

WHAT BECOMES OF HEAT?

A correspondent inquires what becomes, in the winter, of the heat which accumulates in the polar regions during the summer? That great natural force which we call heat, so mysterious in its origin and essence, has been the object of study and observation by many of our clearest intellects, and a vast number of facts in regard to its action have been learned in the last 50 years; and especially in the last 25 years. Dr. Wells' observations of the dew, which were published in 1814, lead the way in the common-sense mode of conducting this series of modern studies of heat; and his very thin volume is well worth reading by any man who takes an interest in the works of nature, and in the correct action of the human intellect, both for the interesting truths which it contains, and as one of the most beautiful and perfect samples of rational investigation. By the means of a few bunches of wool, and some delicate scales and thermometers, Dr. Wells unraveled the cause of the dew, which had, before his time, eluded the comprehension of all who had studied the subject. Since his time the radiation of heat has been investigated by Melloni and others, who have made very numerous and very delicate observations, which resulted in the revelation of many of the laws of its action.

Heat is a restless force; it is constantly rushing, with inconceivable velocity and unmeasurable power, from one body to another—at all events, whenever its equilibrium is disturbed, a circumstance which is constantly occurring in this whirling universe. All substances radiate heat; that is, it is the nature of heat to be constantly rushing out and flying away from any substance in which it exists; and unless the supply is renewed, either by being generated within or by being sent from surrounding bodies, the substance becomes continually more cold. In portions of India where the temperature of the air never falls below 40°, ice is regularly made for sale by simply cutting off water from receiving heat, and allowing it to radiate a portion of that which it contains. Large pits are dug some two feet deep, and filled nearly full of straw, and on this the water is set in broad shallow pans. The straw being a very slow conductor of heat, prevents that which is in the earth from ascending to the pans; and the pans are placed a very little below the surface of the plain to avoid any breeze, and thus prevent a renewal of warm air from continuing the supply of heat to the water. On clear and still nights, these arrangements are found to be perfectly successful, and ice is produced in considerable quantities for market. The water thus placed continues to radiate its heat, as it is always doing; and, being cut off from its usual sources of supply, the temperature soon falls to the freezing point. When there are clouds in the sky, ice does not form; the clouds, radiating heat as well as the water, send down enough to keep the water too warm to freeze. A wind also prevents the formation of ice; the water being supplied with heat by constant contact with fresh bodies of warm air. The pans of water are placed on broad plains, where they may be exposed to a large portion of the sky, and out of view of other masses of matter from which they might receive heat; as heat, like in light, moves straight lines.

Dew is also formed by the radiation of heat to the sky. Heat passes away from bodies which are exposed to space, and if the supply is not maintained, the bodies become enough colder than the air around them to condense the moisture in the air, which appears upon them in little drops of dew. On cloudy nights and on windy nights, no dew is formed, from the same reason that no ice is formed in India under similar circumstances. A board, or even a piece of cloth, suspended horizontally above the ground, by radiating its heat, keeps up the supply to the bodies beneath, and thus prevents them from becoming sufficiently cold to condense the moisture of the air; and this is the reason why no dew is formed in places thus protected. Some surfaces radiate heat much more rapidly than others. Leslie filled a square can with hot water, and, by coating its outside with various substances, he was able to measure with a thermometer the relative heat emitted by each. The following table exhibits the results of his experiments:—

Lampblack.....	109	India ink.....	85
Water.....	100	Ice.....	54
Rosin.....	95	Isinglass.....	82
Sealing-wax.....	95	Red lead.....	80
Urn-wax.....	90	Graphite.....	75
Polished lead.....	39	Polished iron.....	15
Polished tin.....	12	Polished copper.....	12

From which it seems that lampblack emitted more than

eight times as much heat as polished tin, and ice about six-sevenths as much as lampblack.

The heat which comes from the sun upon the polar regions, when they are inclined towards him, is constantly flying away into the boundless depths of space, and as soon as the supply ceases the temperature falls. Some philosophers have speculated upon the probability of the sun, and with it the earth, being gradually cooled till all life shall be extinguished upon our globe, and have attempted to calculate how many millions of years the process will occupy. But, as the solar system is sweeping through space, we know not what sources of heat may lie in its path; neither do we know enough of the generation of heat to render these predictions of any value. As well might the ephemeron, whose existence is limited to a summer's day, infer from his own observations the eternal and unchanging conditions of the earth, as for the human race—which is but an ephemeron in the unlimited flow of time—to conclude from its observations what is to be the eternal condition of matter.

HYATT'S PATENT EXTENSION CASE.  
COMMISSIONER BISHOP'S DECISION.

UNITED STATES PATENT OFFICE  
November 4, 1859

On the application of THADDEUS HYATT, for the extension of a patent granted to him on the 12th of November, 1845, and re-issued on the 3d of April, 1855, for "Improvement in Vault Covers":—

The character and amount of testimony submitted in this case, as well as the acknowledged ability of the counsel employed by both the applicant and the remonstrants, justify the conclusion that the issue involved is one of considerable importance. If no opposition had been made to the extension, and the case rested entirely upon the evidence submitted by the applicant, I should not hesitate to grant the prayer of the petitioner. I shall therefore proceed at once to an examination of the objections to the extension on the part of the remonstrants, with the view of ascertaining whether there is anything therein contained to justify the rejection of this application.

Mr. Hyatt asserts, and has submitted evidence to prove, that he is the first and original inventor of the plan of lighting subterranean apartments by means of the invention set forth in the following claims:—

"What I claim as my invention and desire to secure by Letters Patent in covers for openings to Vaults in floors, decks, &c., is making them of a metallic grating or perforated metallic plate with the apertures so small that persons or bodies passing over or falling upon them may be entirely sustained by the metal, substantially as described; but this I only claim when the apertures are protected by glass, as and for the purposes set forth.

"And I also claim, in combination with the grating or perforated cover and glass fitted thereto, the knobs or protuberances on the upper surface of the grating or perforated plate for preventing the abrasion or scratching the glass, substantially as specified."

The applicant further asserts, notwithstanding the greatest exertion upon his part that owing to the neglect and refusal of the public to make use of his invention when first offered to them, he has failed to obtain a sufficient remuneration for the time, labor, ingenuity and expense bestowed upon it, and its introduction into use.

It is claimed, however, by the remonstrants, that Hyatt is not entitled to a patent for this invention, for the reason that the same thing was patented to J. T. Christy, in England, in 1841. As evidence of this the London *Mechanics' Magazine*, for 1841, is exhibited, in which we find, under the head of "List of Designs registered between June 28th and July 28th," the following:—

"Date of registration—July 6, 1841; No. on the register—742; Registered proprietor's name—J. T. Christy; Subject of design—Coal Plate; Time for which protection is granted—3 years."

From this it appears that J. T. Christy, on the 6th day of July, 1841, registered a design for a coal plate, in the exclusive sale of which he was protected for the term of three years. What this particular coal plate was does not appear from the printed publication. No one in this country would imagine that the words "coal plate" meant an iron frame with several openings filled with thick glass to be placed upon sidewalks or floors for the purpose of admitting light into vaults, cellars, basements, &c. It cannot therefore be claimed that this notice in the *Mechanics' Magazine*, unaccompanied as it is by any explanation of any kind, is a printed description of the particular device for which Letters Patent were granted to Hyatt in 1845.

But the remonstrants have offered in evidence what purports to be a copy of a drawing of an "Improved Coal Plate," registered in England in July, 1841, by John Fell Christy and Company.

I am clearly of the opinion that this drawing and the accompanying affidavits, as well as the affidavit attached to the so-called coal plate, cannot be received as evidence in this case, for the reason that the applicant did not

have the opportunity offered him to be present and cross-examine the witnesses, a right which is virtually guaranteed him under the rules of this office. I am aware that it has been urged by remonstrants' counsel that this was the best evidence that could be produced, for the reason that there is no provision under the laws of England for taking certified copies of registered designs. It would require, however, something more than the naked statement of an attorney to satisfy my mind upon that point, particularly in the face of the following remark found in the letter of Newton & Son, patent lawyers, of England, to remonstrants' counsel, marked Exhibit T. "The courts of law are bound to accept as evidence the copies of a design stamped with the Registrar's seal." No such stamp appears upon the drawing purporting to be a copy of Christy's registered design.

But even admitting it to be true that a certified copy of a design registered in England cannot be obtained, does it follow that the affidavit of any private individual can be received in lieu of such certified copy, when the opposing party has had no opportunity of testing by a cross examination the character and veracity of the witness? I apprehend that no Court of law would recognize a principle so manifestly dangerous and unjust. Waiving the objections of applicant's counsel to the admissibility of the testimony of John Stuart, and what do we have to establish the fact that the invention claimed by Hyatt was patented in England in 1841? Stuart testifies that he saw vault covers in use in England made of one piece of cast-iron, with four holes in each, about 3½ or 4 inches in diameter, with pieces of thick glass fitted into each hole, and that said vault covers were similar to one exhibited to him on the stand. There is, however, no legal or admissible testimony to show whether the particular vault cover shown to Stuart was made in London, Paris, or New York; whether it was made by Christy, in 1841, or by J. T. Jackson, in 1859. Stuart does not testify that the vault cover which he saw in England was, to his knowledge, ever patented or even registered. All that can be inferred from his testimony is that he saw such vault covers in use or on sale in England in 1841 or 1842. The point is well settled that the mere prior knowledge and use of an article in a foreign country does not destroy the validity of a patent for the same thing in this country. I deem it, therefore, unnecessary to inquire whether a registered coal plate is, within the meaning of our laws, a patented coal plate, as there is no legal evidence to show what the particular coal plate registered in England was. But if we admit the affidavits, the cast-iron coal plate, and the alleged copy of Christy's drawing, there is, even then, nothing to destroy the validity of Hyatt's patent. All of this evidence proves no more than that Christy's registered coal plate was a round iron cover with four round holes in it, while Hyatt's invention, as described in his original specification, is a vault cover so constructed "as to admit light through a considerable number of small glasses or lenses which are so set in the iron cover as to effectually defend them from injury by the falling or pressure of weighty bodies upon them, or from the contraction or expansion of the metal; they being protected by knobs or protuberances on the iron cover, and defended also by being set in a frame-work of wood or soft metal or wood and soft metal combined, which will yield to percussion, and thus aid effectually in preventing the breaking of the glass."

The testimony of Wm. W. Cornell (in which he states that he saw in England, in 1857, "a light marked 'Christy; registered July 6, 1841,' twelve inches in diameter, containing four round glasses, each four inches in diameter,") fails to establish the fact that Christy's coal plate, as registered, contained any glasses at all. I have examined the purported copy of Christy's registered drawing, the *Mechanics' Magazine* for 1841, the cast-iron coal plate, the testimony of Stuart and Wm. W. Cornell, as well as all the rejected affidavits, and am unable to find anything therein to prove conclusively that the Christy design registered in 1841 was for a cast-iron plate containing holes filled with glass. We have just as much right to suppose that the holes exhibited in the drawing were not to be filled at all, or were to be filled with pieces of wood or iron in such a manner as to be removed for the purpose of ventilation, as to suppose that they were intended to be filled with glass. The rejected affidavit of Richard Folkard shows that the holes in one of Christy's coal plates were filled with disks of iron after the glasses had been broken out. If Mr. Cornell had chanced to have seen that coal plate with the holes so filled with disks of iron, we would be as much bound to believe that the apertures in Christy's registered coal plate were designed by him to be filled with iron as that they were to be filled with glass.

Cast-iron vault covers, with holes through them for admitting light and air into vaults, had been in use in this country long before the invention of Mr. Hyatt. These were of various shapes and designs, and there is no admissible evidence submitted in this case to justify the conclusion that the Christy registered coal plate was anything more than a design for an old-fashioned open vault cover.

Although, under the view I have taken of this point, it is a matter of no importance, still it may not be amiss to state that the coal plate referred to in the *Mechanics' Magazine* is represented as being registered by J. T. Christy; the one referred to in Exhibit A, by John Fell Christy & Company; while the name shown in said exhibit upon the drawing itself is J. E. Christy & Co.

For the reason hereinbefore referred to, I must set aside the Christy coal plate as having no bearing upon

this case. It is further claimed by the remonstrants that Hyatt's invention is nothing more than a mere application of Rockwell's vault cover, patented in 1834.

This invention of Rockwell was for a vault cover composed of a single plate of glass of any size or shape, inclosed by an ornamental rim of iron. Rockwell does not set forth, in his specification or claim, any method for preventing the breaking of his glass by the contraction and expansion of the iron rim, or any plan for fitting in the glass in such a manner as to prevent leakage. The attention of the Office was called to the Rockwell light by Hyatt in his original application, as well as in his application for a re-issue, for he describes therein the leading features of Rockwell's light, and points out the improvements upon it which he has invented. In view of these facts, the Office has twice decided that Hyatt's invention was such an improvement upon the iron vault cover with a single glass as to entitle him to a patent. I should not, therefore, feel justified, at this late day, in overruling the decision of the Office, twice rendered upon that identical point, unless I was satisfied beyond the shadow of a doubt that the Office erred in its former decisions. I am not free from doubts upon that subject, and must therefore regard the action of the Office in granting a patent as entirely correct, at least, so far as the Rockwell vault light is concerned.

We are next led to inquire whether iron window sashes and the thick glasses inserted in the top of diving-bells are to be regarded as anticipations of Hyatt's invention. To answer this it is only necessary to ask whether either of them, placed in a side-walk, would have accomplished all that is realized from Hyatt's invention? Would the former have been safe for people walking over them when the glasses were broken out, or would the latter have made suitable vault covers, combining all the advantages of his invention?

Hyatt may have noticed the metallic window sash and the top of the diving-bell, and these may have suggested to his mind the idea of combining the iron grating of the one, properly modified, with the thick glass of the other, in such a manner as to form his metallic illuminating grating. If no invention was required to accomplish this result, why did not Rockwell think of it when he applied for his patent in 1834? Why did not some other ingenious mechanic, who was aware of the importance of a full supply of light to those subterranean vaults, accomplish the same result? The fact that such vaults had for a long time been in existence, and that no living man had before thought of such a thing as covering the top of such vaults with simple iron covers, with small openings filled with glass, in such a manner as to be water-tight and secure from breaking by persons passing over them, and so constructed that, even if the glasses were all broken out, the covers would still be safe to walk over, makes it perfectly clear to my mind that there must have been some ingenuity and invention exercised by Mr. Hyatt. It may be said that the amount of ingenuity and invention displayed was exceedingly small and insignificant; still it was so great that hundreds of people besides Mr. Hyatt, who had seen metallic window sashes and thick glasses in diving-bells, day after day and year after year, had never thought or dreamed of combining these in such a way as to produce the article which he claims as his invention. It seems, therefore, that Hyatt, at least, displayed more ingenuity in this particular line than any one before him.

Other points have been presented by the remonstrants as showing a want of invention and originality on the part of Mr. Hyatt; but as these are of less importance than those to which I have already alluded, I deem it unnecessary to further pursue the inquiry in regard to the original patentability of his invention, and shall therefore proceed at once to examine the objection made to the re-issue of Hyatt's patent in 1855.

It is urged by the remonstrants that the claims in the re-issued patent confer upon the applicant more than he was entitled to—that it embraces new matter not contemplated by Hyatt when he made his original application.

I regard the plan of forming a metallic grating with several small apertures filled with glass, for the purpose of letting in the light and keeping out the rain, as the gist of his original invention. Hyatt's real invention, however, is better explained by himself, in his original specification, in the following language:—

"I have so contrived my illuminating vault cover as to admit the light through a considerable number of small glasses or lenses, which are so set into the iron cover as effectually to defend them from injury by the falling or pressure of weighty bodies upon them, or from the expansion and contraction of the metal; they being protected by knobs or protuberances on the iron cover, and defended also by being set in a frame-work of wood or of soft metal, or of wood and soft metal combined, which will yield to percussion, and thus aid effectually in preventing the breaking of the glass. In situations where it is desirable, I combine a ventilator with my vault cover in such a manner as to allow a current of air or vapor to pass freely, whilst the entrance of water from without, under ordinary circumstances, is prevented."

He then goes on to describe minutely one or two methods by which he confines the glasses in their proper positions in the vault cover by the use of laminæ of wood, or soft metal, or of both combined.

The question therefore arises, was his invention merely the particular method shown in his drawing of securing the glasses to the metal frame, or was it the general plan of combining a perforated vault cover with small glasses

in such a manner as would accomplish the object desired? Most obviously the latter. Mr. Hyatt, in his original application, virtually gave the following analysis of his invention:—

1st. A metallic vault cover, with holes so small that it may be safely walked over.

2d. Small thick glasses, to be placed in the holes in such a manner that light may be admitted, and that they may not be broken by the contraction and expansion of the metal.

3d. Knobs or protuberances upon the upper surface of the metallic vault cover, to protect the glasses from scratching or injury.

4th. Wood or soft metal, into which the glasses are to be so set as to yield to percussion.

5th. The whole to be made water-tight.

The elements of the invention are here set forth in such a clear manner that an ordinary mechanic, skilled in the business to which this invention appertains, could, without any further explanation, have constructed a vault cover which would have answered all the purposes that Hyatt's vault light was intended to accomplish. One mechanic might have secured the glasses to the metallic frame in one way; another mechanic, in a different way. One might have used wood, the other lead; still, the result would have been a load-sustaining, light-admitting, surface-protected, water-proof vault cover; and, however, different the modes of securing and protecting the glasses may have been, they could only be regarded as equivalents of the particular mode which Hyatt exhibited by his drawings. The affidavits of Messrs. Delavan, Stoughton, Alrich, Brooks, and others, which were submitted at the time of Hyatt's application for re-issue, show conclusively that, previous to his application for his patent in August, 1845, he constructed and put down at the Delavan House, in Albany, several vault lights, some of which consisted of a single plate of cast-iron with small apertures, into which apertures the glasses were fitted with cement, and protected from injury by projections upon the upper surface of the cast-iron plate; while small plates of brass, with openings in them corresponding with the size and shape of the glasses, were placed over the top of said glasses, and secured to the cast-iron plate by means of screw-bolts and nuts. These affidavits were not, in my judgment, introduced, on the application for re-issue, for the purpose of showing that Hyatt had, previous to his original application for a patent in 1845, invented more than was described in said original application, so that he might be enabled to embrace in his re-issue new matter not referred to in the original specification. They were evidently designed to show that this invention, as set forth in the original application, did not consist of a particular method of securing the glasses to the iron vault cover, but included an iron vault cover with several small glasses, properly protected and so secured as to make a safe, water-tight, illuminating cover. I have no hesitation, therefore, in saying that the re-issued patent of April 3, 1855, confers upon Hyatt nothing more than he was entitled to claim under his original application, and nothing more than he described in said original application.

I must accordingly hold that the invention secured by the patent of 1845, and by the re-issue of 1855, and for which an extension is now asked, was new and patentable when patented. It is, however, claimed by the remonstrants that the applicant has sold and put down illuminated vault covers or gratings marked "T. Hyatt, patented Nov. 12, 1845," which were not covered by his patent, and has thus abused the privilege secured to him by his patent, as well as virtually threatened to prosecute persons for using that which they had a perfect right to use. I do not consider it my province to inquire into this point. The patent law provides for the imposition of heavy fines upon all persons who sell articles marked as patented, which are not patented. And, for all that appears to the contrary, Mr. Hyatt may yet be obliged to pay these very penalties. Should his application for extension be refused on this ground, he might be punished twice for the same offense, once by the Patent Office and again by the courts. The only points into which the Commissioner is authorized by law to inquire, on an application for extension, are—

Was the invention new and patentable when patented?

Is it a useful and important one to the public?

Has the inventor used due diligence in introducing his into general use?

Has he received a reasonable remuneration for the time, ingenuity and expense bestowed upon the same and the introduction thereof into use?

There is no pretence in this case that Mr. Hyatt has not endeavored, steadily and persistently, to induce the public to use his invention. The testimony clearly proves that his attention was directed to the subject of vault lights as early as 1834, when he was a student-at-law; that from that time until the present, he has been engaged upon this subject. Indeed, I doubt whether many instances can be found where an inventor has devoted more time and effort to his invention and its introduction into use. The testimony of several architects of acknowledged reputation and skill, as well as the testimony of real estate proprietors who have used his illuminating vault covers, fully establishes the fact that Mr. Hyatt's invention is an exceedingly valuable one to the public; it is mainly through his untiring efforts that land-owners have been induced to adopt his lights, and extend the basements of their buildings under the side-

walks, and thus add to the value and convenience of their property.

It is through his efforts that the former dark, damp and gloomy subterranean vaults, fit only for the storage of coal, wood or boxes, have been transformed into cheerful and useful apartments, suitable for the transaction of business. And, although it appears that the New York Sun Building was constructed with a basement extension, and lighted by Rockwell's vault lights, before the patent of Hyatt was granted, still, it seems that no person, with the example before him, considered it of sufficient importance to warrant its repetition. Property-holders continued to build their stores and warehouses in the old-fashioned way; and it was not until after Hyatt had succeeded in having his ideas carried out at Cooley's Building, on the corner of Broadway and Cortlandt-street, and at the Herald Building, in the city of New York, that the public were convinced of the value and importance of his invention. It was then discovered that there was remaining unoccupied, under the streets and sidewalks of New York, and of other large cities, a vast amount of space which might, by the adoption of Hyatt's lights, be rendered as valuable as the second floors of buildings; while the additional rent to be realized therefrom would pay the interest upon the additional cost, and still leave a large per centage for the benefit of the owners of the property.

It is unnecessary to consider whether the invention of Hyatt has been the means of enhancing the value of real estate in large cities, or whether the enhanced value of real estate has made the use of his invention a matter of great importance, or even necessity. In either event, the value of the invention must be admitted. Its value and importance is further established by the fact, that land-holders prefer to use his invention, and pay him a large royalty for such use, rather than use the invention of Rockwell, or iron sashes with large openings filled with thick glass, both of which belong to the public.

I am entirely satisfied that Hyatt's invention, whether it was the result of a high degree of inventive genius or required but a very small amount of ingenuity, is a very valuable one to the public, and has proved a source of more advantage and profit to them than to the inventor himself.

I shall therefore, without further remark, pass to the consideration of the question, "Has the inventor received a reasonable remuneration for the time, ingenuity and expense bestowed upon his invention and the introduction thereof into use?"

The profit which Hyatt will realize from his invention, by the day on which his patent expires, will, as near as I can calculate, amount to about \$93,000. In deciding the point of sufficiency of compensation, various preliminary points are first to be determined.

It was undoubtedly the intention of Congress, in establishing our patent system, to offer a premium for the fruits of inventive genius, for the purpose of encouraging progress in the arts of civilized life.

To effect this, it is necessary and proper that an inventor should enjoy the fruit of his labors for a sufficient length of time to enable him to realize more than he would be likely to realize during the same time if engaged in the ordinary branches of business. For unless a man after devoting his time and talent to a new and useful improvement is allowed to make more from his invention than a man of the same capacity and energy can make in other kinds of business; no reward is granted him, and no encouragement extended to others by which they may be induced to follow his example. The law goes upon the presumption that the monopoly by an inventor of his invention, for the period of fourteen years, will as a general thing enable him to reap the proper reward, but, in the event that should not be the case, wisely provides for an extension of the time for the further period of seven years. The amount of this reward should depend to a considerable extent upon the value that the invention is to the public. If the amount paid by the public for a particular improvement which they consider necessary for them to use is greater than the benefit derived from it, they have just right to complain and to protest against the extension of a patent therefor. But if, on the other hand, the benefit which the public has received far outweighs the profits which the inventor has realized, such complaints and protests might be regarded as unjust and unreasonable.

Again: the law presumes that when a new useful and valuable improvement is invented and offered to the public, the public will at once avail itself of the advantages of such an improvement, and that the inventor will at once begin to realize a profit upon his invention, which profit will continue for the period of fourteen years, provided he charges for his improvement less than it is really worth.

How are the facts in case?

Many of the first and most reliable men in the city of New York, who have used and paid for this invention, testify that the price paid bears no comparison to the advantages resulting from it. The testimony also proves that the applicant, owing to the persistent neglect or refusal on the part of the public to use his improvement, has really enjoyed his invention but seven or eight years. Thus, if the extension prayed for is granted, he will in fact be secured the advantages of a profitable invention for no longer a period than the law contemplated when his patent was granted.

It is comparatively rare that an invention is made which proves to be of any substantial advantage to the public. When such a thing does occur, the inventor

is allowed a large and munificent reward, not only on account of the benefits which he may have conferred upon his race, but that his brilliant success may stimulate other inventors to renewed and increased exertion. Rather than with a begrudging spirit grumble at the success of such an inventor, and fear that he may profit too much, we should congratulate ourselves that a wise provision of the law has placed it in our power to bestow a reward upon him commensurate with the benefits which he has conferred upon the public. It is a peculiar feature of this case that the opposition to the extension does not come from those persons who have adopted and paid for the improvement, but from certain rival iron manufacturers and contractors, who, during the fourteen years of the existence of this patent, have probably accumulated larger fortunes from their regular business than Mr. Hyatt has from his invention. The fate of the inventor is a hard one at best. No matter how valuable and important his invention may be, he must first overcome the prejudices of the public, before he is able to obtain any remuneration. By this time, as a general thing, the duration of his patent has already partially expired. Then, as soon as he has succeeded by his labors and perseverance in satisfying the public of the advantages of his invention, and has created a market, hundreds of greedy rivals at once by a system of piracy attempt to rob him of his property. Rich and powerful combinations are formed against him. He is compelled to abandon his invention or submit to prolonged vexations and expensive litigation. Nine inventors out of ten, unable to withstand the pressure brought against them, retire broken-hearted from the contest and finish their lives in poverty and want, while those who have robbed them reap all the profit. The applicant in this case is, to a certain extent, a living example of the truth of these statements. It was about seven years after the patent was granted before he succeeded in conquering the prejudices of the public, and rendering his invention profitable; and although he has not as yet been prevented by infringers from realizing some remuneration, still he now finds them remonstrating against the further extension of his patent.

After having devoted more than fourteen years of the best portion of his life to this invention, he has succeeded in realizing a profit of \$93,000. This covers his profit both as inventor and manufacturer, as well as all that may be properly chargeable to his other patents. A thorough investigation of the case has satisfied my mind that the profit which the applicant has received from his invention is not sufficient, when compared with the advantages which the public have experienced from it.

It is therefore ordered that the patent be extended for seven years from the 12th day of November, 1859.

W. D. BISHOP,  
Commissioner.

#### FOREIGN SUMMARY.

At the recent meeting of the British Association of Social Science, Lord Brougham, at the advanced age of 82 years, delivered an address over two hours long with all the vigor and eloquence of a young orator. At this meeting many gratifying facts were reported by Mr. A. Baker, regarding the benefits conferred by the Factory Act upon the operatives in English factories. He stated that by the reduction of the hours of labor, there had been a marked and decisive improvement in the health of factory operatives, and an entire disappearance of the physical deformity and excessive mortality which prevailed among those classes previously. In the condition now brought about by that act there was no greater amount of disease, deformity, or mortality among factory laborers than others, while for some years previous to 1832, a marked and alarming deterioration of physical strength had occurred.

The Queen had attended the opening of the new water-works for the city of Glasgow, at Loch Katrine, in Scotland, made famous in classic song as being the scene of Sir Walter Scott's "Lady of the Lake." It is a beautiful sheet of water, very deep and clear, and is conveyed about the same distance through a conduit as the Croton water at New York. Heretofore, the city of Glasgow has been supplied with water pumped from the river by huge steam-engines; it is now to be supplied by gravitation, and the expense will be much less. As a work of engineering it can compare favorably with some of the greatest achievements of ancient or modern times, and deserves to be very generally known. It embraces 13 miles of tunneling, 9½ miles of aqueduct, and 3¾ miles of huge iron tubing. There are altogether 70 distinct tunnels, upon which 44 vertical shafts had to be sunk for facilitating the work. The first tunnel is 2,325 yards long, and 600 feet below the summit of the mountain. It was excavated from twelve shafts, which had to be sunk 500 feet deep. There is another tunnel 3,650 yards long, cut through blue basalt, at 250 feet below the summit of a hill. The rock in all the tunnels is very

hard, being mostly gneiss interspersed with veins of quartz. In some places it required a new drill for every inch that was bored, and although the work was carried on night and day in some shafts, they sometimes could not make over three yards of progress in a month. The undertaking was commenced three years ago, and was recommended by Stephenson and Brunel. It is remarkable that the *Great Eastern*, the Victoria Bridge, and the Glasgow Water Works, with which the names of these great engineers are associated should have been completed just about the time they departed, and that they were denied the pleasure of seeing their designs perfectly finished. The supply of water to Glasgow will be 50,000,000 gallons per day, with a store sufficient for 120 days without rain.

The metal market has been somewhat depressed since our last. This is attributed to the unsettled state of political affairs. Banco tin has fallen slightly, but copper has somewhat advanced. The export of British coal has increased during the past year to the extent of 270,000 tons, the whole being 4,490,956.



ISSUED FROM THE UNITED STATES PATENT OFFICE  
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\* \* Pamphlets giving full particulars of the mode of applying for patents, size of model required, and much other information useful to inventors, may be had gratis by addressing MUNN & CO., Publishers of the SCIENTIFIC AMERICAN, New York.

26,005.—Corintha Alden, of Cassadaga, N. Y., for an Improved Clothes' Ironing Apparatus:

I claim the arrangement of the box, A, with the follower, B, or its equivalent, in combination with the tank, D, substantially as and for the purpose specified.

[With this invention the operation of ironing is rendered so easy that it requires no bodily exertion, and in fact neither particular attention nor great skill. The clothes are neatly folded in a box, and compressed by means of a follower, and in this state they are exposed to the influence of steam for a few hours. When properly folded they become perfectly smooth.]

26,006.—Ephraim C. Allen, of Le Roy, N. Y., for an Improvement in Corn-planters:

I claim the arrangement of the various parts of the seeding machine described, when the whole are constructed and combined for operation conjointly, as an improvement for the purposes in this specification set forth.

26,007.—John Aspinall, of London, England, for an Improvement in Refining Sugar. Patented in England Feb. 8, 1859:

I claim the method described of effecting the blowing-up or melting of raw sugars; that is to say, by so supporting or upholding the sugar that successive portions will be brought into contact with the water, whereby the sugar will be melted at or near the surface, for the purposes and substantially in the manner set forth.

26,008.—Merrick Bemis, of Ashburnham, Mass., for an Improved Compensating Pendulum:

What I claim is my improved mode of making a compensating pendulum, namely, by arranging a part of the rod in the form of a bow or sectoral bend, and applying to such bend or part a clasp or bow of metal having a different expansive ratio, the whole being substantially as specified.

26,009.—Robert Blair, of Malugin Grove, Ill., for an Improved Device for Applying Steam as a Motor:

I claim the combination with a radial lever, or frame, D, and circular railway, A, and central revolving power-transmitting shaft, C, of a traction steam-engine, B, when the crank axes of said engine radiate from the central shaft, C, and the inner traction wheels are made of smaller diameter than the outer one, the whole arranged and operated substantially in the manner and for the purpose set forth.

[The object of this invention is to supersede the various horse-powers that are now used for driving portable machinery, chiefly such as are used by agriculturists, as threshing machines, for instance, churns, pumps, and the like. The invention consists in placing a traction engine on annular ways, and having said engine attached to a radius frame, the center shaft of which is provided with a toothed wheel or pulley, from which the power is taken as the engine passes around the annular ways.]

26,010.—Nelson Burr, of Batavia, Ill., for an Improvement in Corn-shellers:

I claim the peculiar arrangement of the section, e, provided with the ring, f, and placed relatively with the cylinder, A, and adjoining sections, d, f, to effect the object set forth, substantially as described.

[This invention consists in the employment or use of a rotating cylinder and a stationary shell, the latter being provided with a door and wing, and the whole so arranged that a very simple and efficient combined corn-sheller and cob-grinding mill is obtained, the machine being capable of being used in either capacity by a very simple adjustment.]

26,011.—Thos. Carpenter, of Battle Creek, Mich., for an Improved Shoemaking Table:

I claim the movable bottom, D, arranged in combination with the bench, A, and compartment box, B, constructed as described, substantially in the manner and for the purpose specified.

26,012.—R. Carkhuff and B. Chalfant, of Lewisburgh, Pa., for an Improvement in Steam Valves:

We claim the peculiar arrangement of the slide, T, and transverse bar, U, which form the valve of the steam chest, K, the bar, U, and the cross-arm, R, of rod, S, whereby said valve is allowed a lateral as well as a longitudinal movement within the chest, for the purpose set forth.

26,013.—L. C. Chase, of Boston, Mass., for an Improvement in Girth Buckles:

I claim constructing a buckle with wings, B, B, or their equivalents, and furnished with holes, b, b, substantially as set forth and for the objects specified.

26,014.—B. S. Church, of Manhattanville, N. Y., for an Improvement in Water-meters:

I claim, first, The arrangement of the partitions, g, g', in the trough G, as described, in combination with the air-tight chamber, D, chamber, F, and tubes, I, whereby that portion of the water which does not pass through the measuring buckets is prevented carrying off any of the air in the chamber, D.

Second, Arranging in the air-chamber, D, a float, J, in combination with a valve, h, or its equivalent, substantially as and for the purpose described.

26,015.—George Clay, of New York City, for an Improvement in Packing for Sliding Gas-lights:

I claim the combination with the pipe, D, shell, A, and pipe, B, of the elastic tube, C, when the latter is fitted so that its central portion will contract and press upon the burner or upon the sliding pipe, so as to form a gas-tight joint, all as shown and described.

[This packing is so simple in its application and so efficient in its action, that it recommends itself to all gas-fitters. It consists simply of an elastic tube, the ends of which are expanded over two nipples, whereby its central part collapses, thereby making a tight fit on the sides of a pipe which passes through said elastic tube, and at the same time allowing the pipe to slide up and down.]

26,016.—J. W. Cochran, of New York City, for an Improvement in Projectiles for Rifled Ordnance:

I claim, first, The band, C, of copper or other wire, applied substantially as described, in combination with the cup, or cup-like frame, B, attached to the rear of the projectile, for the purpose described.

Second, The expanding ring, D, applied substantially as described, in combination with a conical surface, f, formed behind a shoulder on the front part of the projectile, for the purpose set forth.

26,017.—J. W. Cochran, of New York City, for an Improvement in Projectiles for Rifled Ordnance:

I claim the application to a projectile for rifled ordnance of a covering, or of one or more bands, composed of a coil or coils of copper or other wire, wound upon its exterior, substantially as described for the purpose specified.

26,018.—D. W. Comstock, of Chicago, Ill., for an Improved Railroad Gate:

I claim placing the ends of two pairs of adjoining rails, B, on a rising and falling platform, C, when the latter is suspended from the short arms, d, of crank levers, d, c, the long arms, e, of which carry the panels, F, of a gate, substantially in the manner and for the purpose described.

[This invention is of great importance, particularly in such places where railroads pass through towns, or wherever a railroad crosses a common road. The gate opens as the train approaches, and as soon as the last car has passed it closes again, so that nothing can pass into the road which might cause an obstruction to the approaching train.]

26,019.—Wm. F. Converse, of Harrison, Ohio, for an Improvement in Railroad Car Springs:

I claim, first, The combination of a clamp, f, g, h, with a disk spring, in the manner and for the purpose explained.

Second, In connection with the above, I claim the series of annular steel disks, of unequal diameter, arranged in manner and for the purpose described.

26,020.—N. B. Cooper, of Gratis, Ohio, for an Improved Churn-dasher:

I claim the arrangement of the arms, d, d, on the two points, b', b', one on each side of the upright, B, when the upright, B, is made removable by means of the ways, x, x, substantially as set forth.

26,021.—Edward Crane, of Dorchester, Mass., for an Improved Steam Boiler:

I claim a fire-box surrounded by a water-jacket, the combination of the tubes in the fire-box, with the boxes or chambers, as described, so that a number of tubes shall have the same connections through the said boxes or chambers with the water-jacket and steam chamber, and shall also be capable of being put in and taken out of the boiler at the same time.

I claim the use of tubes coiled or folded into the fire-box, and connected with the water-jacket and steam chamber through the boxes or chambers, as described, and B, C, as described, of such length in proportion to their diameter that all the water entering them at the lower end shall be converted into steam in the lower portion, and the steam be superheated in the upper portion before it is discharged into the steam chamber.

I claim the use of tubes in the steam chamber for discharging the steam generated in the tubes in the fire-box, so bent that the superheated steam issuing therefrom shall be discharged into a drum around the chimney and against the chimney, in the first instance, and then against the surface of the water, as described.

I also claim the use of the drum around the chimney in the steam chamber for securing the discharge from the tubes, and checking the disturbance of the water through the whole extent of the steam chamber, arranged and constructed as described.

I claim the combination of the blow-off cocks, e, with the stop cocks, g, for the purpose of blowing off each section of tubes separately, as described.

I claim the use of the tube coiled around the chimney, for the purpose of taking the steam from the steam chamber, at the point where it has the highest temperature.

26,022.—Edward Crane, of Dorchester, Mass., for an Improvement in Railroad Car Wheels:

I claim a wheel having its rim and tire secured together by india-rubber vulcanized in place, as set forth.

26,023.—Munson C. Cronk, of Auburn, N. Y., for an Improved Clothes' Dryer:

I claim the combination and arrangement of the hollow post, A, the sliding piece, R, brace cords, M, N, P, Q, the hub, B, the stands, W, X, Y, Z, and the radial arms, C, D, E, F, G, the ring, V, substantially in the manner and for the purpose specified.

26,024.—C. A. Desobry, of Plaquemine, La., for an Improvement in Pans for Evaporating Cane Juice:

I claim the heaters, B, B, of inverted cup form, applied within the pan, in combination with the system of connections, E, E, F, F, and the two series of pipes, S, S and W, W below the pan, substantially as described.

And in combination with the said heaters, connections, and two systems of pipes, I claim the pipes, b, b, passing through the said heaters, substantially as described.

[This invention consists in a certain novel system of heaters arranged within an evaporating pan, in combination with a suitable system of connections with two series of pipes arranged below the pan for supplying steam to the said heaters and conveying away the water of condensation, whereby I am enabled to present an extensive and very effective heating surface to the liquid or substance within the pan, and to prevent effectively any collection of water upon the said surfaces.]