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Contents:

(Illustrated articles are marked with an asterisk.)

ADVERTISERS.

The value of the SCIENTIFIC AMERICAN as an advertising medium cannot be over-estimated. Its circulation is ten times greater than that of any similar journal now published. It goes into all the States and territories, and is read in all the principal libraries and reading rooms of the world. We invite the attention of those who wish to make their business known to the liberal terms offered in our advertising columns. A business man wants something more than to see his advertisement in a printed newspaper. He wants circulation. If it is worth 25 cts. per line to advertise in a paper of three thousand circulation, it is worth $2.50 per line to advertise in one of thirty thousand. The value of an advertisement depends chiefly upon the circulation that is given to it.

CONDITION OF THE PATENT OFFICE.

The Patent Office building was commenced in 1836, and 270 feet of the south side of the block were finished and occupied within four years of that period. It is one of the most magnificent public buildings in the world, an ornament to any age or nation.

The order of architecture adopted for the exterior is the Grecian Doric of the age of Pericles, when the fine arts in Greece, particularly architecture and sculpture, had reached the highest excellence. The details are modeled after the celebrated Parthenon, erected on the Acropolis at Athens, which is now in part standing, the marbles having indurated to such a degree by an exposure of more than 2200 years to the atmosphere, as to resist the action of a chisel.

It was the intention of the projectors of the Patent Office, that it should be employed exclusively for the legitimate purposes of its creation, and from time to time as the work progressed Congress appropriated from the surplus patent fund the money necessary for its completion. The last grand hall of the north wing was fitted up in 1865, and formally taken possession of as a receptacle for models. In 1851, Mr. Stuart, at that time Secretary of the Interior, fixed his eye upon the Patent Office and coveted its spacious apartments for the use of his department. At that time it so happened, unfortunately, that we had a very weak person as Commissioner of Patents, who coolly and deliberately reported to Congress, "that the two wings of the Patent Office be finished, and that they be appropriated to the accommodation of the Department of the Interior and the different offices attached thereto." The SCIENTIFIC AMERICAN protested most energetically against the proposition. We thought of the old fable of the porcupine who, wanting shelter for himself, was admitted to share the hospitality of a nest of snakes, but they were so annoyed with his sharp, prickly quil s, that they soon repented of their easy compliance, and entreated the porcupine to withdraw. "No," says he, "let them quit the place that don't like it: for my part, having got in, I am well enough satisfied as I am." When this scheme was maturing, we stated in the SCIENTIFIC AMERICAN, Vol. 7, 1851, that "the wings of the Patent Office should belong to the Patent Office and no other Department. *for if absorbed by any other Department now, when they are required for patent purposes, it will be no easy matter to get them, and required they must be at no distant day.*" The very number of the SCIENTIFIC AMERICAN which contained these words, published a list of only *ten patents* issued for the week ending January 21, 1851

The condition of the Patent Office today, furnishes a powerful confirmation of the warning we then uttered against surrendering any portion of the Patent building to the Department of the Interior; and though Æsop has been dead over two thousand years, unless inventors and those who feel an interest in the future of the Patent Office, unite in firm opposition, his old fable of the porcupine and the snakes is likely to be repeated. In the year 1850, just before the plan was laid to plunder a large share of the Patent Office for illegitimate purposes, there were about twenty-two hundred applications for patents. In the year 1866, when the Patent Office is cramped into the stocks like Titus Oates, the President informs Congress in his annual message that over 14,000 applications for patents were filed during the year ending Oct. 1st. A recent visit to the Patent Office and a careful inspection of its condition revealed to us a state of things which demands an energetic remedy.

It is the duty of Congress at its present session to appoint a committee to inquire what further legislation is necessary to provide for the present and prospective wants of the Patent Office.

The committee will find upon investigation that the Commissioner is very conscientious in the discharge of his duties, anxious to satisfy the pressing demands made upon his time and patience, and to do justice to all who have claims before his department: they will also find some of the Examiners happy and contented, others sullen and moody; the state of mind very much depending upon the pressure of cases referred to them for examination. By calling on Mr. McCormick, the committee will find that the balance sheet shows a surplus fund of about $230,000; an increase of $100,000 in the past year, an amount cheerfully paid by inventors, who are entitled to much better facilities than they now receive. The committee should then look into Prof. Page's room, where they will find six clerks and six Examiners breathing a stifling atmosphere and occupying a space just about large enough to accommodate comfortably two Examiners. In Dr. Jayne's room are four tables and four Examiners, where there should be but two; and as for Dr. Hedrick's room, we undertook to visit him and were repulsed by the formidable front of bottles, documents, desks, etc. His bureau resembles Holbein's picture of the old Alchymist. In short, not to speak of Peale's sepulchre of fine arts, the examining force of the Patent Office is wholly inadequate to do the duties imposed, and wretchedly uncomfortable, and unless a remedy is at once applied, the business will decline.

The Commissioner ought to use all the power he possesses under the law authorizing temporary clerkships, to meet and remove one of the difficulties of which we complain. The examinations are much further behind than they ought to be.

The committee will also find that the Patent Office at this very moment actually needs nearly, if not quite, every available room in the building, and no time should be lost in preparing for the removal of the Secretary of the Interior with his pension bureau, land and Indian traps; they have no business to encumber the Patent Office, and if Congress means to legislate wisely and well, for one of the most precious boons ever conferred upon the people, provision will speedily be made to relieve the Patent Office from present embarrassment and its forces strengthened by adequate legislation. The Patent Office is a self-supporting institution—will not Congress pay some little attention to its wants?

CORROSION OF STEAM BOILERS.

The process of corrosion is very similar to that of the combustion of fuel, the only difference being that in corrosion the metal unites with the corrosive agent slowly, while in combustion the fuel unites with the supporter of combustion rapidly.

The external corrosion of a boiler is due to simple oxidation caused by atmospheric exposure principally. In the boilers of sea-going vessels it is also caused by the contact of the bottom of the boiler with bilge water, and by the exposure of the top to leakage from deck. The best means of preventing this is to cover the top with felt and sheet lead soldered at the joints, and to keep the bottom thoroughly painted.

The internal corrosion is due to simple oxidation and to the galvanic action taking place whenever two different metals or a metal under different conditions are either wholly or partially immersed in a fluid in which either of them would be oxidized; that is, united with the oxygen of the corrosive agent; and which has the effect of confining the corrosion principally and sometimes wholly to one of the two metals in contact. The sheets are eaten away around the rivets before the rivet is injured, on account of the iron in the rivet being in a different condition from that in the sheet, owing to its being more dense from being hammered until cold, and consequently producing a galvanic action by which the sheet is corroded. Tube sheets are apt to leak, when the sheet and tubes are composed of different metals, from the effect of the galvanic action produced by them.

The hot brine or sea water contained in marine boilers is a most powerful corrosive agent of wrought iron. Hence the stays are corroded and the pins or bolts which hold the stays are eaten and loosened. A very thin film of scale is the best protection against this kind of corrosion. The corrosion of the steam drum is caused by the high temperature of the uptake, about 600° Fah. for natural draft, thereby super-heating the steam and oxydizing the iron in a similar manner to the making of hydrogen gas by sending steam over red-hot iron. Boilers not in use are liable to corrosion on the fire side of the heating surface as well as on the water and steam side. To prevent this the smoke stack should be covered over to keep out rain and moisture, the man-hole plates taken off so as to allow a free circulation of air inside, and a light fire of shavings should be built occasionally to dispel all moisture.

THE usual weekly issue of Patents for Dec. 25th will be suspended on account of the holidays.

THE SCIENTIFIC AMERICAN OFFICE.

The engraving upon the opposite page presents a fine view of the Scientific American and Patent Agency Office, which extends through from Park Row to Nassau street, with fronts on both streets; also occupying the whole front on Beekman street, as shown by our signs. The north end of the block is covered by the beautiful buildings of the New York *Times* establishment.

Few persons would recognize this block as the former location of the Old Brick Church, yet it is the veritable spot. Little we thought, years ago, when our then diminutive quarters were in Fulton street, and we used to meet the reverend pastor of the Old Brick, Dr. Spring, striding down Broadway on Sunday, dressed in flowing gown of black silk, wending his way to pulpit—little we thought that we should ever address the public from the same stand-point. But the Doctor and his Church, and the peaceful dead that once reposed within its gates, have been removed. Three miles up town, there on Fifth Avenue, crowning Murray Hill, stands the new Brick Church, and there the venerable pastor is still to be found, engaged in pious labors, surrounded by a large, affectionate and active congregation.

The Scientific American Patent Agency Office is by far the largest establishment of its peculiar class in the world. Our New York offices probably exceed in extent, the area of all other patent agencies in the city combined. In Washington we also have larger and better offices than any others in the profession. Our wide-spread reputation as Solicitors, and our unequalled facilities and success in obtaining Patents for inventors, based as they are upon an experience of nearly a *quarter of a century* in the business, naturally excite the envy of rival patent agents, especially of new comers. They consider themselves particularly fortunate if they can locate near our doors, and by a display of flashy signs, delude inventors into the idea that theirs is the true Scientific American Office: they live upon the few crumbs thus picked up. But after all, the old Scientific American Patent Agency never enjoyed a greater share of the public confidence than at the present moment, and we shall continue by honest industry to deserve it.

DRAINAGE AND UTILIZING WASTE OF CITIES.

A novel system of drainage for the houses of cities, patented by Captain Liernur, is about to be introduced at the Hague, the residence of the king of the Netherlands and a town of 80,000 inhabitants. It consists of an arrangement for daily inodorous emptying and scouring of the passages for excretæ, by pneumatic action, and the immediate removal and utilization of the products, without allowing time for the pestilential process of fermentation, which evolves the intolerable gases of our ordinary sewerage. The absence of water in the products removed, is of no little advantage for fertilizing purposes A plow which at once distributes and covers these products beneath the soil, forms another item of the apparatus. The system of house excretion is quite simple. A straight vertical water pipe extends from the basement to the top of the house, and emerges open, like a chimney. Into this the necessary openings are made, on each floor if desired, with air-tight lids, but entirely clear of valves, traps or other machinery. A strong current of air sets through them in the direction of the outlet above, whenever they are opened. All the house pipes connect with a street pipe, which ends in a reservoir of boiler-iron sunk beneath the roadway at the principal street-crossings: the whole being constructed air-tight. Each house-pipe is closed by a valve operated at the edge of the sidewalk. Every night a sufficient number of wagons go their rounds, each provided with a powerful air-pump, steam engine, and detachable tender carrying an air-tight reservoir. First, the air-pump is coupled to the reservoir beneath the street crossing, and a sufficient vacuum created. Then the valves of the house pipes are opened, one at a time, with a sudden movement. The pressure of the air from the open top of the pipe has already forced the contents as far as the valve, and on opening it, the mass is shot into the reservoir, with a rush of air like a concentrated hurricane scouring the interior of the pipe throughout. Experiment, it is said, has shown this necessary work to be very thorough. Each valve is again closed before another is opened, and during this process, the steam engine continues its work, maintaining the vacuum. When all the valves have been opened and closed, the tender reservoir is coupled on, and the contents of the street reservoir are thrown into it by pneumatic pressure. When filled, it is met and relieved by another tender, and goes its way to the poudrette manufactory; or the reservoir is shipped to the nearest rural station and there decanted into the barrel reservoirs of the patent plow and emptied under the surface of the soil.

The economical estimates reported are as follows: One steam-engine of 10 or 12 horse power, with three tenders of 90 cubic feet each, suffices for the nightly service of a population of 10,000; working seven or eight hours. The quantity removed is one pound and three quarters or 48 cubic inches per day, for the average of all persons; the liquid being to the solid as a little more than six to one, and much the more valuable intrinsically. The least agricultural value of the fertilizing products in Europe, is stated at one shilling sterling per cubic foot; making the income from this source, if the work were performed without charge to the inhabitants, over $22,000 per annum for the services of one engine truck and three tenders, requiring half a dozen horses and as many men, with some further charge for fuel and freight to the country.

In the city of New York, probably a full half of all this agricultural wealth is wasted in the sewerage, and at the same time converted into a source of disease instead of profit. After all this waste and mischief, however, we are informed that there remain, at the very lowest calculation, 500,000 cart-loads or 25,000,000 cubic feet of night-soil, carried out of

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