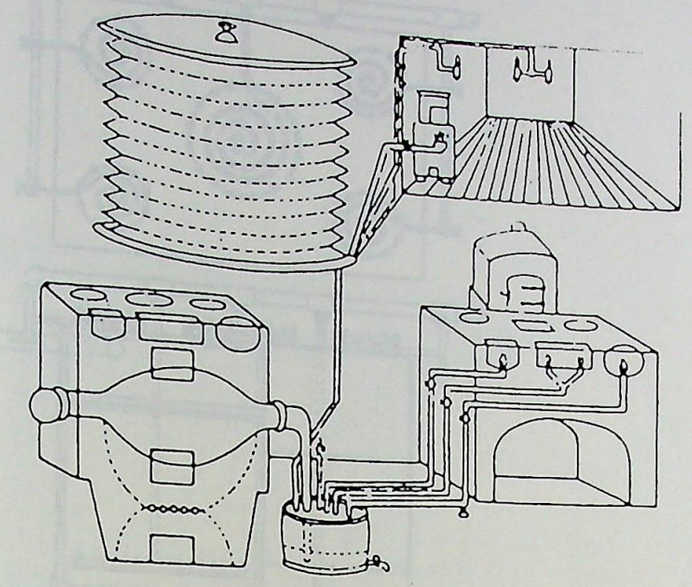
The history of the use of gas for heating and cooking during the three decades from I850 to I880 was one

of exceedingly slow developement. Around I880 the public gradually looses its distrust of the gas range. One must not suppose that people at large were quickly or easily won away from wood and coal to the imponderable fuel. In I889 a Chicago catalouge stresses.

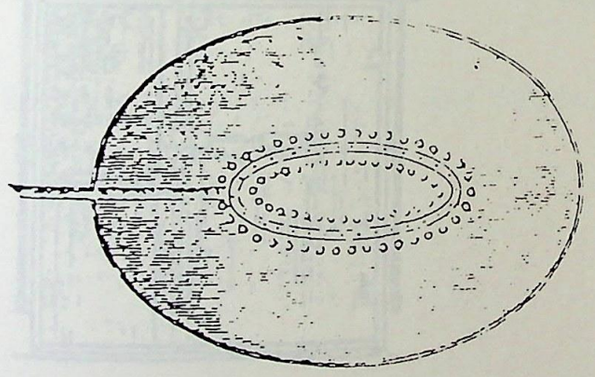
> "For eight years we have been manufacturing the Jewel ,(example 33), we were among the first to appréciate that gas was to be the fuel of the future". "is the use of gas for cooking purposes an extraordinary luxury ?, No, it is an economical necessity".

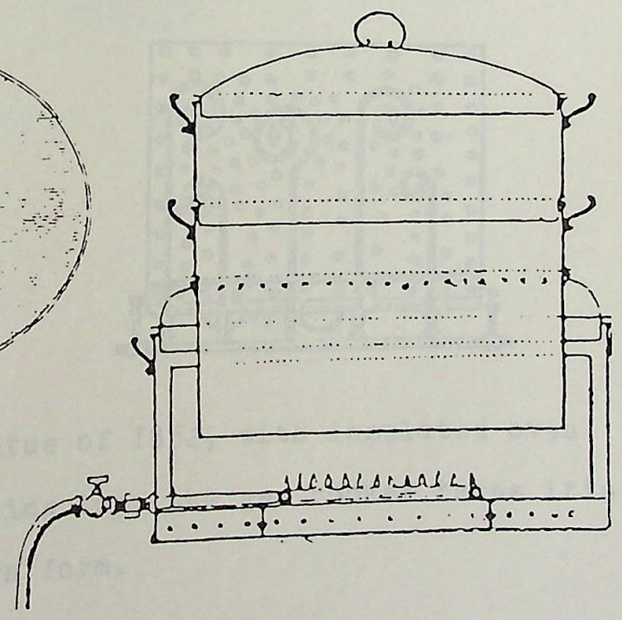
The popular prejudice is gradually given way.

By I9I4 most working class homes in towns had a gas stove, these were usually installed to suplement the range. In the middle class household the gas stove was put in the kitchen but in the working class household it was usually put in the scullery, this was due mainly to the different size of houses between the middle and working class houses. The kitchens in the working class houses became more of a living room due to the lack of space or number of rooms in the house. The larger kitchens of the middle class houses could well aford to accomodate the gas stove. There were also gas ranges on the market which heated water and had space heating radiants and were intended to replace solid fuel ranges, but they were not widely bought; a compromise arrangement was the combined coal and gas range,example 34, which had a fold down gas hob which could be used to avoid having to light the fire, but again, although it was an intelligent idea it was not common.

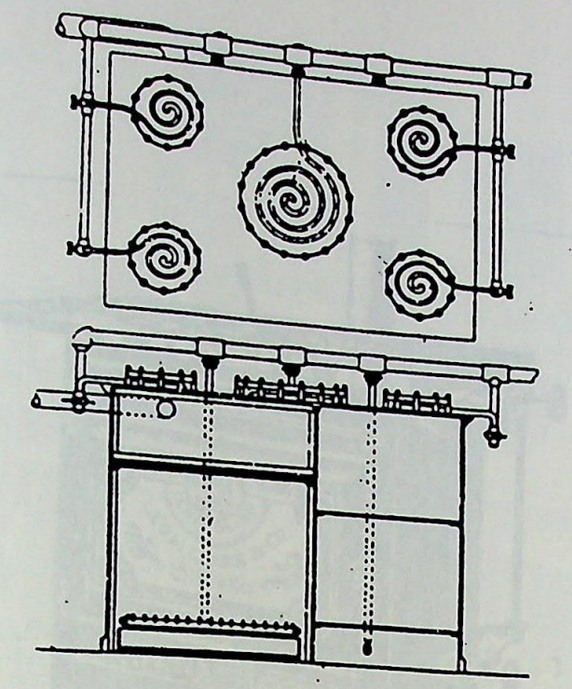


Example 29. Winzler's gas cooker, I802.

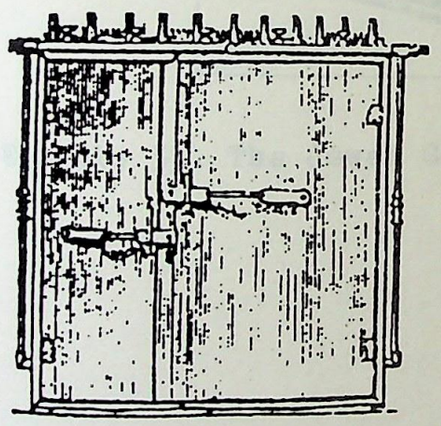


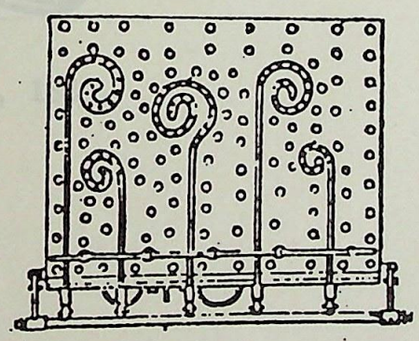


Example 30. Weller's gas cooker, I839.

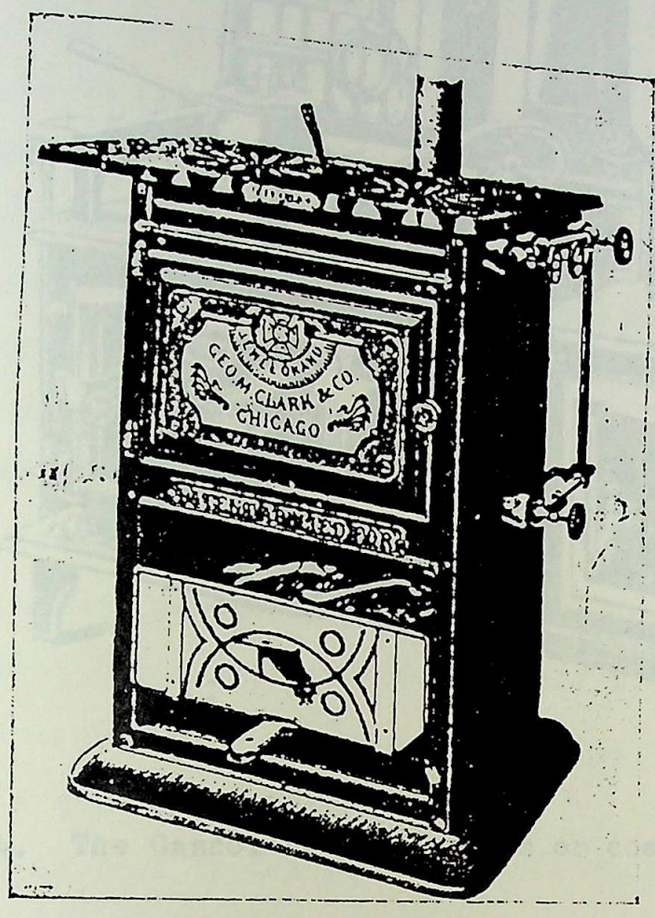


Example 3I. Graham's Gas Range, I85I, shown at the Great Exhibition at the Crystal Palace, in the same year.

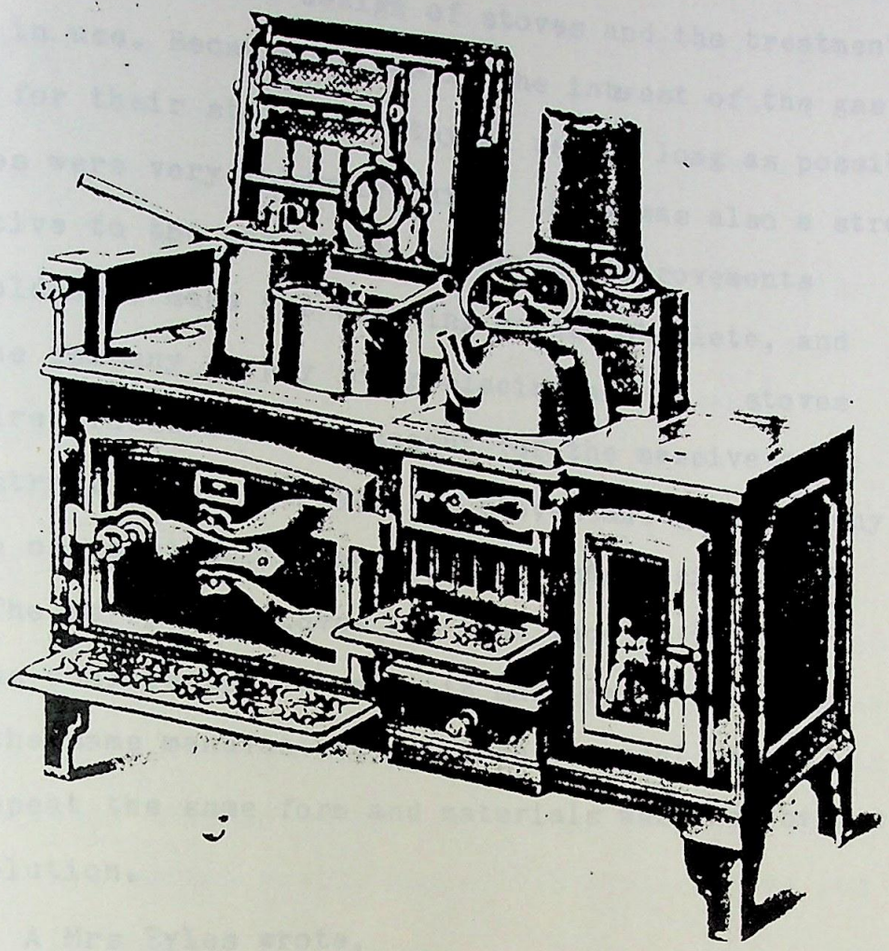




Example 32. Bower's apparatus of I852, with insulated oven below the cooking top, the gas cooker takes it's standard modern form.



Example 33. The Jewel Gas Stove, I889.



Example 34. The Gascol range, for gas or coal, before 1920.

Until the I920's gas stoves were normally hired out by the gas supply company's to the users, and this practice had some effect both on the design of stoves and the treatment they got in use. Because it was in the interest of the gas company's for their stoves to stay in use as long as possible, the stoves were very robustly built, there was also a strong disincentive to the company to encourage improvements which would have made the existing models obsolete, and forced the company to pay for replacing all it stoves out on hire. These reasons account for the massive cast iron construction of pre I920 gas stoves and explains why the style of construction had hardly changed since the I860's. The early gas stoves had been made on the same pattern as coal ranges, because in many cases they were made by the same manufacturers as made the coal ranges, and to repeat the same form and materials was the obvious design solution.

A Mrs Eyles wrote,

"I am told by the gas company's official, that very few people clean gas stoves".

"A woman who takes immense pride in a polished range lets her gas stove get into a disgusting state, inspite of the card of instructions issued by the gas company, of course the iron stove is a cruel infliction to woman, in the existing stoves much more enamel work could be used because this only needs washing with soap and water, this doing away with the blackleading which sends particles of lead into the cleaner's lungs".

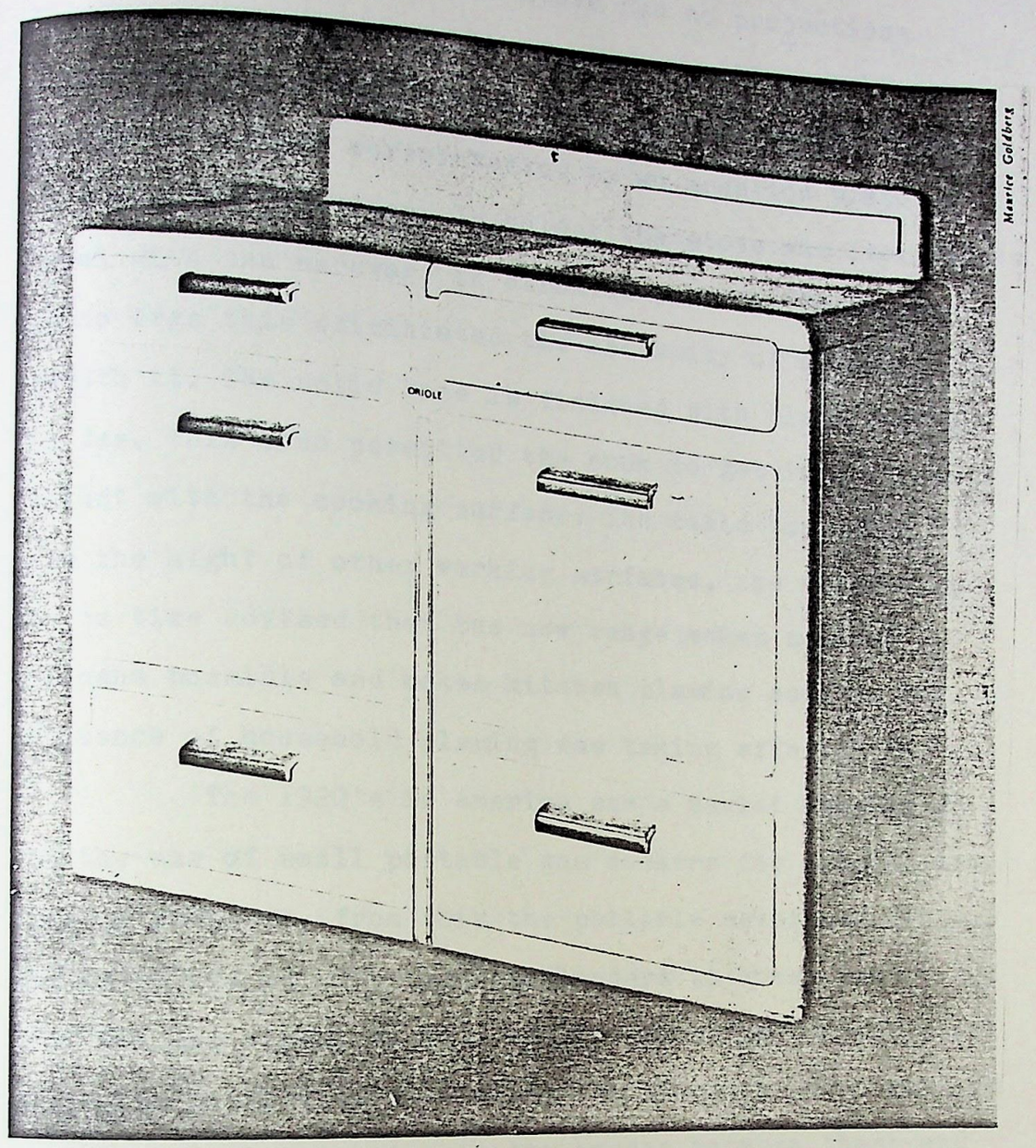
In the I920's the construction and design of gas stoves did change to meet demands of this kind. Not only was there more enamel work introduced but a greater part of the stove was made from pressed steel panels which reduced both the weight and the cost of the stove making outright purchase possible.

The major technical innovation in the design of gas stoves was the introduction of the "Regulo" oven thermostat in I922. Before this there was no means of maintaining constant oven temperature, and therefore the gas oven was as unpredictable as the oven of the coal range. An new approach in the design of gas cookers was starting to appear around this time, the American Gas Stove Company introduced a new line of gas ranges with the name "The Magic Chef",example 35. In this line they introduced a comparatively simplified type of design which immediately caught the eye of the public and within a short time led the market in sales.

One of the first Industrial Designers to properly tackle and change the shape of the gas stove was Norman Bel Geddes. Working for the Standard Gas Equipment Corporation in the I930's, he observed that most of the existing gas stoves contained shelves and interior corners which only the most diligent housekeeper could keep clean. Generally these places collected greases and other deposits from cooking, which eventually caked and spread until the range was anything but attractive in appearance. Bel Geddes came up with a design which was very different to what had preceeded, example 36. It was designed to give the utmost

Example 35. The Magic Chef Gas Stove.

Designed by N.Y. School of Fine & Applied Art 1929.



Example 36. S.G.E. Gas Stove, designed by Norman Bel Geddes in I932.

simplicity inappearance. The stove had no projections or dirt catching corners, the fewest possible cracks or joints where dirt could accumulate. Burner casting formerly exposed to spillage wereprotected by an areation plate which was easy to clean. In colour the stove was ivory white enamel with the hardware in chromium plating. The stove had no legs this eliminiated the necessity of cleaning beneath it. The solid base is finished with black enamel recedes, this also permitted the cook to get into closer contact with the cooking surface. The table top range fits the hight of other working surfaces, the catalogues at the time advised that the new range makes smaller kitchens possible and makes kitchen planning easier. The influence of household planning was taking effect.

The I920's in America saw a market opening up for the use of small portable gas cookers for picnics and camping purposes, from this the portable developed.The gas is delivered in pressure-cylinders to homes remote from the gas mains, it is a mixture of butane and propane. Oil-wells usually release a mixture of crude petroleum and natural gas, butane lies in the border between these and occurs in both. It is so volatile(it boils at about the freezing point of water) that in early days of refining, most of it was lost. Now it is recovered as a liquid mixed with propane and delivered under pressure. When the pressure is relieved it completely evaporates to give a gas of the heating power of ordinary gas.

THE INTRODUCTION OF ELECTRICITY.

By I890 the technology of both coal and gas had reached a point when there was no more uses to which they could be put, and there was only scope for the improvement of existing appliances. Gas, which had beenwcommon use in towns since I860 was used for cooking, lighting and space heating, and the only other appliance developed after I890 was the refridgerator.

Electricity was the energy source which opened up an almost unliminited prospect, as the electrical review wrote in I93I,

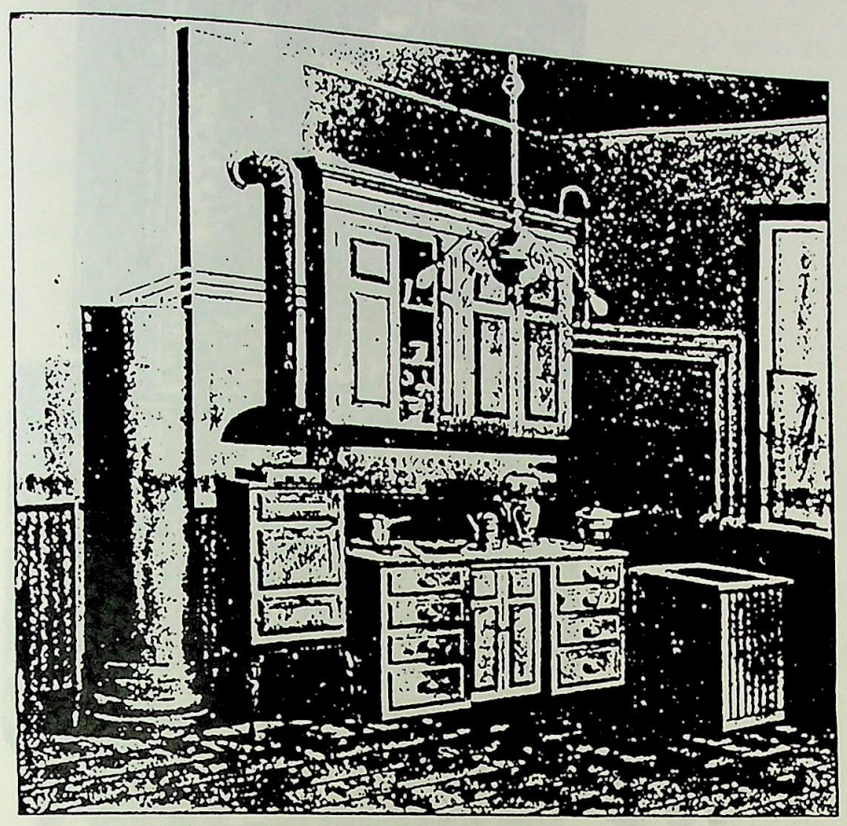
"Electricty is an adventure with infinite and entrancing possibilities".

There was a public supply of electricity for lighting and power to private houses in some towns from I890, but at a cost that few could afford. In the I890 a unit of electricity cost 6d in the West End of London, a considerable sum in those days. Coal and gas, on the other hand were cheap,and therefore electricity was never really considered for heating or cooking. By I9I4 there was enough consumers to make eletricity relatively cheap, it had now fallen to Id per unit for power in some areas. Until the National Grid was established in I926 there were wide discrepancies in price of electricity between different supply companies Once electricity was generally available it became possible to imagine it, if not to use it, as the principal energy source of the house, and there was, even by I9I4, working examples of the"All Electric" home. The real prices of coal and gas remained roughly constant between I9I0 and I939, but the price of electricity steadily fell, and as

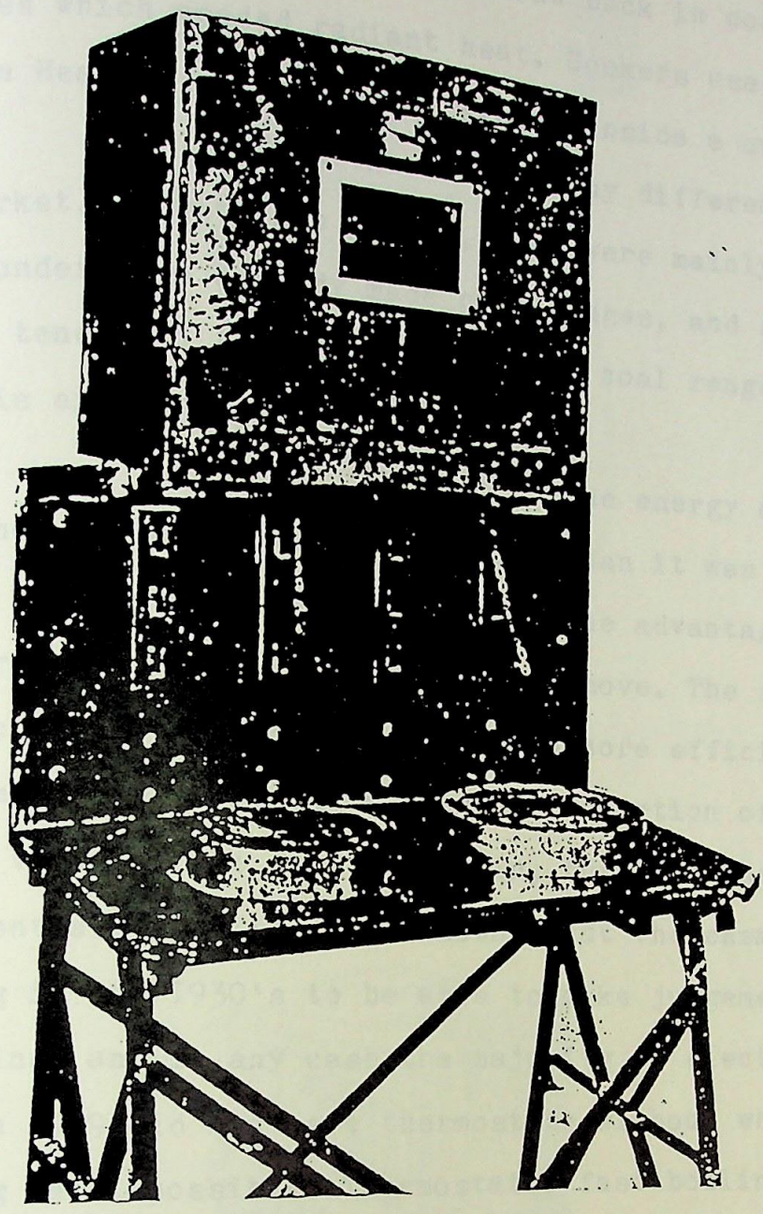
it did so, it became more and more possible to use electric-
ity for other things apart from lighting the home. As
electricity is a commodity whose production costs falls
sharply the more it is consumed, it was in the interest of
supply companies to encourage greater use of electricity.
This they did most successfully, and the progress of
electrification shows a steady annual increase from I9IO
when less than 2% of households were wired, to I939 when
almost three-quarters of households in the United Kingdom
had electricity laid on. The most rapid advance took place
in the I930's when about half of existing British homes
were fitted with electricity and it was also during this
period that the major fall in price occurred. The advantages
of electricity, then and now were that it was very convenient.
It was available at the flick of a switch and in any place
that a flex would reach to, and it was adaptable to a far
wider range of uses than other kinds of energy. Further
advantages was that it was very clean, and easy to regulate
electrical appliances automatically, by thermostats and
time switches, in a way much more possible than with other
sources of energy.

ELECTRIC COOKERS

The first mention of food being cooked by electricity was in Canada in I887. The food was cooked on an electric sauce -pan, and was said to be objectional because it had an electric flavour, this was powered by a battery. Practical experim ents were first made in England around I890. An electrical fair at the Crystal Palace, London in I89I is said to have brought the new cooking agent before the public. The Chicago Worlds Fair of I893 gave a display of electrical illumination such as had never been witnessed before. A number of industrialists had spiritedly began electrical experimentations in various directions. Included in the exhibition was a "Model Electric Kitchen",example 37, having a small electrified range, electric broiler and electric kettles. Just as demonstration kitchens had been set up to bolster confidence in the gas range of I850, the same strategy was used four decades later to popularize electrical cooking. The Algonquin Club in Boston is recorded as having set up a demonstration restaurant for twenty people, where a full dinner was cooked, the cost of fuel amounting to barely over a cent per person. But this dinner seems to have proved no more persuasive than the electrically cooked banquet held in I895 in honour of the Lord Mayor of London. During the period I890-I9I0, there came an incubation of the electric cooker. The ' General Electric Range' of I905, example 38, stands on braced metal legs, the oven is still well above the cooking surface, with an impressive switchboard between. Until about I9I2 most electric cookers were converted gas cookers, example 39, of massive cast iron, though sometimes insulated. All electric heating elements had to be sealed in air tight containers to prevent



Example 37. Electric Kitchen, Columbian Exhibition, Chicago, I893.



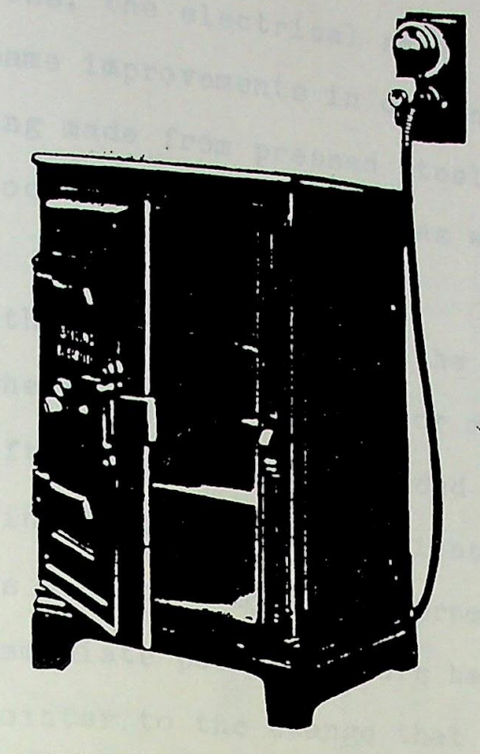
Example 38. General Electric Range, 1905.

burning out. This was less of a draw back in cookers than in fires which needed radiant heat. Cookers used the 'Bastian Heater' a wire spiral sealed inside a quartz tube.

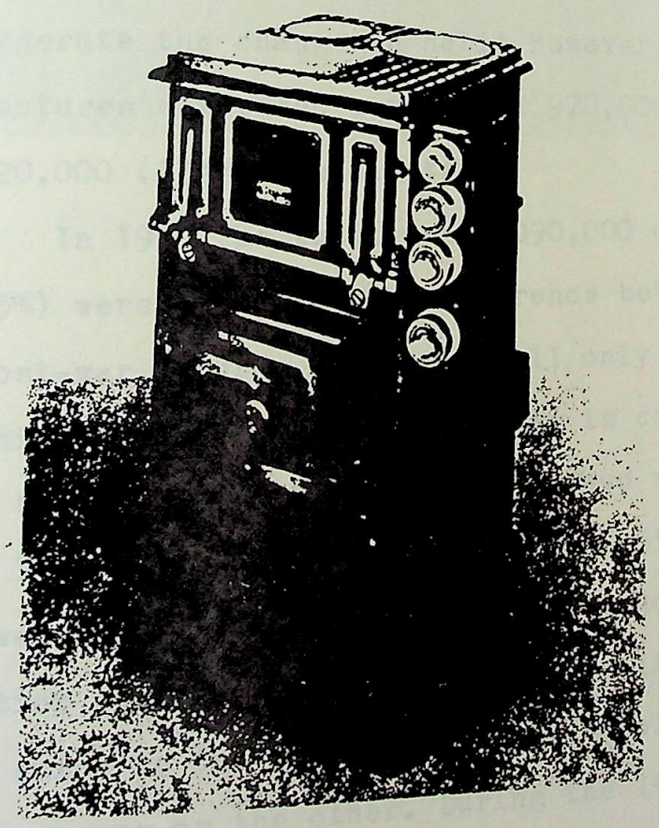
By I9I4 there were many different makes on the market. As with gas stoves, they were mainly made by ironfounders who already made coal ranges, and so electric stoves tended to look very similar to coal ranges such as shown in example 40.

Although the cost of the energy and of the appliance was more with electricity than it was with other fuels, the electric cooker did have the advantage that it was very easy to instal and easy to move. The supporters of electricity argued that it cooked more efficiently than other means, by allowing a greater proportion of the nutritional value of the food to remain, but this was a groundless arguement as too little was known about the chemistry of cooking in the I930's to be able to make judgements of this kind, and in any case the majority of electric cookers even in I939 did not have thermostats without which controlled cooking was impossible. Thermostats, fast boiling rings and even microwave ovens were technically possible by I939, but again the hire system which continued longer with electricity than with gas, had discouraged innovations because of the electricity companies fear of obsolescence.

Until I930, the electric cookers popularity began, the gas range held the lead and was apparently first to attain the 'table top' form standard today.From then on, as the largar electrical firms take to selling entire kitchen units and undertake their own investigation



Example 39. Gas oven converted to electricity, 1912.

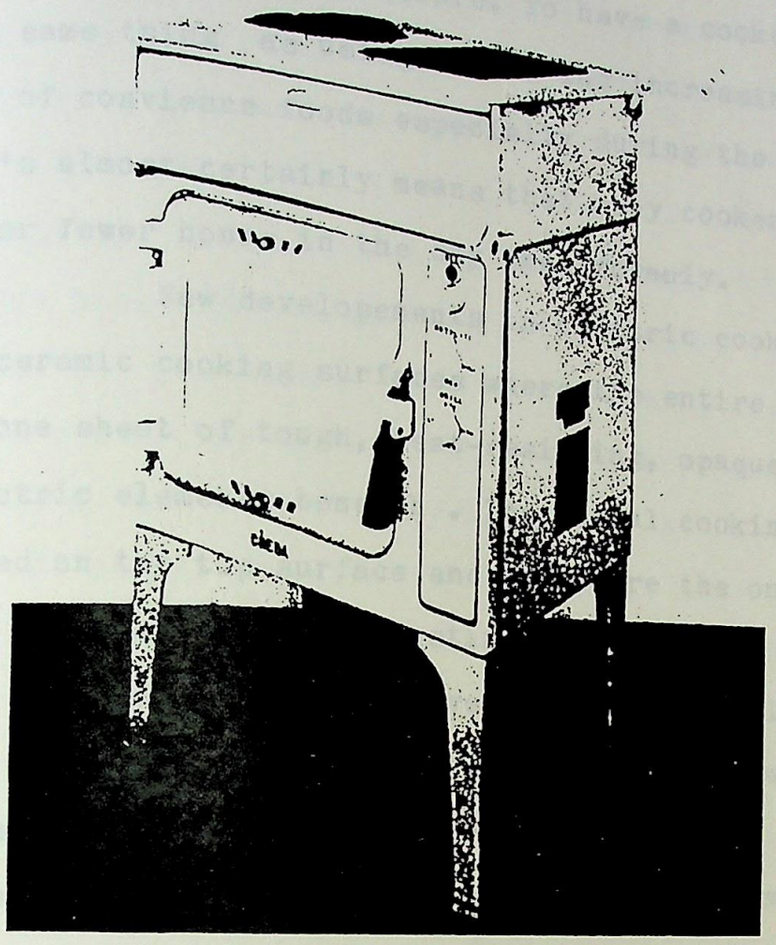


Example 40. GEC 'Magnet' electric cooker, 1912.

of the work process, the electrical range comes to the fore. Much the same improvements in design, such as a greater part being made from pressed steel panels and enamel surfaces occured with electric as with gas heaters, example 4I.

Before the Second World War, the majority of British homes, wheather working class or middle class cooked on gas. After the war coal yielded ground to gas and electricity in about equal proportions. The new pre-fabricated houses sponsored by the Government as an emergency measure in the immediate post-war years had electric cookers, and this was a pointer to the change that was taking place. Before the war it was extreemly unusual for municipal houses or flats to have electric cookers which demand, it is true, more careful and responsible handling than other kinds, especially if large bills are to be avoided. One should not exaggerate the change in habit however. In I939 many manufactures delivered a total of 970,000 cookers, of these 220,000 (23%) were electric.

In I950 the total was I,090,000 of which 275,000 (25%) were electric, the difference between the pre-war and post-war figures are very small, only 2%, but in such in a highly competitive market this is considered sufficient to indicate a trend, which indeed was continued during the I950's and I960's. in I970 about 35% of cookers delivered were electric. One cannot assume, however that the proportion of electric to gas cookers delivered is a reliable guide to the proportion of households which cooks by one means or the other. During the I940's and 50's many of the gas cookers sold were undoutable for



Example 4I. Creda electric cooker, 1933.

replacement, the design of all forms of gas appliances improved enormously during the post-war years, whereas many more of the electric cookers went into homes which had not cooked in this way before. To have a cooker is not the same thing as using it and the increasing popularity of convience foods especially during the I960's and I970's almost certainly means that many cookers are in use for fewer hours in the day than formerly.

New developements in electric cookers include ceramic cooking surfaces where the entire hob is made of one sheet of tough, heat-resisting, opaque material with electric elements beneath . The actual cooking areas are marked on the top surface and these are the only parts that get hot.This is an interesting developement, but it could be dangerous to inquisitive visitors or small children. When not in use the top can be used as a general work surface. Fan-assisted ovens, which incorporate a small fan set in a circular heating element, are a timely power-saving developement. By cooking food more quickly they can save up to 25% of the electricity. They also produce an even temperature, so large- scale batch-baking is possible. The other main developement is the microwave oven,which has been popular with the catering trade for some years and is beginning to appear on the domestic market but is still relatively expensive. It cooks dishes in a matter of seconds using high-frequency electromagnetic waves without heating the containers they are in. Speed is the main advantage but they do not brown the food so that it can look unappetising unless it is subsequently placed under a grill.

CONCLUSION

Food is the ultimate source of body heat, it provides us with energy. We have not as yet come to a stage when substitute food pills are necessary and I hope,we never will.

To get the best results from our food, depends on the cooks ablity to cook and the type of appliance they use. The choice of cooker still lies between, solid fuel, gas and electricity, each advertising the virtues of their medium. The housewife who chooses solid fuel is far better provided for than her grandmother was. With a modern insulated solid fuel cooker, if she will accept the occasional chore of starting it up, (and she may reject it for this reason if the house is not continuously occupied,) and will be patient in learning its ways, the fuel bill will be absurdly low.

If the choice lies between gas and electric cookers, the Consumers Association provides good guidance(Which?, October I980 and September I98I). On many important points- how well the ovens cooked, the size and speed of grill, ease of cleaning, and safety - no inherent differences were found. Other differences, briefly, are: Gas cookers cook faster on the hob, do not interfere with TV or radio, and do not leave residual heat. Electric cookers are kinder to paintwork; they do not have to be lit; most have more useful cooking space in their ovens; all have, or can have, automatic oven timers, and more have spits. Gas cookers were found to be more expensive to buy than comparable electric cookers, though much cheaper to run.'So if you are particularly keen on instant control of the heat, you will choose gas, if on cleanliness and a wide choice of extras,electricity'.

Experts in each generation continue to predict the exhaustion of fuel sources for the next, but the crisis is constantly delayed by new discoveries and economies. Wood is by no means obsolete as a fuel: more firewood is burned in the world than ever before, and more wood is used as fuel than for all other purposes together. Geophysicists can still find oil faster than we can burn it. Even should all these fail, a pound of uranium carries more releasable energy than 1500 tons of coal. Vast improvements in the collection of solar energy has been made over the past few years and within a short time will be an economical reality. So on the part of energy resources, our needs are well catered for, even in the distant future.

Our needs today, on behalf of the cooker appliance industry are well provided for, what ever lifestyle you may lead. Cooking can be very fulfiling if one enjoys it, but the majority of people who cook find it laborious, spending the least time in the kitchen; for others, such as in the third world countrys, are only grateful to have food to cook and don't mind how they cook it or how long it takes. These are the contrasts in life, different cooking methods and appliances are used to suit each ones needs. As new demands are placed upon the cooker to fulfil, it will continue to change, playing a major role in the household.

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