



Description of an economical and useful stove for warming rooms and other purposes : invented by Bracy Clark

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M. D. qu. 38²⁵

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Description of an economical and useful Stove for Warming Rooms and other purposes, invented by Bracy Clark, F.L.S. and Member of the Royal Institute of France, &c.

HAVING early in life been much attached to the pursuits of chemistry, and for amusement as well as economy, been led very often to construct the necessary furnaces and stoves with my own hands, so in years since, being desirous of warming my study in the most effectual and economical way, I contrived one which, after more than a twenty years' use, finding it both pleasant, effectual, and beneficial, I am induced to make it, by giving figures of it, and a description of it, more fully known to the public. This stove or furnace combines in one all the essentials of an English fire-place, German stove, and air furnace, being changeable from one to the other at pleasure in a few moments. I have called it *The Megalifer*, or *Megacalifer Stove*, from the great heat it gives out, with a comparatively small portion of fuel, conceiving the most useful property of a stove to be that of yielding from a given quantity of fuel the greatest share of absolute heat and of radiance when required, and to have these properties under good controul as to their proper degree; and, at the same time, to be simple in its construction, and of comparatively little expense.

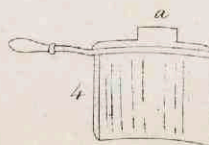
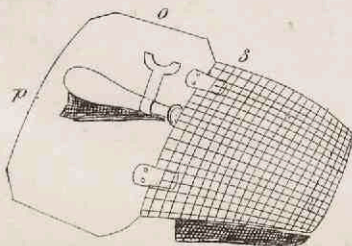
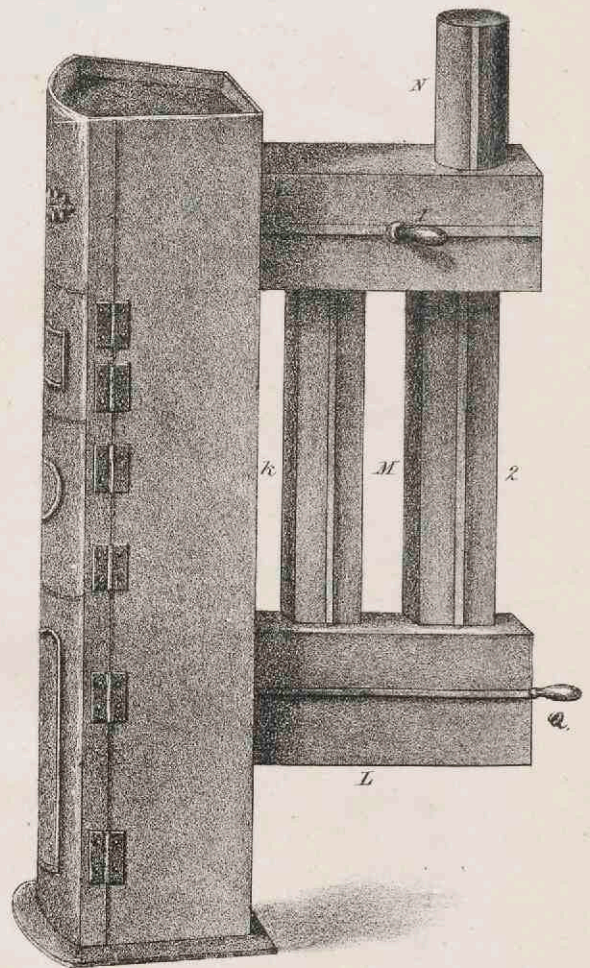
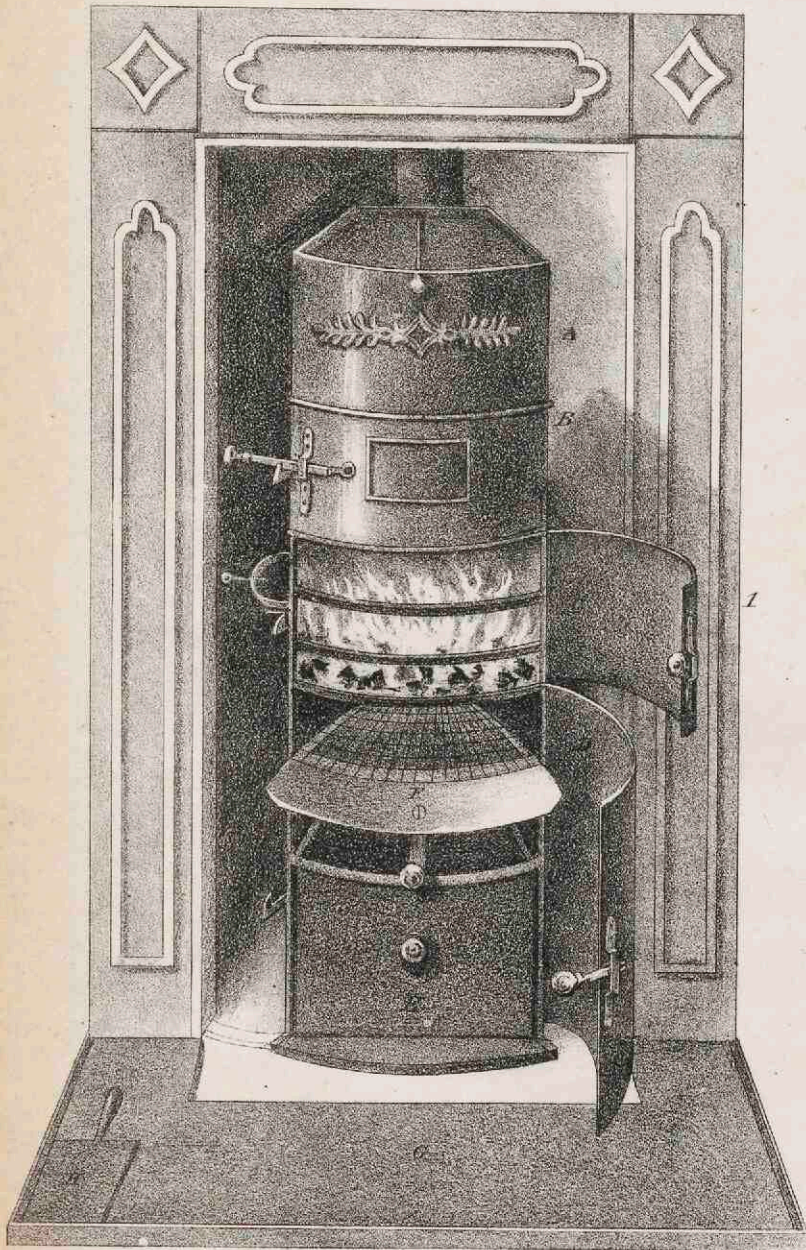
The fire in this machine can be wholly exposed as in a common English fireplace, or be half-exposed with a sharpened draft, or be wholly enclosed as in the German stove, and be kept out of view. Or, it can be made of the keen draft of an air furnace, which in the lighting of a fire quickly is a very great convenience. It admits also of boiling, roasting, or baking, in a small way; or for hastily warming water for shaving, or boiling an egg, &c. and this without soiling the tin vessels used, by the placing them in close contact with the stove on its outside, and opposite to the place of the fire, or on the fire itself for greater speed.

For a private gentleman's, or student's apartment, it will be found invaluable; or for a large poor family, where the consumption of fuel, and the making the most of it, is an object, as it will render a considerable sized room perfectly warm everywhere in the coldest day of winter. It is also a sure antidote and remedy to a smoky chimney, and it enables us also readily, and in a remarkable degree, to renew a fire immediately that is nearly gone out; and will burn well with very inferior coals, and is easily controuled.

I had a drawing of it made after a furnace I had had more than twenty years in use without its being near worn out, of which a lithographed copy is here given. And the following is a description of it.

In its general figure it is a tall square tower, Fig. 1, narrowing backwards, by which we obtain as much radiant heat as possible, farther increased by its bowing out in front. And by contracting it backwards, we not only diminish very much the consumption of fuel, but at the same time prevent the operation and effects of the fire upon the back parts of the stove.

The stove is made of common iron plate of moderate thickness, transmitting the heat readily to the air surrounding it, which air, as it cannot pass up the chimney, that being



closed, as we shall see more particularly hereafter, so it ascends into the room, and making for the ceiling, diffuses itself throughout.

The stove is contrived to stand in the recess of a common fireplace very commodiously, or only partially so, as may be thought best, and we now proceed to describe its provisions or parts. There are also certain pipes or tubes of metal behind the stove, which are almost concealed, and which contribute not a little to its effects, without being hardly visible, see Fig. 2.

The total height of the stove is about 2 feet 9 inches; and its rounded front exposure, in advance of a straight line in the middle of it, is about 2 inches, the actual width being 11. Its back line is only $7\frac{1}{2}$ inches; its side exhibits $7\frac{1}{2}$ also. Its compartments or divisions are as follow. Its general frame, I should first observe, is strengthened by a flat iron bar, going down its front edge, of $\frac{3}{4}$ in. wide and $\frac{1}{4}$ thick, and which receives also the bars of the fireplace.

The Top Chamber, A No. 1, confining and directing the smoke and flame, is of 6 inches depth, closed upwards by a well fitted plate of iron, which rests upon iron stays, and is sunk a full inch within its superior edge or margin, affording a light appearance to the stove, and a cavity useful for many purposes. This chamber in front is ornamented with a double feather of brass or iron gilt, which gives to it a more agreeable and elegant appearance.

B. No. 2, is the Suprafocal Chamber, receiving more immediately the flame and smoke from the fire, and is closed by a door $5\frac{1}{2}$ inches deep, and is provided with a latch handle for fastening it, and has an ornamental square of brass or iron on its front surface.

C. No. 3, is the Focal Chamber, or direct fireplace, the fire being supported on bars, resting on four stays bent at right angles; the bars in front retaining the fire, are narrow in thickness as $\frac{1}{4}$ in. but are $\frac{3}{4}$ in. wide, that by their substance or thickness may not absorb much heat or prevent radiance. The door is 6 inches deep.

Fourthly, we have D, the Infra-focal Chamber, which is much larger than the others, and contains below, E, the *Ash-box*, with its handle for drawing it out by. This box, on occasion, can be made to serve the office of an oven, having a lid or plate of iron, which closes it at top, inserted in a fold or groove. In this case it can be introduced into the top of the stove, the plate which closes it being removed, it is only suited however for any small matter, for the roasting or baking of it.

Above the ash-box, and resting by its foot on a bar which divides this lower chamber into two nearly equal parts, is seen a wire sieve, the wires running transversely across it to a frame made of a stouter wire, either iron or brass, and which sieve lets nothing pass but ashes and the smallest cinders, and is a great convenience and economy in saving fuel, and in roasting potatoes, or other things, and occasionally, when it may be required to damp the force of the fire, in throwing on it the cinders so collected.

To this sieve is attached a tin plate, F, of about six inches width, and which is bent downwards, or concaved a little, the better for receiving and collecting the ashes and cinders, which otherwise might litter the hearth, and directing them to the wire sieve, the outer or front extremity of it also sloping upwards. This slope upwards is maintained by a wedge, which is resting on the wooden handle attached to the sieve by loops of tin. Through the tin plate and wedge, and nearly through the handle, passes a screw, holding them all firmly together. If the screw passed quite through, we found by experience it burnt the fingers coming in contact

with it on handling this part in throwing the ashes or cinders on the fire, and the wedge was also contrived to prevent the hand coming into contact with the hot tin plate on these occasions.

To those who enjoy their pipe, this ash-box, being drawn out, becomes a convenient spittoon.

Fig. 3 exhibits the under surface of this sieve, and its attached plate, its fastenings and rising margins of tin to collect and retain the cinders from falling over; sufficiently plain, we apprehend, for any one to construct it by. And opposite letter O, is seen the iron stem or foot with its claw, by which it is supported in an elevated manner on the bar.

If it be desirable to close the stove entirely, we must first remove the tin plate and sieve and then we form a sort of German stove of it, and produce a slow consumption of the fuel, and any considerable escape of air from the apartment into the chimney.

The stove stands on a flat frame of iron, to which it is rivetted, of about the same thickness as the bars of the grate, having a projecting flange.

G, represents a broad iron plate, which defends the floor, and prevents any danger of ignition; exposing however, a good portion of the clean white hearthstone in front and sides of the stove, and gives it a lighter and more pleasing appearance than if the iron plate had covered the whole stone, as well as requiring less iron. Its margins are everywhere bent up at right angles, about an inch, to hinder the escape of any cinders or ashes. This plate in our stove is 2 feet 6 inches wide, and 2 feet from the jambs to its front turned-up edge.

In this same plate, letter H represents a small tray of plate iron, which fits exactly the left-hand corner of the plate or fender, and the front edge of this tray is let into or received within a slit or notch of the fender plate the edge being a little raised, and over which any dust, or ashes, or cinders, &c. are swept, and thus lodged, are easily removed by the handle throwing them on the fire, into the ash-box, or on the sieve.

Fig. 2 represents a lateral view of this stove, and exhibits an interesting part of the contrivance for increasing the heat communicated to the chamber, which is a distribution of iron pipes that stand in the recess of the chimney very commodiously, and almost unseen, and which can be brought into use or omitted at pleasure, the hot air of the fire being made to pass through them, or only a very short part of them, and this is instantly effected by the Valve I, whose handle is seen projecting from the side of the tube; turned horizontally, it allows free passage, and vertically obstructs any passage, without going first through the two perpendicular pipes, L, M, and so through the short pipe N into the chimney, which last short pipe is removable, being fitted on to a rising collar, beaten out of the upper surface of the horizontal pipe I, it is about a foot long, and we may just observe it is applied to the collar after the stove has been duly set and adjusted in its place in the recess of the fireplace.

The chimney is perfectly closed from any access of air (otherwise than through the apparatus) by an iron plate traversing it, the edges being turned down an inch at right angles, through which nails are passed into the wall, a perforation being previously made in it for pipe N.

We have found it highly convenient when the stove is to be removed for any purpose from its recess, to have a long nail inserted in the back wall, reaching nearly to the pipe N, and on which this tube is set whilst the stove is being withdrawn.

At Q is seen a trap-door, with its handle, for cleansing the pipes below, the upper parts being best reached through the doors of the stove and through the collar.

As cleanliness is also an object with a stove, as to the cinders and ashes falling about upon the hearth; and where we possess the great advantage of a fire-place bowing out and projecting circularly in front, by which exposure of the fuel we obtain a vast increase of its heat, we encounter also the difficulty of its dropping its ashes more extensively than in a perfectly flat grate, as this projection was a benefit of a description not to be given up, we palliated the inconvenience by the invention of a tin plate to receive such fallings; and sloping upwards, it turned the cinders and ashes on to the wire sieve, and saved any litter, more however than is inseparable from the burning of all fuel in open grates.

Farther, what ashes did happen to fall in putting on the fuel or in stirring the fire on the hearth stone, were easily brushed on to the iron plate extending over great part of the stone, and from this iron plate on to the little square tray at the left hand corner of it, they were, by its handle, easily taken up, and placed on the fire or in the coal or ash-box, so that it was, of all hearths I ever saw, the most easily kept clean. I need hardly repeat, the front edge of this small tray was received or buried in a rising slit in the plate, over which any ashes, &c., were easily passed, by the use of the hand-brush.

If the reader receives only half the pleasure and profit I have had in its use during many years, he will not have much reason to regret the adopting of it.

Useful properties and proper management of the Stove.

A FIRE of equal dimensions in this stove can be made to burn with more brightness, and consequently with more warmth and cheerfulness, than when placed in a common grate, and that even without the closing of either of the doors; but if we close the supra-focal door only, the briskness of the fire is very much augmented, more so than in any house stove. It will be said, that with this augmented brightness, the fuel is consumed faster, and such is the fact, but I maintain it as a truth, that with a moderate brightness, the warmth and radiance given out is in a greater degree than the increased consumption, compared with a low fire of little or no brightness or radiance.

The great perfection of any stove is to be completely under command, and to yield the greatest possible share of heat and light with a given quantity of fuel: some admire a slow smouldering stove, but we admire rather a very bright one, that can be made a smouldering stove at pleasure, whereas the smouldering stove cannot be made a very bright one.

A stove smaller than this, on this principle, if properly attended to, would be adequate to all the purposes of heating a room, but then it would be liable, if not frequently looked after, to going out, as with a very small mass of fuel, will always be the case. I find, to make a long enduring fire, it is well to heap the fuel at the side of the fire-place or grate, that is, when the fire has been well lighted,—the ignition, in crossing over to the cold mass, takes some time, and from the mass heaped together, is long in consuming, which, before it is too far consumed, we heap the fresh coals again on the opposite side, when a similar operation

of crossing over slowly takes place, for the fuel being attacked only on one side retards a too rapid ignition and consumption: in this way the fire was easily maintained, without much or very frequent attention; or the same may be done by heaping the coals on the back of the stove, drawing the fire previously to the front part; and in this way the difficulty is tolerably well removed. In all other respects, this stove has superior advantages, and the pipes behind are so contrived as to be no desightment at all to an apartment, which a straight pipe of the same length undoubtedly would be, with the advantage of using it or not, at pleasure.

In my early attempts with this stove, I proposed to add to its other properties, that of being a descending one, at will; that if any chop or steak was done over the fire, the smoke from the burning fat might be carried downwards through the hot coals and be burnt, instead of mounting upwards in the room or chimney, this I also effected, but abandoned it afterwards, from finding that this operation was liable to uncertainty, for if the mass of fuel was at all in a thick or dense stratum on the grate, the descent of the smoke was precarious, too much so indeed to be trusted, and a very thin stratum of fuel was always liable to go out.

The Arnott Stove is much employed at present, but the vast mass of dried clay or brickwork the fire has to penetrate through to get the heat to the exterior of the stove, and then only in a weak state or degree, is a great waste of fuel and loss of time, especially where a speedy effect is wanting to be produced, as in a cold day, the thin metal in the present stove is so soon penetrated through, that it is almost as though the naked fire was presented to the air of the room, which in very cold weather is a great advantage, and in warmer weather the lowest degree of combustion, which a mixture of cinders, ashes, and fuel, and an open stove unclosed can produce, is sufficient, and in that case also, the valve being set open, the flues or pipes are put *hors de procès*. And if a dull heat be required, the whole stove can be muffled up by closing all the doors.

In early attempts with this stove, the supra-focal door for feeding the fire was half as high again, and the flue or smoke chamber consequently as much diminished or reduced; the consequence was, that whenever the door was opened, and the weather unfriendly, and the draft not very keen, it often smoked, but after I reduced the door, and augmented the depth of this chamber, it never was seen to smoke in the least, not even under the most unfavourable circumstances.

O represents more in detail the figure of the tin plate for receiving the ashes, and its handle *p*, having a wedge beneath it, between it and the tin plate, to give the latter an inclination upwards, it is secured by a screw, and tin clasps passing from the plate to the sieve: *q* is an iron stem forked at bottom, for spanning the bar of the ash chamber, for it to rest on, the other end screwed or drawn out to a nail point in order to drive it into the wooden handle.

We now take notice of an article or two of convenient use with this stove, and which will render a man very much independent of the attentions or neglects of servants. For instance, to get a little water hot for shaving or otherwise, the tin vessel, No. 4, is used; being filled with water, it is clapped to the side of the stove, and the wire on left hand of the stove embracing it, forces it strongly against the hottest, often red-hot, plate of the stove, and boils it presently. If more dispatch is wanted, a flat piece of wood, that is of deal board, *z*, is thrust into the tin vessel, which excludes an equal bulk of water, when it is presented

as before in a thinner stratum to the action of the fire. In this way, the vessel is not blacked at all or smoked, and being dried over the top of the stove is always found ready for use;— or a small black tin pot may be put into the stove itself, and the doors closed, when the hot boiling water is procured almost instantaneously. Fig. 5, is a tin vessel also to fix on the side of the stove, wide enough for boiling an egg or so, in the same way. We need not further dilate on the very extensive application of it in a culinary point of view, as these things will suggest themselves almost naturally to one who requires their use, as with the student of small means, or to the poor man of honest endeavours, and to whom economy may be imperative. The stout wire seen to pass horizontally through the top of the stove with a brass knob to it, will conveniently suspend a fowl or other matter requiring to be roasted.

For chemical or pharmaceutical purposes a hole in the side of the stove enables us to work a retort. A larger opening, as of 5 or 6 inches diameter in the closing plate at the top of the stove, enables use to use a sand or water bath. And placing over this same opening a metallic or earthen flat pan, we may conveniently carry on the process of solution, evaporation, desiccation, &c., or use a small Still or alembic, such as is employed for scented herbs. A crucible placed in the naked fire can be brought to an intense heat. In some of these processes, as that of evaporation, distillation, &c., the grate, which is easily removable, must be advanced nearer the vessels by suspension or by transverse wires or rods across the supra-focal chamber. Also from the iron lid covering this opening, when not used as above, having a knob near the centre, with a hook below the plate, can be suspended any subject within the stove at any distance from the fire by an iron wire or link.

On facility in lighting a fire.

In cities and towns where wood is dear, the mode of lighting a fire is some consideration in the year's expenses: some servants very wastefully employing it, and others doing the same business as well with a very little; my way of doing it, which may, perhaps, easily be surpassed by the ingenuity and frequent practice of others,—and if not, my motto simply is, that of Horace, "*Si quid novisti, &c., his utere mecum*,"—I thrust a piece of paper downwards and through the bars, (having first cleared a couple of bars from fuel, so as to admit air freely through them, and thrown a few small bits of fresh coal upon them to get a flame from, these bits being surrounded with the rest of the least burnt cinders,) this paper being readily seen and lighted with a match or candle when wanted: I then place two or three pieces of paper again over the former piece, and over this lay a small handful of little twigs, of old basket, or of the usual deals reduced to thinness, and again on these lay a stouter piece or two to maintain the fire, and on these some coals piled round about, dust and nubbings mixed. I then set a light to the bit of paper under the grate, close the supra-focal door, and wait the event. If more expedition is wanted, close also, or nearly close, the focal door, which makes a rapid draught, and the unclosed door fans back the flame in a remarkable manner upon the fuel, and the ignition is then most rapid.