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Improved Air Purifier.

The object of this apparatus is to filter and purify the impure air for respiration, to dry it when too damp, and, in summer, to cool it—somewhat as we would filter, purify, and cool foul water if obliged to use it for quenching thirst.

Practically it is found that when the charcoal, lime, and ice or water are properly provided, and the valve fully open, an apparatus occupying a space of only 15 by 23 inches on the floor, and 6 feet 6 inches high, supplies from 30 to 80 cubic feet per minute, in one constant current of perfectly pure air, dried and cooled to any desirable extent. It does this in any position in which it may be needed, without the necessity of specially receiving air from outside the apartment to form the current, and without any machinery of any kind to become disordered.

The materials used for purifying and cooling the air cause, at the same time, the circulation; and, when properly provided with these, it must continue to blow as long as the law of gravity continues to act. With it we can always sleep in pure air; and persons can even remain in the warmest and most filthy hospitals in the South, and, at the same time, be enveloped in, and breathe, an atmosphere as pure and as exhilarating as was ever breathed upon the hights of Oregon.

The expense of materials—that is, ice, lime, and charcoal—for providing a steady current of 50 cubic feet per minute, perfectly purified, and, in the hottest weather, cooled 20° and properly dried, has been less than two cents per hour in this city. Much of the season it is not necessary to cool it over 4° or 5°, merely enough to keep up the circulation through the disinfecting material.

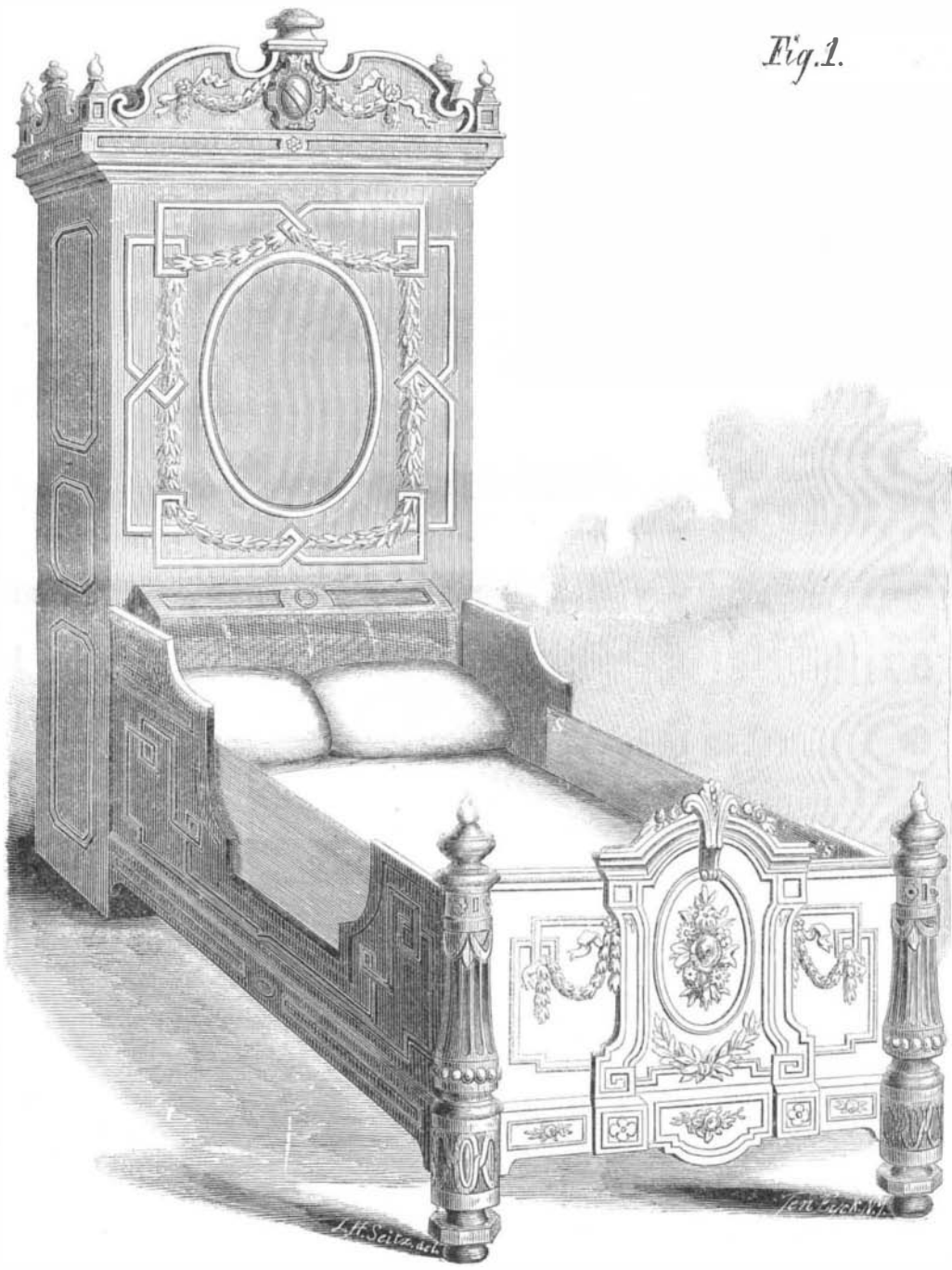


Fig. 1.

LYMAN'S AIR PURIFIER.

In the lower part of the apparatus, upon the wire-gauze bottoms of the drawers, L L, (Fig. 2), are placed lumps of unslacked lime. The air in contact with the lime gives off its moisture and its carbonic acid. This warms, rarefies, and causes it to rise. The air to supply its place enters through the valve door, E, and flows in the direction of the arrows. D is a deep drawer, with wire-gauze bottom, filled with charcoal. The air next flows up through this charcoal filter and the ascending flue, F, and comes in contact with the metallic roof, G through which it gives off a part of its extra heat. It next passes over and through the fragments of ice in the chamber, A, where it is still further cooled and condensed, and falls down through the grate and the descending cold-air flue, C, and is delivered through the opening, B, between the pillow and head board of the bed, as shown in Fig. 1. In hot weather the ice alone, without the aid of lime, causes quite a brisk circulation. In any weather the lime alone will produce quite a steady current. Half a bushel of unslacked lime has blown night and day for ten days, apparently without a moment's intermission. Both materials acting together produce quite a brisk current under all circumstances.

The spout, H, leads off the water, resulting from the melting of the ice, into a pan, from which it is drawn at will by the stop cock, I.

It is well known that there are immense amounts of minute particles of decomposing animal and vegetable matter floating in the air of cities, and more or less in all inhabited districts. There are also the deleterious gases, the products of the decomposition of animal and vegetable matter. These gases are carbonic acid and the compounds of ammonia and of hydrogen.

The air first passes through the lime. One hundred pounds of lime will absorb twenty-four pounds of carbonic acid gas even when slacked or saturated with moisture. Its power for absorbing other impurities is also well known, as it has long been in use for destroying offensive smells.

After leaving the lime, the air next passes in a zig-zag direction through the charcoal filter.

Experiments have repeatedly shown that each cubic inch of charcoal will absorb about 90 cubic inches of ammoniacal gas, about 80 of sulphureted hydrogen, and considerable quantities of other gases.

But this cubic inch of fresh-burned charcoal is not a mere sponge for holding impurities. Each one of its many thousand little cells is really a beautiful chemical laboratory, perfectly fitted up for decomposing impurities and storing away their products where they can do no harm. The most filthy exhalations, consisting of the minute particles of decomposing animal and vegetable matter, are collected by this charcoal, apparently as a filter of magnets would collect the minute particles of iron floating through it in the air. Here, in these little cells, these impurities are decomposed, and here their elements are stored away.

The most disgusting gases—the products of putrescence—are sulphureted hydrogen and compounds of ammonia. The first is always present where bilious and intermittent fevers, agues, etc., are generated, and, hence, is supposed by some chemists, to be a principal cause of these diseases; while, for the same reason, the sulphuret of ammonia is supposed by some chemists to be the prime cause of typus and typhoid fevers, etc. The charcoal seizes the ammonia, takes it into its little cells and causes oxygen from the atmosphere to unite with it, and thus forms dilute nitric acid and holds it there simple sour water, a harmless sub-

stance. In the same way each cubic inch of charcoal will absorb enough of sulphureted hydrogen to instantly kill a dozen men, if Dupuytren and Thenard's experiments are reliable; and combining oxygen with it forms a few drops of dilute sulphuric acid, which may all be taken with impunity by a single child. These dilute acids remain in the charcoal until it is reburned.

According to Dupuytren and Thenard the 1-1500th of this gas in air is instantly fatal to a small bird; 1-1000th killed a middle-sized dog; and a horse died in an atmosphere which contained 1 250th of its volume. It does the mischief by decomposing the blood in their lungs when inhaled by them.

Finally, the air passes through the fragments of ice. Here it is washed as by a hail storm. The water on the surface of this ice is also a powerful absorbent of these impurities. It absorbs sulphureted hydrogen, and also deprives the air of any compounds of ammonia.

"Ammoniacal gas has a powerful affinity for water. Owing to this attraction, a piece of ice, when placed in a jar of ammonia, is instantly liquified, and the gas disappears in the course of a few seconds. Davy, in his 'Elements,' stated that water at 50°, when the thermometer stands at 29·8 inches, absorbs 670 times its volume of ammonia. According to Thompson, water at the common temperature and pressure, takes up 780 times its bulk."—*Turner's Chemistry, article "Ammoniacal Gas."*

The air is also dried by coming in contact with the ice. By being cooled its capacity for moisture is lessened, and the moisture is deposited on the cold surfaces of ice even more abundantly than upon the pitcher of ice water.

The following table shows the amount of moisture contained in one cubic foot of air when saturated, at different temperatures:—

	Grains.
At Zero	0·18
32°	2·35
40°	3·06
50°	4·24
60°	5·82
70°	7·94
80°	10·73
90°	14·38
100°	19·12

An inspection of the above table will show that if the air is 80° temperature and saturated, it would be possible to reduce its moisture from 10·73 grains to 2·35 grains per cubic foot by simply passing it through fragments of ice broken sufficiently fine. We have carefully weighed 20 pounds of ice before putting it in this apparatus, with the lime and charcoal left out, and received from it over 21½ pounds of water. The 2½ pounds of water were rendered exceedingly disgusting to the taste by the filth that had been collected from the atmosphere in their passage through the ice.

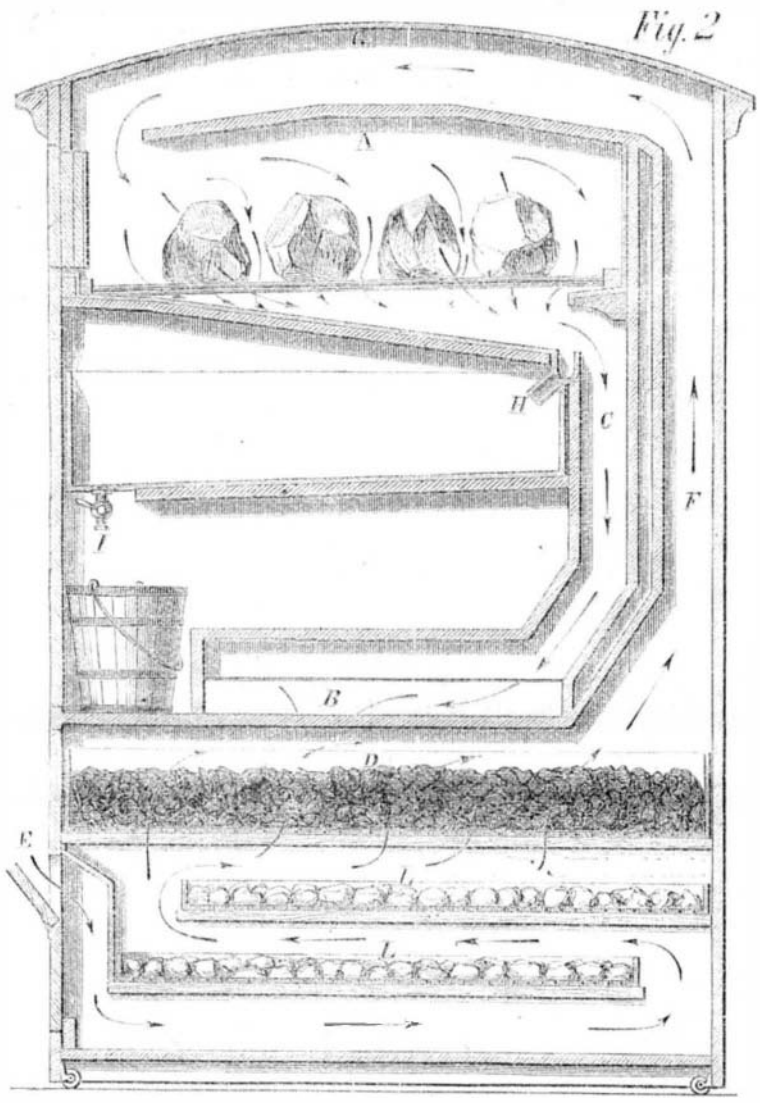
Here, then, we have in this apparatus three of the most powerful absorbents of impurity known, and when they are properly supplied, the air passing alternately through each, is rendered absolutely pure.

In order that the person shall always be immersed in pure air, the bedstead is made with its sides raised near the head and foot, as shown, and strong curtains are hung inside on the buttons, S S, Fig. 1. This forms a sort of reservoir, or bath. The pure air, which even in cold weather is 3° or 4° cooler than the other air of the room, is flowing in near its bottom, between the pillow and purifier, or head board, as shown by the arrows. The current is generally broken up by a sort of screen before the pipe, and it moves slowly over the pillow. This cool air may be felt flowing over the top of the reservoir where the side is lowest. If the curtain is let down the cool air may be felt pouring out toward the floor. While the bed is occupied, the curtain should always be kept tightly closed.

The apparatus is also combined with desks, and made in various other forms. Rooms are easily and cheaply cooled in warm weather, and ventilated with it. In such cases, even when the temperature, as shown by the thermometer, is not lowered, the air, on account of its purity and dryness in hot damp wea her, seems 10° lower.

Patents for this invention have been procured in this country and Europe through the Scientific American Patent Agency, and further information may be obtained by addressing the inventor, A. S. Lyman, at No. 212 Second avenue, New York.

Fig. 2



LYMAN'S AIR PURIFYER.

Steel Pens.

Swedish iron is said to be the best material for pens. It is converted into steel on the old plan in a furnace, or by the new process of Mr. Bessemer, and subsequently hardened by tilting, casting into ingots, and rolling it into thin sheets. The consumption of steel in this way is enormous. As much as four-and-twenty years ago it amounted to 120 tuns annually, and was equivalent to about 2,000,000,000 of pens. This quantity is now greatly increased in consequence of the penny postage and the improvements in steel-pen manufacture. Some idea of it may be gathered from the fact that pens may now be bought by the trade at 4d. per gross, the box included, and that there are houses which produce 20,000, 30,000, and even 50,000 pens daily throughout the year. The art of steel-pen making has never been brought to greater perfection than in the manufacture of lithographic "crow-quill" steel pens. They are very small, as the term indicates, and are adapted to the finest shading. Their chief use is in tracing in crimson lake, and also in lithographic ink on "transfer paper," which has the remarkable property of discharging all its inked line on the stone, so as to make a complete transfer of the writing or drawing.

GLYCERIN OINTMENT.—Melt together spermaceti, ½ oz., and white wax, 1 drachm; put them into a stone mortar, add glycerin, 1 fluid ounce, oil of almonds, 2 fluid ounces, and rub them together until cold. Used for chapped hands, etc.

Independence vs. Impudence.

There is no trait in a workingman's character which commands more ready respect than a manly independence. This is true of employer as well as apprentice boy. A man of known independence is treated with respect and consideration by those holding superior positions; and why? Simply because that any treatment short of proper, will not be endured. The independent man knows his rights and dare maintain them.

Independence is always founded upon ability; the workman feels his capability to sustain his position without cringing to the frowns of elevated incapacity, or bowing submissively to unmerited censure from purse-proud, ignorant employers.

Independence, while demanding proper treatment for its possessor, dare, at the same time, give the same to all others, irrespective of position. An independent man, while demanding an apology where one is required, has the manliness, if in error, to make one himself to either superior or inferior.

Independence, like all genuine, meritorious traits, is liable to be counterfeited, and its counterfeit presentment is impudence, which is always founded upon just the reverse of principle, from which springs true independence.

Impudence is always the signboard of ignorance; the impudent workman knows not what treatment he should receive from his employer, or how, in return, he should behave toward him, but thinks that a saucy tongue is always in order, and that, upon all occasions, it is proper for him to show the little respect he has for his employer or his fellow workman. This is to be regretted, from the effect it has upon those just entering upon life as mechanics; they invariably consider the least restrictions upon their actions as meriting insubordination; the impudent, incompetent, is made their beau ideal of what an independent man ought to be, while the unostentatious worth of the really independent man is looked upon as a truckling fellow, one who will suffer in preference to assuming a self-defense. A greater mistake is never made than when impudence is considered a mark of moral courage, for the two are never found in the one person, while true, unostentatious independence is always allied to and accompanied by true courage.

Impudence is ever trying to hide its defects by bluster and assumed worth, knowing well that if it could be turned inside out that it would be found to be utter worthlessness; while independence is satisfied to let time and circumstances define the true bearings of all minor questions.

Men, as well as apprentices, should bear in mind that impudence is not independence; also, that while an impudent man is never independent, an independent man is never impudent.—*Fincher's Trade Review.*

PATENTS ISSUED THIS YEAR.—The number of patents issued since Jan. 1, 1865, is 6,220. The estimated number to be issued during the coming month is 450, making a total of 6,670 for the year 1865. The number issued in 1864 was 5,220.

THE American Academy of Arts and Sciences has given the Rumford gold medal to Prof. Treadwell, of Cambridge, "for improvements in the management of heat, made and put in practice by him in constructing cannon of a series of coiled rings, in the year 1842."

THE Indiana Legislature lately passed a resolution inquiring into the expediency of licensing locomotive engineers, making them all pass examination as to qualifications, moral character, etc.