GOLD'S PATENT

STEAM HEATING APPARATUS,

FOR WARMING

PRIVATE RESIDENCES, STORES, CHURCHES, HOSPITALS, PUBLIC BUILDINGS, GREEN HOUSES, GRAPERIES, &C.

PATENTED IN AMERICA AND EUROPE,

BY STEPHEN J. GOLD.

MANUFACTURED AND ERECTED BY THE

MASSACHUSETTS STEAM HEATING COMPANY,

OFFICE,

11 BROMFIELD STREET, BOSTON.

WITH A TREATISE ON ARTIFICIAL WARMING, WRITTEN EXPRESSLY FOR THIS PAMPHLET,

By BENJAMIN SILLIMAN, JR.

PROFESSOR OF GENERAL AND APPLIED CHEMISTRY IN YALE COLLEGE.

BOSTON:
PRINTED FOR MASS. STEAM HEATING COMPANY,
BY H. O. HOUGHTON AND COMPANY, CAMBRIDGE.

GOLD'S PATENT

STEAM HEATING APPARATUS,

FOR WARMING

PRIVATE RESIDENCES, STORES, CHURCHES, HOSPITALS, PUBLIC BUILDINGS, GREEN HOUSES, GRAPERIES, &C.

PATENTED IN AMERICA AND EUROPE,

BY STEPHEN J. GOLD.

MANUFACTURED AND ERECTED BY THE

MASSACHUSETTS STEAM HEATING COMPANY,

OFFICE,

11 BROMFIELD STREET, BOSTON.

WITH A TREATISE ON ARTIFICIAL WARMING, WRITTEN EXPRESSLY FOR THIS PAMPHLET,

By BENJAMIN SILLIMAN, JR.

PROFESSOR OF GENERAL AND APPLIED CHEMISTRY IN YALE COLLEGE.

BOSTON:
PRINTED FOR MASS. STEAM HEATING COMPANY,
BY H. O. HOUGHTON AND COMPANY, CAMBRIDGE.

THE MASSACHUSETTS

STEAM-HEATING COMPANY,

HAVING purchased the right to introduce in the States of Massachusetts and Vermont, "GOLD'S PATENT STEAM HEATER," are prepared to furnish Dwelling Houses and other buildings with this valuable apparatus.

ITS PERFECT SELF-REGULATION OR AUTOMATIC CHARACTER.

THE fire being kindled and the day's supply of coal put on, no further attention is necessary. Steam will in a few moments enter all the open radiators, and instantly impart its heat to the space exposed to its influence; the fire will then burn, and the coal be consumed, *only in proportion to the amount of heat required.* For as the amount of heat obtained from the radiators depends upon the *condensation* of steam therein—as explained in another part of this book—and as this condensation depends entirely upon the temperature of the atmosphere in which they are placed—*the atmosphere is itself the agent to open and close the draft to the fire.* Thus when the atmosphere is at a low temperature, and the apartment cold, the condensation in the radiator is rapid, a great amount of heat is thrown out, the steam used fast, the press-

ure taken from the boiler, the draft door opened and the consumption of fuel increased. But as the temperature of the atmosphere is raised, and the space grows warm, the condensation of steam in the radiator diminishes, less heat is thrown off, less steam used, the pressure increased, the regulating column raised, the draft closed, and the fire deadened to the requirements of the steam. Or if the steam be shut off from any one room, *just in that proportion will the draft be closed, and the consumption of fuel saved.*

This feature of Self Regulation in Mr. Gold's system, being a matter of *economy* as well as of comfort and safety, is not to be found in any other heating apparatus of the present age. In fact, none other that we have been able to discover, is at all self-regulating. The closing of the register to exclude the heat of the hot-air furnace from the room, does not, as is well known, deaden the fire in the least, but rather increases it than otherwise.

VENTILATION.

Too much importance cannot be attached to this department, in the architectural and domestic arrangement of buildings. The common plan of constructing chimneys, with flues opening through the fire-place into the rooms, is an excellent provision for ordinary dwelling-houses; and the occasional opening and shutting of doors, with the unavoidable ingress of air through the crevices of windows, amply supplies ventilation where there is no unusual perversion of the atmosphere. But for the purpose of ventilation, merely, we would recommend that the flues or vents be made of tin, thus avoiding the expense of chimneys, which only disfigure the interior of a house, and take up valuable room. By this arrangement, where Gold's plan of warming is adopted, but one chimney is needed, even in the largest building. The atmosphere in the room being evenly rarefied by coming in contact with surface never sufficiently heated to char the finest particle of dust, and rendered impure only by respiration, is constantly but imperceptibly being carried off, while a sufficient supply

of fresh air is continually entering. It has been found that a gradual change is thus effected in the atmosphere of the whole house.

Gold's apparatus does not profess to be, of itself, *a ventilating machine*, although *it admits of the most thorough ventilation.* We must be pardoned for asserting in this connection, without entering into the proof, that the various appliances for heating, so much in vogue at the present time, not only *do not properly ventilate*, but actually do not *permit of it*, although the *term* "ventilation" is conspicuously affixed, as a redeeming appendage, to each yearly revision of the old system.

SAFETY FROM FIRE.

A SIMPLE glance at the position of the boiler and fire in Gold's Heater will convince any one of its *perfect safety.* The fire is on all sides enclosed within a fourteen inch partition, including the water sheet around it, two inches; flue, four inches; and brick wall, eight inches. The heat is so perfectly consumed by traversing the boiler, that the temperature of the smoke-pipe does not exceed that of the steam (212°), which is a degree of safety, as well as economy, hardly to be equalled. The only external openings to the fire are through the feed-spout and ashmouth, both of which are of iron, substantially built into brick work, and with a pitch inclining inwards, thus preventing the liability of coals falling out.

According to recent reports of the Fire-Marshal, two-thirds of the fires in New York city are traceable to the use of hot-air furnaces; and the evil is increasing to such an alarming extent, that THE FIRE INSURANCE COMPANIES OF NEW YORK CITY HAVE BEEN COMPELLED TO INCREASE THE RATES OF INSURANCE WHERE THEY ARE USED, and to offer a premium on safer modes of heating. To this end, the authorized agents of the companies have carefully examined our apparatus, and have pronounced it the most free from danger of fire of any method of heating buildings now in use; and have further-

more decided to MAKE A REDUCTION OF TEN PER CENT ON ALL RISKS WHERE THIS MODE OF HEATING IS ADOPTED.

GENERAL REMARKS.

THE construction of the boiler is such as to ensure a very perfect combustion of the fuel, without forming clinker, or leaving unburned portions of coal. The conducting pipes, when exposed in damp cellars, or where the heat from them would be lost, are generally wound with some non-conducting material.

The heat from the radiators is of the mildest and most agreeable character; it produces no such effect of giddiness, dryness, or of oppression about the head, as is attributed to stove and furnace heat; and as the air never comes in contact with any surface warmer than 200°, no odor of burnt particles is perceived in the apartments. It is *radiant* heat which is given off from them; hence, the limbs and feet, feeling its genial influence equally at the same time, are free from the unpleasant coldness so often complained of in furnace heat, where, as elsewhere explained, the effect of radiant heat is almost entirely lost.

The *uniform distribution* of heat effected by this means of warming is another very noticeable advantage in its favor. It is entirely unaffected by wind, and, for a simple and obvious reason, is more efficient and rapid in its operation in very cold weather, than in more moderate temperatures, because the more rapidly the condensation takes place, the more heat is evolved, and this happens when the atmosphere is of a low temperature.

ITS DURABILITY.

IN point of durability, it is believed that this apparatus will be found remarkably free from objection. The boiler is built as substantially as any other steam boiler, and with careful usage must last almost indefinitely. Even lime-stone water used in it can do no harm, since the same bulk of water is

used over and over again without sensible addition being required. The radiators and conducting pipes being of iron, might be regarded as liable to rapid oxidization. Such is, however, proved by experience not to be the case. The oldest operators in steam pipe, affirm that they never rust internally. The nature of steam is to prevent corrosion. The radiators are externally protected by paint put on at a high temperature. When not in use they are closed air tight, and all perfectly dry on the inside. After four years' use, one of them being cut open, was found to be quite as clean and free from rust as when it was made.

The following letter from an eminent authority, should be taken as positive evidence on this point. Mr. Hills has the honor of being the first to adopt, on a large scale, this plan of warming.

NEW HAVEN, *March* 17, 1857.

Messrs. J. W. LANE & Co.—You have the liberty to use my letter to which you refer; though I have the impression that this method of heating is no longer an experiment, but a fixed fact, satisfactory to all who have used it. One doubt still seems to be hanging to the minds of a few of the fastidious, to wit: whether the radiators will not rust out. Within ten days I have had the satisfaction of examining mine, and know that they are free from rust, and as sound as when first put up. Mine, it should be observed, were the first put into use in this city, and have now served me three years the coming fall.

Yours respectfully,
LEWIS M. HILLS.

CLOSING REMARKS.

HAVING given a full description of this New Method of Heating, and spoken briefly of its prominent advantages, we will omit noticing the various modifications to which it is peculiarly susceptible, and submit to all interested in the sub-

ject, whether this apparatus does not supply the want so long felt in the community of some exceedingly simple and economical mode of using steam for warming purposes.

It is adapted as well to old houses as to new, and can be put in with very little inconvenience to the occupants. We cannot furnish the apparatus at a *first cost* less than some other methods of heating, though we do claim a very decided superiority in this particular over any other *steam* or *hot-water* arrangement.

The proprietors would respectfully urge upon those who intend to adopt this mode of warming, the necessity of giving in their orders at once, as Spring and Summer are by far the most favorable seasons for the erection of the apparatus. We have already many orders for the apparatus; and we hope that all who are disposed to give our new system a trial, will favor us with their orders before the cold season commences. The apparatus is put up complete, in the most substantial and workmanlike manner, AND WARRANTED TO GIVE SATISFACTION.

Subjoined are a few of the many recommendations which we have at our disposal, and we ask for them a candid perusal. It may be well to state here, that the parties who have kindly and freely given us these testimonials, are not interested in the invention either directly or indirectly, to the amount of a farthing. They have bought the apparatus, and paid the full price for it, and, further than the one they are using, have no interest whatever, in its success.

GENERAL PRINCIPLES OF ARTIFICIAL WARMING

AND OF THE

SYSTEM OF MR. GOLD IN PARTICULAR.

BY B. SILLIMAN, JR.

PROFESSOR OF GENERAL AND APPLIED CHEMISTRY IN YALE COLLEGE.

HEAT is distributed from an open fire, stove, or other source of heat either by *radiation*, or by *immediate contact*. In the old-fashioned open fireplace or in the modern grate, radiation is almost the only source of any practical value for the distribution of heat. The draught in these cases carries off nearly all the heat communicated by actual contact of air with the ignited fuel. In anthracite coal and charcoal, the amount of heat sent out in rays to the surrounding air is nearly or quite equal to that communicated by contact; while from wood it has been ascertained by experiment to be only about one-fourth part of the whole amount of heat set free in combustion. Hence the disadvantage in point of economy of fuel of the old methods of heating compared with the modern, while in respect to perfectness of ventilation, many of the more potent forms of modern apparatus are decidedly inferior to the open fire.

In the *hot-air furnace*, so much used at present, the effect of radiant heat is in a great measure lost, the extended surfaces of hot cast iron communicating heat to the air in its passage through the hot chamber, chiefly by *immediate contact* of the air with the heated iron surfaces. Unfortunately the excessive heat of these surfaces often, and indeed generally, burns the insensible dust always present in the air, producing an unwholesome and disagreeable odor in the apartments, while at the same time the capacity of the air for moisture is greatly increased. The effects of this last evil are seen in the deterioration of woodwork and furniture, and are *felt* in the brittleness

of the finger-nails, the dryness of the skin, producing an intolerable itching, and an oppressive sense of fulness about the head. These evils are very imperfectly obviated by the evaporation of water in the chamber of the furnace, a practice which also introduces new evils without fully remedying the old. *The loss of heat* in the use of the best constructed furnaces is always very great, and any attempt to economize it by extending the iron surfaces of the smoke flues beyond a certain limited point, is checked by the leakage of sulphurous and other irrespirable and deadly gases from the joinings of the flues, when these are cooled below a certain pretty elevated point. The advantages ascribed to hot-air furnaces from the equable distribution of heat over the whole house, are often counteracted by the changes in direction of the wind and other atmospheric causes, which frequently act to expel the heat entirely from one side of a house, (particularly if it is in an isolated situation,) while in some cases the direction of the current is reversed and the heat driven through the cold air box into the outer air. There is also plainly a loss of heat in raising the temperature of the external air (taken in perhaps at ZERO or below) to 70 degrees or 80 degrees, while the efficient ventilation which this system is capable of, when well managed, is usually, in a good degree, lost by the want of any escape being provided for the effete products of respiration and combustion.

Notwithstanding the frequent adoption of this system of warming dwellings wherever anthracite coal can be obtained, it is generally felt by those who have had experience in the use of hot-air furnaces that the objections just enumerated have great force. We have daily opportunities to note the existence and increase of this conviction in the eagerness manifested at every hand to know the merits of Mr. Gold's system of heating by steam.

Ever since the celebrated Dr. Joseph Black, of Edinburgh, in 1764, discovered and explained the laws of heat in their application to steam, it has been well known that steam was the most economical and efficient agent that could be employed for the rapid and easy transmission and distribution of heat. Numerous plans for the employment of steam for warming buildings have been proposed, and one (its circulation in small wrought-iron tubes) has been for a long time in use, to a limited extent, in domestic economy, and much more largely in public buildings. Without pausing to consider in detail the reasons why previous plans for steam-heating have been only partially successful, and not generally adopted, it is

sufficient to say that they have been very costly, often noisy, (*and always liable* to the noise resulting from a vacuum in presence of water in small tubes,) and that the high pressure required always involved the sense, and sometimes the reality, of danger. Indeed, such an apparatus, as has been before used for this purpose, demands an engineer to look after it, and is, of course, expensive to maintain, and not economical of fuel. These and other difficulties the inventor of the present system believes he has entirely overcome; and he presents his apparatus to the critical consideration of practical and scientific men, with the conviction that a candid examination of its peculiarities will satisfy them that it will accomplish all that he claims for it.

As many intelligent persons have never had occasion to consider the laws of heat in relation to *steam*, and the reason why this subtle agent is at once the safest, most manageable, and most economical mode of distributing heat, it is proposed here to consider these laws and reasons very briefly and in the plainest manner possible.

GENERAL PRINCIPLES ON WHICH GOLD'S SYSTEM DEPENDS FOR SPECIAL VALUE.

IT is a fact made known by experiment that the quantity of heat which various substances can absorb in the same time from sources of equal intensity are very various, and consequently, that in cooling from a given temperature, different kinds of matter give out very different quantities of heat.

Now, with respect to air and water, it has been proved by accurate trial, by eminent philosophers, that in cooling from 212° to 32° water liberates 3.74 times as much heat as the same weight of air will do, and consequently will raise the temperature to 3.74 times as much air to the same degree. This peculiarity is described by the terms *specific heat*, or *capacity* for heat. The power of water to store away heat in itself in a way insensible to the thermometer, and to give it out again on cooling, is nearly four times as great as that of air, and hence the heat which is required by a given quantity of air to raise it to a certain temperature can be stored away in a much less quantity of water, being, as it were, accumulated or condensed in it.

When *steam* is made the means communicating heat, this advantage is much more sensible than it is in the case of water. For on passing into the state of vapor, water absorbs

nearly six times as much heat as is required to heat it from 32° to 212°, and this great quantity of heat, (20 1–2 times as much as an equal weight of air can contain, and consequently capable of heating to the same point 20 1–2 times its own weight of air,) produces no increased *sensible* temperature in the steam, which has still by the thermometer the temperature of 212°, the same as the water from which it comes. But the instant the vapor or steam is condensed, by reconversion into water, this enormous quantity of heat is liberated, and becomes available to heat the surrounding air both by radiation and conduction, or by immediate contact. To give this statement in figures, 1 lb. of vapor of water (steam) at 212° will, by condensing, to form water of the same temperature, give off sufficient heat to raise the temperature of 5 1–2 lbs. of water to 212°, equal (3.746x5.5), 20.6 lbs. of air to 212°, or 103 lbs. of air to 68°. A cubic foot of air at 68°=0.037 lbs. A cubic foot of water is 770 times heavier than a cubic foot of air. At 32° 24.6 cubic feet of air weigh 1 lb. Aqueous vapor at 212° has a density of 0.622 air=1, and 100 cubic inches of it weigh very nearly 15 grains. (Knapp's Chemical Technology, V. p. 89. London edition.)

Because this prodigious quantity of heat is stored away in steam in a perfectly hidden and insensible manner, it has been called the *latent heat of steam*, becoming *sensible* heat again only when the steam is reconverted into water. A careful consideration of the operation of this beautiful law will render clear the fact, so mysterious otherwise, that a comparatively small radiating surface heated by steam should prove sufficient to heat a large volume of air without at any time passing the limit of 212°.

For the sake of more completely explaining this law to those who are not already familiar with it, we will quote the following passage from Silliman's Chemistry, p. 85:—

"If we place a known quantity of water over a steady source of heat, we shall see the thermometer indicating each moment a higher temperature, until, at 212°, the fluid boils; after which the thermometer indicates no further change, but remains steady at the same point until all the water is boiled away. Let us suppose that, at the commencement of the experiment, the temperature of the water was 62°, and that it boiled in six minutes after it was first exposed to the heat; then the quantity of heat which entered into it each minute was 25°, because 212°, the boiling point less 62°, leaves 150° of heat accumulated in six minutes, or 25° each minute. Now if the source of heat continue uniform, we shall find that in

forty minutes all the water will be boiled away; and hence there must have passed into the water, to convert it into steam, 25°x40=1000°. One thousand degrees of heat, therefore, have been absorbed in the process, and this constitutes the *latent heat* of steam. So much heat, indeed, was imparted to the water, that if it had been a fixed solid, it would have been heated to redness; and yet the steam from it, and the fluid itself, had during the whole time a temperature of only 212°."

It is, therefore, a matter of easy and accurate calculation what effect may be produced from the condensation of a given volume of steam in an iron or copper radiator, or what amount of such condensation will be required to warm a given bulk of air to a certain temperature. It is commonly stated as the result of experience in the use of the old form of steam heating apparatus, that to heat buildings by steam every 2,000 cubic feet of space to be heated to 75° requires 1 cubic foot of boiler capacity, and that every square foot of radiating surface on the pipes will heat 200 cubic feet of space to the degree named. Much depends, however, for the amount of boiler capacity on the construction of the boiler, and our experience leads us to the conviction that such a boiler, as is figured in this statement will accomplish more work than would be implied in the numbers just quoted, with no increase of consumption of fuel. The material of which the radiators are made and the nature of the surface has also much to do with the rapidity of condensation, and consequently with the efficiency of the apparatus. It has been determined that at 59° F. one square foot of cast iron horizontal surface in pipes will condense 0.234 lbs. of vapor, of bright copper, 0.184, and of blackened copper tube 0.213.—A *vertical* position of the tubes somewhat increases this amount of condensation. American sheet iron (*i. e.* iron not smooth and polished like Russia iron) is believed to be in condensing power nearly equal to cast iron, which is well known to have the highest radiating power of any substance in use. American sheet iron is therefore the material which both theory and practice recommend as the best for constructing the radiators in Gold's Apparatus.

ECONOMY OF FUEL IN HEATING BY STEAM.

The means universally resorted to for testing the relative value of different fuels is to ascertain their respective powers of evaporating water in a well-constructed steam-boiler. Anthracite coal (Lehigh) is regarded as the most efficient fuel that

can be employed for this purpose, and it is perhaps a high average of the various experiments made by Johnson, Hayes, and others on this subject, to state the quantity of water which can be evaporated by the complete combustion of one pound of anthracite at *ten pounds*, producing, of course, ten pounds of steam, (equal in bulk at 212° to 596.7 cubic feet of steam,) and capable of raising 1,030 lbs. of air to the temperature of 68°. But 1,030 lbs. of air are equal to more than 25,000 cubic feet; and we may therefore say that the complete combustion of one lb. of anthracite in a well-constructed boiler is capable of raising 25,000 cubic feet of air from 32° to 68°. A result beyond comparison more economical than can be reached by any other mode of using fuel, and one to which a reasonably close approach can be made in actual practice by the proper use of steam.

It is a fact of the greatest importance with respect to the economy of fuel and the proper use of a steam apparatus, that there is no manner of advantage gained by using steam *under pressure*, as a source of heat. As the pressure under which steam is generated increases, so does the latent heat of the vapor diminish and its sensible heat increase. There is a constant ratio between the latent and sensible heat of steam; these two quantities added together always give the same sum. Thus steam at 212° has latent heat equal to 972°, giving the sum 1,184°. Subtract the sensible heat of steam produced at any given temperature from the constant number 1,184°, and we have the latent heat for that temperature, *e. g.*, at 280°, (about three atmospheres of pressure, or 45 lbs. to the inch:) steam has a latent heat of 904°. Hence both theory and experience unite in declaring that steam for heating purposes should be generated at the lowest possible pressure, and consequently in Gold's system the limit of pressure is fixed at only 1 to 1 1–2 lbs. to the inch. Gold's system is quite free from the risk which has very properly led the insurance companies to affix higher rates of insurance upon buildings otherwise heated. Indeed, no mode now in use is so free from all danger of fire as this. The hot-air flues of the common house furnace have destroyed many valuable buildings.

Letters, etc.

Boston, *April* 21, 1857.

Mass. Steam-Heating Co.:—

Gentlemen: Last winter I introduced into three stories of my house, your Steam-Heating Apparatus. It was done partly as an experiment, not knowing as it would answer my purpose; but a short trial convinced me that it was, in *every way*, far superior to either Furnace or Stove. I have since carried it to the 4th story, and also to the L part, and through all weather, mild, middling, and the very coldest, it has more than exceeded my utmost expectations. In point of economy, I should say it saves one-half. A room can be heated in twenty minutes, and it is a uniform heat throughout the room, not as is generally the case with either Stove or Furnace, that while one part is warm the other is cold; but it is a warm, agreeable, balmy,—you might almost say summer heat,—which I consider healthy and invigorating. The trouble is much less, as you are free from all dust, Coal Gas, Ashes, and sundry other inconveniences, arising from coal fires. As regards danger from fire, or an explosion of the boiler, I consider it next to impossible to occur. Allow me to say that I consider it the *best* apparatus for heating buildings, and would recommend it to all others.

Respectfully yours,

E. R. Phinney, 30 Beach St., Boston.

Milliken's Hotel, Boston, *April* 27, 1857.

To the Treasurer of Massachusetts Steam-Heating Co.:—

It affords me great pleasure to bear testimony to the advantages of Gold's Steam-Heating Apparatus, over all others I know of now in use. It is impossible for me to state the many advantages it possesses over any other mode of heating known to me. I don't know of any other kind of apparatus that I would substitute for Gold's. If I could have it set up, free of expense, and have all the coal furnished, in the bargain, I think it is three hundred dollars a year advantage to me, over any other apparatus that I could have put up, and I will, most cheerfully, show and explain its superior advantages to any persons wishing to become acquainted with the operating of it.

Francis Milliken.

Boston, *April* 30, 1857.

To the Mass. Steam-Heating Company:—

Having used "Gold's Steam-Heating Apparatus" for the last few months, I would most cheerfully recommend it to all who are desirous of obtaining the most economical, pleasant, and even heat. It is free from dust, and the great excess of heat, which is produced by Furnaces and Stoves, and which is so injurious to the health of those subject to it, besides doing serious damage to Furniture and woodwork of a house. I think the health of my family has much improved, since I had the apparatus put into my house. To say nothing of the luxury it affords, it is possible I shall, in a little time, save, in doctors bills, enough to pay the entire expense of the apparatus.

Yours truly,

L. L. Tower,

Firm of Cutter, Tower & Co., 17 & 19 Cornhill, Boston.

Massachusetts Steam-Heating Co.—GENTS.: I have used your new Steam Apparatus in my house, during the past winter, and take pleasure in saying it has met my most sanguine expectations. The heat produced is very healthful and pleasant, and I have found no difficulty, during the coldest weather, in keeping my house perfectly comfortable—the air being soft and balmy like a summer's day. I have also found it very economical, and attended with little trouble in consequence of its self-regulating power.

BOSTON, *May* 7, 1857.

Yours respectfully,

E. S. CONVERSE.

GENTLEMEN: Your favor of 11th inst., is before me. Gold's Heating Apparatus was put up for me, by your predecessors, and, as you know, was the first one of the kind made use of in this vicinity. Notwithstanding the difficulties which might reasonably have been expected to attend its introduction here, requiring, as it did, much patience and skill, on the part of workmen, who had never seen it before, I have been able to use it for the last two extremely cold winters, without an alteration, in one of the most exposed situations in the town, and with greater comfort to my family than would have been possible from any other known method of heating dwellings. In value, far beyond any statements made to me by the proprietors, it has proved to be simple, safe, effectual, and very economical, and I should not part with it for any other arrangement now before the public. You are at liberty to refer to me such persons as desire a detailed explanation of its operation.

SOMERVILLE, *May* 15, 1857.

Yours truly,

JAMES M. SHUTE.

Mass. Steam-Heating Co.:—

GENTLEMEN: In answer to your inquiries how "I like Gold's Steam-Heating Apparatus," I would say that I think it is capable of doing all you guaranteed. My house is large, and in an exposed situation, yet as far as my experience goes, having removed a good furnace in October last, and substituted this apparatus, I think it is the most healthful, pleasant, and efficient way of heating now in use, and must eventually take the place of all other modes of heating. I remain,

BOSTON, *February* 9, 1858.

Yours, &c.,

JOHN BREWSTER,
40 State St.

Mass. Steam-Heating Co.:—

GENTLEMEN: In reply to your inquiries relative to the operation of the Steam-Heating Apparatus arranged by you in the various apartments of our store last autumn, we would say that it is in a high degree satisfactory, and so far as our experience with it and other modes of heating buildings enables us to judge, we have no hesitation in pronouncing it superior as regards health, safety, and general efficiency. Our opinion is that as soon as it becomes more known it cannot fail to be adopted by all who recognize in those features such essential advantages as it is most desirable for them to secure,

BOSTON, *February* 12, 1858.

Yours very truly,

OLIVER DITSON & CO.
277 Washington St.

Mass Steam-Heating Co.:—

GENTLEMEN: In reply to your inquiries how we like "Gold Heater," we would say that we think it will do all you guarantee, and, as far as our experience goes, we think it is the best heating apparatus for warming buildings we know of now in use.

BOSTON, *February* 6, 1858.

JOHN B. WINSLOW,
Superintendent.
Boston & Lowell R. R., Causeway St.

To the Mass. Steam-Heating Co.:—

GENTLEMEN: Having occasion last summer to build a house for my own occupation, I took a good deal of pains to ascertain the best methods of heating dwelling-houses, and finally decided upon putting into my house Gold's Patent Steam-Heating Apparatus. I have only to say, that my expectations, which were large, have not been disappointed. I find the heat sufficient, very agreeable, perfectly controllable, and safe, and I think economical. I have little doubt that this, in time, will be the most approved method of heating dwelling-houses.

DANA HILL, CAMBRIDGE, *March* 9, 1858.

H. O. HOUGHTON.

MESSRS. LANE & BAKER:—

GENTLEMEN: It affords me much pleasure to bear testimony to the safety, efficiency, and wonderful economy of Gold's Patent Steam Apparatus, which you introduced into my dwelling, corner of 1st Avenue and 114th Street, last Fall.—It has given me the most perfect satisfaction in every particular. Like many others, at the first examination of your heating apparatus, from its extreme simplicity, I must confess, that before you attached it to my house, I was disposed to look upon it, at least, as a hazardous experiment; but the practical operation of it, has proved it to be, to my mind, the only sensible heating apparatus now in vogue. The heat produced by it, is characterized by a softness and balminess that leaves a pleasant and invigorating impression upon the body, and is widely distinguished from that evolved by high pressure steam and Furnaces, producing in many cases fulness of blood to head, and sometimes even vertigo.

The apparatus is so simple of management, that the entire care of it has been left to a servant girl of very ordinary mental capacity. In point of economy, in my opinion, it has no parallel. My building, 25 x 42 feet, and four stories in height, has been kept at a delightful summer temperature—never varying a degree during the whole winter—with about the same amount of coal which I formerly consumed in one grate. In point of labor-saving and cleanliness, it is perfect. I have been enabled thereby to dispense with the labor of one servant.

In short, it seems, in its practical operation, to be almost an *intelligent machine*; and the only requisite to perfection that is needed, is the invention by yourselves of some apparatus whereby the coal could be brought from the vault and fed to the machine.

NEW YORK, *March* 21, 1857.

Yours truly,

J. B. DEVOE.

MESSRS. J. W. LANE & CO.:—

GENTLEMEN: After having used, through the past winter, one of your new Steam-Heating Apparatus, and after carefully watching its operations, it is with great pleasure that I comply with your request, and bear my testimony in its favor. From its self-regulating power, it requires less attention and consumes less fuel than any stove or furnace giving out the same amount of heat that I have ever known. The heat produced is exceedingly agreeable, having the softness of mild summer air, free from dust and dryness, and the escape of gases. The heating by steam which can be so regulated as by your process, must be highly important to those who have sensitive lungs, and to young children. My attention was drawn to the value of heating by steam by the effect upon a lady whose lungs were extremely delicate, and who had for the past twelve years, during the winter months, repeated colds, which were followed by hemorrhages from the lungs, though every precaution was taken to prevent them by confining herself to the house, heating the entries with a furnace, and the rooms with cannel coal in an open grate, regulated by a thermometer—yet the variableness and severity of our winter climate would reach her and produce these dreaded attacks. She removed two years ago to a hotel heated by steam *exclusively*, from which time to the present she has not had a single attack of hemorrhage, though the past two winters have been unusually severe. This result was, no doubt, owing to the peculiar character of the heat generated by steam. I regretted that steam heat is not within the reach of all, for as then used, it was on a large

NEW YORK, *March* 26, 1857.

scale, requiring the attention of an engineer. I have now learned and found that you have so completely domesticated steam, that it can safely be left to take care of itself.

Yours respectfully,

EDWARD BAYARD, M. D.,
No. 6 West Fourteenth Street.

NEW YORK, *March* 25, 1857.

MY house having been heated by Gold's Steam-Heating Apparatus through the past winter, I can recommend it to be the most healthful, pleasant, and economical way of heating.

It is easily managed; and all the favorable representation which the proprietors have made in its behalf have been fully realized.

It must ultimately be used in our hospitals and public buildings generally, as it merits the approval of every intelligent person who can examine it, as the best as well as the safest mode of heating buildings known.

LEVI FOLSOM, M. D.,
No. 124 West Twenty-eighth Street.

NEW YORK, *March* 16, 1857.

THIS certifies, that in October last I took out my hot-air furnace, and put in its place Gold's Patent Steam-Heating Apparatus. Having tested it during the past winter, I am fully convinced that it is decidedly the best plan for heating buildings, for economy, and especially for health.

J. R. PECK,
No. 299 West Twenty-second Street.

CLINTON HOUSE,
Corner Broadway and Clinton Place.

NEW YORK, *March* 18, 1857.

THIS large and commodious Hotel has been warmed during the past winter by Gold's Patent Steam-Heater, put in by Messrs. Lane & Co.

I consider it one of the most economical, simple, and efficient methods of producing a healthy and uniform summer heat ever invented; it is a self-regulator, and requires no engineer, nor is there any danger of fire or explosion. It must very soon supersede all other methods of warming public or private houses.

WM. HOLDRIDGE,
Proprietor.

NEW YORK, *March* 25, 1857.

OUR offices and sample rooms, occupying the entire second story of the store 13 Beekman Street, we were unable to satisfactorily heat by a large stove and furnace, the latter part of the winter and spring of 1856.

In October last, we introduced Gold's Patent Steam-Heater. The boiler (which will hold about 40 gallons, with a 16-inch grate,) is located in the under cellar about thirty feet below the offices, and the pipes conducting the steam are placed in exposed positions. Yet the consumption of coal is small, and much less than we formerly used.

During the severest weather, we have had all the heat desired to keep our rooms comfortable, and it has always been of an agreeable nature.

The apparatus is safe, simple, and easily managed.

We take pleasure in recommending it to the public.

B. M. & E. A. WHITLOCK & Co.

YONKERS, *March* 24, 1857.

WM. C. BAKER,

Office of Gold's Steam-Heater:—

DEAR SIR: In regard to the working of Gold's Steam-Heating Apparatus, about which you ask my opinion, I can cheerfully say, it operates very much to

my satisfaction. I was prepared, by previous examination of the apparatus, to expect a good deal from it, and have not been disappointed. I have no doubt of its capability of heating any ordinary dwelling, to entire satisfaction, in the coldest weather. As a mode of heating I consider it superior to any other I have seen tried. It has some decided advantages. The air of the room is not vitiated, it is merely heated by radiation. There is no opportunity for the escape of dust or of gas, as from Registers. The steam will go in one direction as well as another, no matter what the direction of the wind is. It is very complete as a self-regulator. If water and coal are supplied, the regulating fixtures will control the consumption, almost to perfection. It is very economical in the consumption of coal, consuming just in proportion to the demand for steam, and as soon as that demand is met, invariably shutting off the draft. With regard to danger of explosion, I do not think there is the least occasion for apprehension.

Yours truly,

W. C. FOOTE.

NEW HAVEN, *February* 23, 1857.

WM. C. BAKER, ESQ.,

Office of Gold's Steam-Heating Apparatus:—

DEAR SIR: I have used in my dwelling-house here for three winters past, Gold's Steam-Heater, and with much satisfaction to all the members of my family. During the very severe weather of January (last month) and also of December, we found no difficulty in keeping our house comfortably warm with this, and this alone, as our sole dependence for heat. It requires less care in the management of the fire than any furnace I have had any personal experience of, and it consumes very much less fuel than any other heating apparatus with which I am acquainted, which is capable of warming so much space. My house is not very large, 38–38 with two wings and a back building, all of which (say 40,000 cubic feet) is abundantly heated by this apparatus. I shall burn this winter as far as I can now tell, not exceeding 12 tons (2,000lbs.) of hard anthracite, say from October to May, an average of 120 pounds per day, of 24 hours, day and night. In the most severe weather the consumption was certainly 200lbs. per day. I am able by it to heat parts of my house which could not be heated by any furnace, viz: a back building 60 feet from the fire, and nearly on the same level. Combined with a good system of ventilation, I consider this means the perfection of an artificial temperature. The prime cost of the system is certainly an objection to its general introduction in many cases where it would be desirable. But all who can afford the prime cost will I am sure soon feel convinced of its essential economy, comfort, and safety. Steam in some form of apparatus, is sure to take the place of most other means of warming houses and public buildings. Great objections both from fear of explosion and of fire exist, and justly, against *high steam* distributed in small pipes. These dangers are avoided in the case of Gold's Apparatus. This apparatus uses only low steam, *one* to *two* pounds per inch, and at that pressure no danger can be experienced either from fire or explosion; and the very construction of the apparatus is such, that a higher pressure is impossible. Perfectly regulating its own supply of air and water, it needs only to feed itself with fuel to be independent of human aid.

It is superior to all hot-air furnaces in not overheating and burning the air, in absence of dust and dirt, in ease of its management, and safety from fire, as well as in economy of fuel. To the hot water apparatus it is superior in activity and less cost; and in giving an ample supply of RADIANT HEAT in the apartments is very greatly superior to both, and supplies in fact the place of an open fire.

Yours respectfully,

B. SILLIMAN, Jr.

NEW HAVEN, Conn., *March* 23, 1857.

MESSRS. J. W. LANE & Co.:—

GENTS.: In reply to your brief note of Saturday last, asking my "*experience in heating with Gold's Steam-Heater,*" I would say, my sales-rooms are some 16 x 90 feet, my work-room 20 x 26 feet, having some 16 windows, a large part of which open to the north and west. I formerly *attempted* to warm the same

with furnace and stoves, and managed by burning some 10 to 12 tons of coal to get along comfortably, *excepting* in very cold weather, when my clerks found it absolutely necessary to huddle around registers instead of being at their counters, while workmen in my work-room often accomplished less than two-thirds as much work as they would have done had their rooms been evenly and thoroughly warmed. Since fall of 1855 I have used Gold's Heater, burning from 7 to 8 tons of coal per year only; my premises are *evenly* and *thoroughly* warmed in the *coldest* weather: in very severe weather, customers frequently remark, "*How comfortable you are here.*" "*Your store is the warmest place I have found to-day.*" "*How very pleasant the heat is;*"—in a word, I liked my first year's experience (or experiment) so well, I placed another Heater (No. 3) in my house last fall, which has given entire satisfaction; and now, to answer your question, would quote the language of a friend, who has tested the apparatus for the past 20 months: "*I consider Gold's Steam-Heating Apparatus, for heating purposes, one of the greatest improvements of the age.*" *Where known, it needs no recommendation, as it recommends itself.*

Yours respectfully,

T. B. Carpenter,
97 Chapel Street.

Troy, N. Y., *March*, 1857.

My new store, 50 feet front and 130 feet deep, has been thoroughly warmed the last winter by Gold's Patent Steam-Heater. The heat is of a mild and most agreeable character, being entirely free from the dry air and dust invariably arising from hot air furnaces and stoves; and which are so injurious to dry goods.

G. V. S. Quackenbush.

New Haven, *March* 14, 1857.

J. W. Lane & Co.:—

I take pleasure to say, that my experience in the use of Gold's Heating Apparatus, through the past three winters, is highly satisfactory. The area heated exceeds 47,000 cubic feet. (The basement has a dining-room and hall; the first story has five rooms, the second, eight, and the third, nine—each story having its respective hall.) The most remote radiator is elevated about 35 feet above the boiler, which is as readily filled as any of the intermediate ones. My fire was managed by a lad of fourteen most of the time, at other times by myself. I weighed the coal for three weeks in succession, and the average consumption was 84 lbs. per diem. During this time I burned the siftings, which are included in the above weight. Through the winter it averaged about 100 lbs. a-day. There was no lack of heat during the severest weather, nor was there difficulty in excluding it in milder weather. The heat furnished by the Apparatus gives entire satisfaction to *all* my family, and a large number of friends, besides the inquisitive. I consider a decided advantage gained in the purity of the air heated, and in exemption from gas, ashes, and smoke. The often repeated inquiries, "Is there no danger of explosion or of fire? Will it not need frequent repair?" &c., as far as my experience goes, must be answered in the negative, and I think all similar use elsewhere strengthens this opinion.

Lewis M. Hills.

Statement of Jonathan Knight, M. D.

I have examined with some care Gold's Steam-Heating Apparatus, in reference to its influence upon the health of those who employ it. That method of warming apartments is the most healthful which, while it produces the proper temperature most uniformly, adds nothing to the air and takes nothing from it, so that it remains in its natural condition. This is most happily accomplished by this Apparatus.

Uniformity of temperature is readily preserved by the ease with which a greater or less amount of heat can be almost instantly communicated to the

air of the whole or any part of a house which is provided with it, and this without any unpleasant current of hot or cold air.

In all the ordinary modes of warming buildings by furnaces or stoves of every kind, the air is liable to become impure by the addition to it of dust, smoke, and gases of various kinds. This cannot be entirely obviated, and is often greatly increased by the imperfect contrivance of the furnaces, and especially by portions of them becoming impaired by gradual decay. So also the heated air becomes impure by its contact with the iron of the furnaces and stoves, raised to a high temperature. The particles of vegetable and animal matter always present in the air are burnt, and the products of the combustion are mixed with the air, which at the same time is deprived of the moisture which belongs to it in its natural state, and which is essential to easy and healthful respiration.

All these sources of impurity in the air of apartments warmed by this Apparatus are entirely avoided. The air is simply warmed, while nothing foreign is added to it. It is at the same time warmed by contact with the heaters, at a temperature but little below that of boiling water; too low to burn the particles of matter which may be in it, or to deprive it of its moisture, in such a degree as to render it unfit for respiration.

In warming rooms by this Apparatus, all that is necessary to preserve the air in a state of absolute purity is to prevent its contamination by the products of respiration, and of whatever means are used to produce artificial light. In the common apartments of dwelling-houses, the frequent opening of doors and windows, which necessarily takes place, will usually suffice, and if more is required, an open fire-place or flue communicating with the chimney will be an abundant means of ventilation. In other apartments, such as school and lecture rooms, more efficient means of ventilation will be required. There are no more required in this than in any other mode in common use of warming such rooms. The same means are necessary, and are equally efficient in them all.

For reasons such as the above, and which might be easily multiplied, I have no hesitation in expressing the confident opinion that this Apparatus will be a more healthful method of warming houses than any other now in use.

J. Knight, M. D.,
Professor of Surgery in Yale College.

From the Hon. James F. Babcock, *Editor of The New Haven Palladium.*

We are often asked personally, and by letter, how we are pleased with the operation of Gold's Patent Steam-Heater which was put into our dwelling-house early last fall. We reply to these many inquiries, that we regard the apparatus as one of the very greatest inventions of the present age. It has been thoroughly tested by many persons, and we believe is universally commended as possessing all the qualities claimed for it; besides some that were not thought of until they were developed in the process of using it. We should now as soon think of giving up the use of friction matches and going back to the old tinder-box, as to return to the use of hot-air furnaces—for with steam you have no burnt atmosphere to breathe. You are not dependent upon the power or course of the wind for increasing a volume of warm air sufficiently to pervade thoroughly the space to be heated. You are not sitting or sleeping over a volcano, or a mass of fire which may ignite your building; or if it does not do that, certainly does consume from two to three times as much coal as is necessary to heat *the same amount* of space. You are not having, and cannot have, a fumigation of sulphur or impure air from gas, that finds its way through the warped and half melted furnace flues into all your rooms. You are not having colds from a great variation of temperature, and the more variable from standing over a hot-air register at one moment, and sitting by a door or window at the next,—and cold feet are among the things unknown and unspoken of where the steam apparatus is used.

We are not aware that any member of our family had a cold during the whole of last winter, which as we believe was a fact without precedent; and the only ice that was made in the building was a slight covering of the tank in the attic on

one of the coldest nights of the winter, when the steam had gone down; for we prefer not to sleep in a warm room.

We cannot state the exact amount of fuel consumed, as it was mixed with that used for kitchen range, which was the only other fire we had in the house; but we suppose the amount was between seven and eight tons—possibly nine tons.—The same space we are confident will be more thoroughly heated next winter with one or two tons less, in consequence of some few improvements which have been made in the Apparatus. With the above specified amount of fuel, we warmed a dining room of 15 by 22 feet—and five chambers—an upper and lower hall.

This is our experience. We give our account of it cheerfully, and with a great deal of satisfaction, and we believe it is substantially the experience of all, or nearly all who have used the Apparatus. It costs much more than a furnace in the beginning; but it will pay for itself in a few seasons, especially in large houses, which require large furnaces, grates, &c., for warming.

The Steam-Heater is free from every kind of danger, as it will feed itself with water; open and shut its draft doors, let off its surplus steam, should any accumulate; and cannot do any damage in the way of bursting; because its steam can escape in two or three ways more easily without putting itself to all the trouble of a "smash-up." An intelligent boy of ten years of age can manage it.

The radiators, into which the steam is conducted through small iron pipes, are very ornamental as now finished—much more so than an ordinary grate. We should, perhaps, state here, that we have not a dollar's interest in the invention, and that its success or failure, beyond the one we are using, is of no pecuniary concern to us. We have bought and paid for it, and we would pay the same amount over again, rather than part with it.

ELIZABETHPORT, N. J., *March* 13, 1857.

MESSRS. J. W. LANE & CO.:—

GENTLEMEN: In answer to your inquiries in relation to Gold's Patent Steam-Heater, I would say, I have been using the Apparatus during the past winter in my house, in this place, and can give it my unqualified approbation. It requires but little attention, gives a remarkably pleasant heat, and is very economical, burning but little more coal to warm my house than is usually consumed in one ordinary cylinder stove.

I consider it far superior to any other heating apparatus ever brought to my notice, and I think it only requires to be known to the public to be brought into general use.

Very respectfully,
J. JEWELL SMITH.

NEWARK, N. J., *March* 28, 1857.

WM. C. BAKER,—
Office of Gold's Steam-Heater:—

DEAR SIR: In answer to your inquiry as to the working of my Gold's Steam-Heater, I can truly say it exceeds my most sanguine expectations. I have given the subject of heating dwellings considerable attention, and have long been convinced of the superiority of steam over all other methods of artificial heating; but it has never been presented in any form that we could domesticate and take into our homes with that feeling of security which is necessary in all household apparatus. The invention of Mr. Gold has put to flight all former objections to Steam-Heating. It can be put up at a price within the reach of all—it is perfectly safe, there being no more danger of explosion than exists in an ordinary tea-kettle—it can be put up in a form suitable for the most costly dwellings—much less coal is consumed than in the best constructed furnace. By comparison, (the coal being accurately weighed by myself,) I find I burned in 24 hours 36 lbs. under my boiler, against 50 lbs. in my furnace during the same time last fall; thus making a saving of about 30 per cent. and I think the same ratio will hold good through the winter. The sensations produced on a person occupying rooms warmed by steam, are so different that I would not use the hot-air furnaces at half-price. I am satisfied that for a person with weak lungs, a hot-air furnace is very injurious, and a person who suffers from headache, in apartments warmed

with a furnace, would be entirely free from it if the same were warmed by steam. I have conclusive evidence of this last fact in my own family.

Your obedient servant,
HENRY E. RICHARDS.

MEDFORD, Mass., *February* 13, 1856.

HON. NEAL DOW, *Mayor of the City of Portland:*—

DEAR SIR: Your letter of the 9th inst. was duly received, making inquiries in regard to Gold's New Steam-Heating Apparatus.

In answer I would say that the Building Committee appointed to build a school-house during last summer placed one of Gold's Apparatus in the building by way in part of experiment. I am happy to say the results realized our expectations in the highest degree, as regards convenience, economy, and capacity for heating large buildings. The Apparatus is very convenient, occupying but little space, is easily taken care of by a faithful steward, is entirely free from all gas, so frequently escaping from hot-air furnaces, and is perfectly safe in regard to fire or explosion. The amount of fuel consumed, according to the statement of cur steward, is less than one half required to heat a building of equal size. Tne school-house where this new Apparatus is in use, is a large building two stories high, having four large rooms, a large stairway and hall, all of which are perfectly heated by this Apparatus during the coldest weather. This winter should be a sufficient test for the capacity of any heating apparatus. Allow me to say I regard it altogether superior to any apparatus I have ever seen for heating large buildings.

Yours very truly,
A. K. HATHAWAY.
Chairman of School Committee, Medford.

BOARD OF TRUSTEES, School District No. 1, Pawtucket, R. I.

HON. NEAL DOW, *Mayor of the City of Portland:*—

DEAR SIR: Yours of 18th inst., inquiring about the sufficiency and economy of Gold's Patent Steam-Heating Apparatus, is received.

Our school-house was formerly warmed by a hot-air furnace, but as it stands in a bleak situation, and was built in rather a loose manner, we were unable to heat it sufficiently warm for the comfort of the teachers and pupils. We then put in seven stoves, with pipe extending from one end of the rooms to the other; but were still unable to warm it sufficiently with proper ventilation. The new warming Apparatus has been in about six weeks, through the coldest weather, and we have no hesitation in saying that we are heated to our entire satisfaction, and we think with much less coal than the old methods.

I am very respectfully yours,
OLNEY ARNOLD,
Chairman of Board of Trustees.

From DR. STEWART *of Baltimore:*—

GENTLEMEN: During the very cold weather of the early part of this Spring, my house has been rendered comfortable by means of "Gold's Patent Steam-Heater." Several hot-air furnaces have been used for heating my house, during the last few years, neither of which could be so arranged as to answer the purpose fully, the amount of hot air conveyed through the pipes being dependent upon the direction of the wind. When blowing from the East, that part of my house was almost entirely deprived of warmth, and the hot air forced through one or two pipes in the opposite direction or into the cellar. Such was the case when blowing from the West and Northwest. Moreover, the air became so dry as to be unfit for respiration. The Steam-Heater you are now putting up is not liable to any of the above objections. The heat is afforded principally by radiation, and consequently is very similar to that of a fire in an open fire-place. Indeed, it is preferable, because the surface of the radiators never become so

heated as to deprive the air of its moisture. Another very important advantage is, that you can regulate the temperature in any apartment where you have a radiator, and in so doing save your fuel. No less an advantage is in the fact that no part of the Apparatus can, by any possibility, fire your dwelling. You may trust it to the management of any servant, and yet feel secure on this point. I think that from such a consideration, a house warmed by this Heater might be insured for a reduced premium. Yet another advantage is the small consumption of fuel, which amounts to less than half the quantity required by the ordinary furnaces. The arrangement of the Heater is such as to prevent, at any time, a too rapid combustion, and thus a temperature sufficiently high to form clinkers never occurs. Therefore a new grate or cylinder will not be required for many years. On account of these advantages, I vastly prefer your "Gold's Steam-Heater" to any fixture for warming purposes now in use, and would advise others to avail themselves of its comforts.

Respectfully,
JAMES V. D. STEWART, Chemist,
S. E. corner Hanover and Camden-st., Baltimore.

We also give the names of the following parties who have the Apparatus.

ARNOLD, CONSTABLE & Co. 309 & 311 Canal-street, New York.
ARCHER, WARNER & Co., 376 Broadway, New York.
R. T. WILDER, 251 Broadway, New York.
CHARLES H. LUDINGTON, Esq., 23 Park Place, New York.

ALEXANDER STRONG,	Boston.	DAVID G. RAY,	Cincinnati.
C. C. WALWORTH,	—	DAVID GIBSON,	—
WM. CARLTON,	—	M. D. PARKER,	—
S. WILLARD,	—	E. S. HARLOW,	—
BENJ. RICHARDSON,	—	A. WOOD,	Milbury.
CHARLES SCOTT,	—	ISAAC PRATT,	Brighton.
PHOENIX BUILDING,	—	M. S. STETSON,	Abington.
WILLIAM WASHBURN,	—	GEORGE STETSON,	Bridgewater.
BANKER & CARPENTER,	—	S. BUCKLIN,	Marlboro.
THE LAWRENCE SCHOOL,	—	JOHN HILL, Jr.,	Stoneham.
PETER NEFF, Jr.,	—	A. R. COFFIN,	South Reading.
T. W. SPRAGUE & Co.,	Cincinnati.	R. W. KERR,	Foxboro.
JAMES C. HALL,	—	A. BELL,	Jamaica Plain
GEORGE SELVER,	—	M. S. SCUDDER,	Grantville.
CALVIN FLETCHER,	—		

This Apparatus has been put into houses the past year for the following persons, among others,

GEORGE FRAZAR, Watertown.
SAMUEL WALKER, —
AUGUSTUS H. HOVEY, Cambridgeport.
C. W. WILDER, M. D., Fitchburg.
R. F. BREWER, Cashier Holliston Bank.
D. A. COOK, President Wrentham Bank.
WILLIAM STETSON, Marlboro.
JOSIAH REED, South Weymouth.
B. F. KENDALL, Brookline.
GEORGE L. STEARNS, Medford.
LEVI BOLES, Boston.
PELHAM BONNEY, —
The House occupied by DR. MORIARTY, Physician, at Deer Island.
FRANCIS BRIGHAM, Feltonville.

Stores in Franklin Street owned by

Trustees of JOSHUA SEARS' Estate.
JOHN SIMMONS, Esq.
GEORGE H. KUHN, Esq.
THOMAS WIGGLESWORTH, Esq.

and occupied by the following parties are also heated by this Apparatus.

STANFIELD, WENTWORTH & Co.
EDWARDS, NICHOLS & RICHARDS.
WILKINSON, STETSON & Co.
J. C. HOWE & Co.
JEWETT, TIBBETTS & Co.
BURRAGE, BROTHERS & Co.
DENNY, RICE & Co.
AUSTIN, SUMNER & Co.
DODGE, BALDWIN & Co.
WOODMAN, HORSWELL & Co.

NEW ERA IN WARMING BUILDINGS.

STEAM DOMESTICATED.

THE ONLY APPARATUS IN THE WORLD ADAPTED TO WARMING PRIVATE BUILDINGS BY STEAM.

A SYNOPSIS OF THE ADVANTAGES CLAIMED.

Economy in Fuel.
Safety from Fire.
Self-Regulating.
Simplicity and Ease of Management.
Freedom from Dust and Gas.
Cleanliness—Healthfulness.
No injury to Woodwork or Furniture.
Not liable to Freeze.
Occupies but little Space.
Quickness of Operation.
Equality of Temperature.
Nicety of Adjustment to any required Temperature.
Freedom from Currents and Drafts of Air.
Even Distribution of Heat.
Safety—Simplicity.
Economy—Durability.
Automatic, Radiating and Condensing.

THE PERFECTION OF ARTIFICIAL HEAT.