during the deposition of the copper. He also gives five pages of his work to the discussion of the reduction of alloys in which, among other things, he mentions that zinc and copper have been deposited simultaneously by galvanic action, and afterwards alloyed by heat.

Mr. Walenn remarks that Smee was evidently not informed of Professor E. Davy's discoveries in 1830 (see "Phil. Trans," Vol. cxxi., pp. 147-164) or of the labors of M. de Roulz in 1841, or of Mr. C. Walker in 1845. Certain patented inventions also refer to electro-brassing at this early date, *e.g.*, Fontaine Moreau's invention, No. 10,282, A.D. 1844; De la Salzède's process, No. 11,878, A.D. 1847; Fontaine Moreau's plan, No. 12,523, A.D. 1849; Russell & Woolrich's discoveries embodied in No. 12,526, A.D. 1849; and Steele's patent, No. 13,216, A.D. 1850.

Smee undoubtedly believed that the evolution of hydrogen gas was evidence of the existence of the metal in the non-reguline form. At the present time, however, it is well known that there are solutions which deposit reguline metal during the copious evolution of hydrogen, and this generally takes place during the deposition of alloys. The views of Smee will not stand the test of vigorous experiment when alkaline solutions are employed.

In regard to alkaline solutions, Mr. Walenn remarks that if first principles be consulted, it will appear that, in alkaline solutions, the proneness to evolve hydrogen gas during deposition, arises from the joint action of two causes, one electrical, classified as such by Mr. Smee, the other chemical. The electrical cause is the small quantity of metal in solution in comparison to the electric power employed; this cause can be lessened or removed by using a solution that contains a greater percentage of metal than that usually employed. The chemical cause is the disposition of the metal of the alkali to go to the negative pole along with the heavy metal or metals, and thus, by being electro-deposited for an infinitely small space of time in contact with them, decomposing the water, thereby getting oxidized and setting free the hydrogen as a secondary effect; this cause can be eradicated by providing in excess a decomposable compound radical that will take a certain amount of combined oxygen with it to the cathode, and thus, when decomposed, will enable the hydrogen that would otherwise be evolved to be oxidized into water.

In the case of brass, a solution containing the cyanides of the component metals dissolved in excess of potassic cyanide possesses the remarkable property of furnishing the copper and zinc to the cathode in such a form that, during during deposition, they unite and form a true alloy; this tendency to form a true alloy is increased by the presence of a salt of ammonium, for in connection with copper the gas that would otherwise be given off is replaced by metal, this result being secondary, and, in so far, a chemical reaction. It is usually deemed sufficient to charge the solvent solution (the potassic cyanide and ammoniacal salt solution) with brass by electrolysis, but this will be found on trial to evolve gas, and to be only workable by two Grove's cells. The author finds that it is practically serviceable to add to a solution that is charged with not less than two ounces of brass per gallon, as much of the metallic cyanides as it will take up, and then it will probably take still more of the copper and zinc oxides respectively. Should this treatment not perfectly prevent the evolution of gas, the ammonide of copper is added—about two or three ounces per gallon.

In treating the ordinary cyanide copper solution for the prevention of the evolution of hydrogen, the zinc cyanides and oxides, mentioned in the instance of the brass solution, are left out. When the evolution of hydrogen gas has been stopped by the means above set forth, a single Smee's cell is sufficient to deposit the alloy, thus showing that an intense voltaic current is not absolutely necessary, but that the process requires a certain condition of solution to give a perfect result.

The author prefers to use a menstruum containing potassic cyanide and neutral ammonium tartrate in equal parts, and dissolved in five times their weight of water, to dissolve the brass in. This is then treated, as explained above, to prevent the evolution of hydrogen. This solution is employed in conjunction with heat, and a single Maynooth cell or a magneto-electric machine of suitable power. It has been found, with some electro-brassing solutions, difficult to deposit continuously a given quality of brass; with this solution, the regulation of the proportions of copper and zinc in the alloy is made by altering the heat accordingly. If the solution be kept uniform, as shown by a ready test, it is very easy to deposit a given alloy at all times.

In coating wrought or cast-iron work, it is often advisable to coat with copper prior to electro-brassing; the alkaline bath should be employed at above the temperature of the air, sometimes 160° Fah.; this method of working promotes the contact of the coating. The article should be well cleaned, so as to have a metallic appearance, with a pickle of weak sulphuric acid, scrubbed with sharp sand, washed, scrubbed with a portion of the depositing solution, and then placed in the depositing trough. The electrical connections may then be made, and the coating allowed to form for two hours or more. When a sufficient thickness had been obtained, the article is washed, and dried in hot mahogany sawdust. The "tarnishing" of the coating increases its beauty, and does not impair the article, for the tarnish is not corrosive rust, like the oxide of iron, but is a protective film. Two hours' coating will protect from rust in ordinary indoor work, but the best protection from rust (and this is serviceable even in damp air) is to give two hours' coating in an alkaline bath, and then let the article remain all night in an ordinary acid sulphate of copper bath. If desired, a brass coating may be given over the last-mentioned copper coating. By suitable mechanical arrangements, the articles in the acid bath, and the dissolving plates therein, may be moved—preferably by a to-and-fro movement—during deposition. This treatment shortens the time of the deposit, and makes the deposit uniform.

The uses to which electro-brassing may be applied have yet to be greatly developed; among the rest may be mentioned: the prevention of rust; the giving of an improved printing surface to type and electro-types; coating the poles of electro-magnets for the prevention of the "residual charge" therein; covering rams, plungers, piston rods, rollers, etc., with an adhesive and endurable coating; also lining cylinders, pumps, and iron vessels with copper or brass. The application of the processes that have been described to many purposes of ordinary life, such as railings, architectural ornaments, etc., will exemplify the good results to be obtained by the union of the strength of iron with the beauty of copper or brass.

THE USES OF APATITE.

Since the discovery of phosphate of lime in South Carolina, considerable attention has been bestowed upon the importance of working all similar deposits that may be found in any part of the country, and much inquiry has been made in consequence for mines of apatite, or mineral phosphate of lime. We understand that this mineral has been found in the neighborhood of Crown Point, in this State, also at some point on the Hudson, and quite extensively in Canada. As it is likely to become an important article of commerce, we propose to give some account of its properties and uses. In its crystalline form, the mineral closely resembles the beryl, or emerald; so slight is the difference that mineralogists have been constantly deceived by it, and it early received the name "apatite" from a Greek word signifying "to deceive." It occurs occasionally on our island of New York, in six-sided prisms, and we hear that it has also been met with massive, and in considerable quantity. It is one of our most valuable rocks, very little known to unprofessional men, and yet capable of extensive use in agriculture and the arts. It occurs in altered crystalline rocks, especially in granular limestone, and ores of tin, iron, and other metals, and with gneiss, syenite, and mica rocks. The color is not always the same, but the prevailing shade is green; we have also blue, grayish green, grayish white, and brown.

The Canada deposit is an extensive bed ten feet broad, three feet of which are pure, sea-green apatite. At Crown Point, the deposit is fibrous; in New Jersey, shafts have been sunk, and the apatite brought out in masses weighing occasionally 200 pounds.

The composition of apatite varies almost as much as its color, but it is essentially composed of phosphoric acid, 42·00; lime, 54·00; fluorine, chlorine, etc., 4·00. Many specimens, however, do not have more than 90 per cent of phosphate of lime. The occurrence of phosphorus in association with iron renders the ore useless for metallurgical purposes, but if the apatite be in sufficient quantity, it might be worked for superphosphates and fertilizers.

The uses of apatite are not many, but they are important. It has been proposed and used as a substitute for bone ash, and in the manufacture of porcelain and milk glass, and in England, the apatite from Estremadura is taken for this purpose.

In the manufacture of phosphorus, the pulverized mineral is mixed with twice its weight of silica, in the form of sand or ground quartz, and 25 per cent. of charcoal, in a closed vessel, or peculiarly constructed furnace, and the whole heated to approaching white heat. The phosphate of lime is decomposed, and silicate of lime produced, and the phosphoric acid is reduced by the charcoal to the vapor of phosphorus, which passes into proper coolers, where it is condensed. The latest improvement is to add some soda to the quartz, thus producing a silicate of lime and soda, which is more readily fusible and more easily handled than the simple silicate.

The operation is carried on in France in something like a blast furnace, and is made continual by feeding with alternate layers of ore and fuel. In England, a native phosphate from the West Indies, called sombrerite, is somewhat used in the manufacture of phosphorus; and as this material, together with the South Carolina deposits and the mines of apatite of Canada, is much nearer us, we ought to make an effort to introduce this industry among ourselves. At the present time, very little, if any, phosphorus is made in this country.

The acid phosphate of lime can be made, according to Horsford's patent, from native phosphates. The mineral phosphate is dissolved in nitric acid, of specific gravity 1·23, in the proportion of two nitric acid, by weight, to three of phosphate of lime; and to the filtered solution is added two parts, by weight, of oil of vitriol, diluted with water, for the purpose of removing the lime and other impurities. This process furnishes the acid phosphate of lime in superior condition, for medicinal and culinary purposes.

This use of apatite alone would be of the utmost importance, could it be carried out economically and on a large scale, as chemistry has introduced no compound of greater value in medicine and in food than Horsford's acid phosphate. But the use to which phosphorus has been applied more extensively than to any other, is in the manufacture of a fertilizer known as the superphosphate of lime. The manufacture of this article is carried on in England and Canada, and in some parts of the United States, and is of the utmost importance to our agriculture.

We find in the *American Chemist*, for February, an article by Mr. Gordon Broome, giving the methods employed in Canada for the manufacture of superphosphates from apatite. The mineral is ground by an engine of fifteen horse power, which also turns the agitators during the treatment of the mineral by acid, and supplies steam to the sulphuric acid chambers adjacent to the mill. After the apatite is well pulverized, it is thoroughly mixed with oil of vitriol of the strength known as pan acid, in a suitable vat or tub, where it is thoroughly agitated until the conversion is deemed to be complete. The pasty mass is allowed to flow out of the bottom of the converter over the floor, where it soon becomes sufficiently dry to be fit for transportation in barrels, each containing about 286 pounds. It is, in this condition, only suited for agricultural purposes, as it is very impure. In a sample analyzed by Mr. Broome, there were found: Superphosphate of lime, 20·33; sulphate of lime (gypsum), 63·84; water, 5·50; other constituents, 10·33. The soluble phosphoric acid amounted to 12·33 per cent.

It is evident that this manufacture cannot be carried on profitably unless the same establishment manufactures its own sulphuric acid. As pan acid can be used, the expense of concentrating in glass or platinum vessels is saved, and the cost of packing and transportation avoided.

There is one serious difficulty encountered in the fumes of hydrofluoric acid that come off during the digestion of the mineral. These are very suffocating and dangerous, and it would be a valuable improvement if they could be condensed and made use of in the arts. This is done where fluor spar is employed as a flux in blast furnaces, and important applications are made of the acid thus economized.

In countries where hydrochloric acid is very abundant and cheap, it is substituted for sulphuric acid in the decomposition of apatite; but the resulting chloride of calcium absorbs water so rapidly, and keeps the mass so wet, that it is difficult to handle, and objectionable in every way. Manufacturers of artificial fertilizers sometimes remedy this evil by mixing various refuse animal matters with the mass, and then drying it, and at the same time adding to its value.

The chief importance of apatite is as a manure upon our crops. The strength of lands in the Eastern States has deteriorated so much that few crops can be profitably raised upon them, and it is becoming a serious question to decide what fertilizers are best adapted to remedy the evil. There seems to be no doubt that the phosphates are among the best enrichers of soil, and it is, therefore, important to have this industry more fully developed. To sum up the case for apatite, it will be seen that it has the following important uses;

1. In the manufacture of phosphorus.
2. Acid phosphate of lime.
3. Superphosphate of lime for manure.
4. Manufacture of porcelain.
5. Manufacture of milk glass.
6. Hydrofluoric acid, as an incidental product.

THE AVERAGE CITY DWELLING HOUSE.

The average city dwelling house of 1871 is not what it ought to be, when contrasted with the vast improvements made in all other departments of construction. Built to make as much show as possible with the least expenditure, it is a delusion to the inexperienced buyer, and a snare to the tenant, who has not yet learned the defects that a year or two of use will be sure to develop.

A young couple beginning their experience in house hunting and house keeping, after spending a week or two in discouraging search, at last find a tenement which seems adapted to their wants, at a rent which does not, perhaps, greatly exceed what they can afford to pay; or the house is, perhaps, purchased at what seems a reasonable price. The house is prettily painted, the walls are clean, white, and unbroken (being new), the modern improvements—including bath room, water closets, and gas fixtures—are seemingly convenient and substantial, and the courtyard is laid out with some show of taste. But ere long the walls show ugly seams and cracks; the doors shrink incontinently; the water fixtures obstinately refuse to be kept in order; the floor planking begins to creak, and the entire structure shows decided evidences of weak constitution.

The boiler which supplies hot water to the bath begins to develop troublesome leaks. The plumber is called to the rescue, and loads it with unsightly heaps of solder, which might almost be silver at the prices charged. It is astonishing how the specific gravity of solder increases in this sort of patching.

Then, by and by, the water is drawn off, and the goddess of the kitchen, through ignorance or neglect, lets the boiler collapse. The plumber is again called, who gives the comforting information that its thinness will not permit it to be re-rolled, at an expense of ten or twelve dollars, but that it is, and always was, a shabby affair, and if the luxury of warm bathing be continued, it must be at the expense of forty or fifty dollars for a new boiler.

Winter comes, and a new difficulty is experienced with the water pipes. Relying upon the fact that these are carried up between two buildings and inclosed in the walls, it is supposed they cannot freeze; but they *do* freeze, and burst; and walls, carpets, and furniture are injured, if not ruined, by the flood. Again the plumber is called. You can find plumber's shops as plenty as drug stores. No wonder; there is plenty of business going. The plumber is all smiles. He proceeds to demolish the plastering to reach the pipes, so that in addition to the damage by water, there is the damage by lime-dust. His labors completed, and his not small bill settled, the plasterer follows, careful not to let his work be speedily forgotten, by bespattering with mortar every available spot of floor and paint upon which his mark can be left.

Why water pipes should be placed under the plastering is a mystery to us, especially as they seem artfully contrived to give as much trouble as possible to the inhabitants of the average city dwelling house.

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Further developments will show that the roof is made to last scarcely more than four or five years. The leaders are made of some flimsy material, the nature of which is concealed by painting, but which in two or three years is found to be consumed by rust, and to crumble into pieces like a Boston cracker.

The moral of all this is, that if a man want a good house he must own, not rent it; and if he would own a house that shall be worth the money he pays for it, he must have it built under his own supervision; or, if he be not competent to supervise, he must employ the services of a competent and reliable architect.

The profits to builders of the average dwelling house are very great, as any one will find by a proper investigation of the cost of materials and labor. Invest these profits in superior material and workmanship, and, while your house will cost you no more, it will be at least one third better.

ANNUAL REPORT OF COMMISSIONER OF PATENTS.

UNITED STATES PATENT OFFICE,
January 31, 1871.

To the Senate and House of Representatives of the United States of America, in Congress assembled:

By the 9th section of the Act of Congress, approved July 8, 1870, entitled "An act to revise, consolidate and amend the statutes relating to patents and copyrights," the Commissioner of Patents is required to lay before Congress, annually, in the month of January, a report, giving a detailed statement of all moneys received for patents, for copies of records or drawings, or from any other source whatever; a detailed statement of all expenditures for contingent and miscellaneous expenses; a list of all patents which were granted during the preceding year, designating under proper heads the subjects of such patents; an alphabetical list of the patentees, with their places of residence; a list of all patents which have been extended during the year; and such other information of the condition of the Patent Office as may be useful to Congress or the public.

In compliance with this requirement of the statute, I have the honor to submit the following report:

The receipts and expenditures of the Office for the year ending December 31, 1870, and the condition of the balance in the Treasury on account of the patent fund, as well as the character and extent of the business done by the Office during the year, are shown in the following statements:

Amount received on applications for patents, re-issues, extensions, caveats, disclaimers, appeals, and trade-marks, etc.	$669,456·76
Amount paid for salaries, photography, stationery, and miscellaneous expenses, etc.	557,147·19

STATEMENT OF BALANCE.

Amount to the credit of the Patent Fund, January 1, 1870	531,045·64
Fund of receipts during the year 1870	669,456·76
Total	$1,200,502·40
From which deduct expenditures for the year 1870	557,147·19
Balance on the 1st of January, 1871	$643,355·21

BUSINESS OF THE OFFICE FOR THE YEAR 1870.

No. of applications for patents during the year 1870		19,171
No. of patents issued, including reissues and designs		13,321
No. of applications for extensions of patents		200
No. of patents extended		111
No. of caveats filed during the year		3,273
No. of patents expired during the year		2,545
No. of patents allowed, but not issued for want of final fee		1,016
No. of applications for registering trade-marks		186
No. of trade-marks registered		131
Of the patents granted, there were to citizens of the United States	12,677	
Subjects of Great Britain	349	
Subjects of France	89	
Subjects of other foreign governments	206	
		13,321

The patents issued to citizens of the United States were distributed among the citizens of the several States, Territories, etc., as follows:

Alabama	36	Montana	1
Arkansas	11	Nebraska	16
California	216	Nevada	9
Colorado Territory	18	New Hampshire	111
Connecticut	739	New Jersey	474
Delaware	39	New Mexico, Territory	21
District of Columbia	171	New York	2,962
Florida	5	North Carolina	54
Georgia	81	Ohio	982
Illinois	835	Oregon	22
Indiana	452	Pennsylvania	1,481
Iowa	208	Rhode Island	197
Kansas	46	South Carolina	35
Kentucky	143	Tennessee	109
Louisiana	111	Texas	48
Maine	139	Utah Territory	1
Maryland	206	Vermont	123
Massachusetts	1,448	Virginia	110
Michigan	401	Washington Territory	1
Minnesota	70	West Virginia	47
Mississippi	50	Wisconsin	223
Missouri	210	Wyoming Territory	1

Citizens of the United States residing in foreign countries	17
Persons in the U. S. Army	7
Persons in the U. S. Navy	1
Total	12,677

COMPARATIVE STATEMENT OF THE BUSINESS OF THE OFFICE, FROM 1837 TO 1870, INCLUSIVE.

YEARS.	Applications filed.	Caveats filed.	Patents issued.	Cash received.	Cash expended.
1837	—	—	435	$29,289·08	$33,506·98
1838	—	—	520	42,123·54	37,402·10
1839	—	—	425	37,260·00	34,543·51
1840	765	228	473	38,056·51	39,020·67
1841	847	312	495	40,413·01	52,666·87
1842	761	391	517	36,505·68	31,241·48
1843	819	315	531	35,315·81	30,776·96
1844	1,045	380	502	42,509·26	36,244·73
1845	1,246	452	502	51,076·14	39,395·65
1846	1,272	448	619	50,264·16	46,158·71
1847	1,531	553	572	63,111·19	41,878·35
1848	1,628	607	660	67,576·69	58,905·84
1849	1,955	595	1,070	80,752·78	77,716·44
1850	2,193	602	995	86,927·05	80,100·95
1851	2,258	760	869	95,738·61	86,916·93
1852	2,639	996	1,020	112,656·34	95,916·91
1853	2,673	901	958	121,527·45	132,869·83
1854	3,324	868	1,902	163,789·84	167,146·32
1855	4,435	906	2,024	216,459·35	179,540·33
1856	4,960	1,024	2,502	192,588·02	199,931·02
1857	4,771	1,010	2,910	196,132·01	211,582·09
1858	5,364	943	3,710	203,716·16	193,193·74
1859	6,225	1,097	4,538	245,942·15	210,278·41
1860	7,653	1,084	4,819	256,352·59	252,820·80
1861	4,643	700	3,340	137,354·44	221,491·91
1862	5,038	824	3,521	215,754·99	182,810·39
1863	6,014	787	4,170	195,593·29	189,414·14
1864	6,932	1,063	5,020	240,919·98	229,868·00
1865	10,664	1,937	6,616	348,791·84	274,199·34
1866	15,269	2,723	9,450	495,665·38	361,724·28
1867	21,276	3,597	13,015	646,581·92	639,263·32
1868	24,420	3,705	13,378	681,565·86	628,679·77
1869	19,271	3,624	13,986	693,145·81	486,430·78
1870	19,171	3,273	13,321	669,456·76	557,147·19

A subject-matter index of the patents issued during the year 1870, an alphabetical list of the patentees, with their places of residence, and a list of the patents extended during the year, have been prepared, and are submitted herewith as a part of this report.

Called upon to perform the duties of Commissioner of Patents, temporarily only, until the gentleman already appointed to fill the vacancy occasioned by the resignation of the late Commissioner shall assume the office, it would manifestly be improper that I should embrace the present opportunity to recommend measures, the advisability of which can in any respect be called in question. I shall refrain, therefore, from any general discussion of the affairs of the Patent Office, and confine myself to two or three matters which demand early attention, and about which it would seem that there can be but little difference of opinion.

By the joint resolution providing for publishing the specifications and drawings of the Patent Office, approved January 11, 1871, it is provided that the publication of the abstracts of specifications and of the engravings heretofore accompanying the annual report of the Commissioner of Patents, shall be discontinued after the middle of the year 1869, the mechanical illustrations for the first six months of that year having been already prepared; and that in lieu thereof the Commissioner is authorized to have printed, for gratuitous distribution, 150 copies of the complete specifications and drawings of each patent thereafter issued, which copies, duly certified under the hand of the Commissioner and the seal of the Patent Office, are to be placed for free public inspection in the various State and territorial capitals, and in the Clerks' offices of the district courts of the various judicial districts throughout the United States; and this officer is further authorized and directed to have printed such additional numbers of copies of specifications and drawings, certified as before provided, as may be warranted by the actual demand for the same, to be sold at a price not exceeding the contract price for such drawings. It is also provided that the copies of drawings shall be made upon contract, after due advertisement by the Superintendent of Public Printing, under the direction of the Joint Committee on Printing.

This discontinuance of the publication of the mechanical report is in conformity with the recommendation of the late Commissioner of Patents. I have always doubted somewhat the wisdom of such a step, knowing, as I do, the avidity with which inventors, in all parts of the country, seek for copies of the report, and believing also that the matter contained therein, though necessarily imperfect, is nevertheless full of suggestion, and peculiarly calculated to furnish food for the inventive mind.

The delay heretofore connected with the publication of that report could have been entirely obviated by promptness in making the necessary appropriations for the work, as by proper management the office could easily have had all the matter ready for press within one month after the end of the year. If it were found that the report under the system of distribution heretofore adopted failed to reach the quarters where it would confer the most benefit, this evil could easily have been remedied by providing, among other things, that each patentee of a given year should receive as a gratuity one copy of the report for that year, and that the rest of the edition be sold at a price not exceeding the prime cost thereof. And as to the printed copies, to be hereafter placed at central points, as provided by the joint resolution, it is feared that they will be of comparatively little service to the great mass of inventors, who are scattered widely through the sparsely settled portions of the country, and who, practically, will have but little opportunity of consulting them. As evidence in the courts, as aids to patent solicitors, and to professional experts, upon whom inventors largely rely, and as sources of information to all persons living near the places of deposit, they will of course prove valuable, as furnishing more exact and reliable knowledge than can be gained from any other source. For this reason, they would form a most valuable adjunct to the present report; and, in view of the great benefits which the patent system has already conferred upon the nation—single inventions, like the sewing machine, the harvester, the telegraph, or vulcanized rubber, having more enriched the country than the whole system has cost, from its inauguration to the present time—I believe that the expense of retaining the mechanical report in addition to the new publication would be fully justified. The annual income of the Patent Office, in excess of its expenditures will more than pay the cost of the proposed additional work; and the balance of six hundred and forty thousand dollars in the Treasury to the credit of the patent fund, warrants the most liberal policy in support of the workings of this Bureau. The Government ought not to seek to raise revenue by levying taxes upon the inventive genius of the people; but all the money received from inventors should be expended in such a way as to secure the largest and most beneficent development of the patent system.

[The Commissioner then proceeds to remark upon the subject of reproducing the drawings*, that this should be done in the Patent Office, and not by contract. In dealing with contractors the office is compelled to part temporarily with the custody of its original records. When done in the office, the copies prepared for gratuitous distribution can be made uniform in size with those now made for office use, and a saving of many thousands of dollars could be effected annually. If, under the contract system, a smaller size be adopted, a recomposition of the letter press would be necessitated, involving an annual expense of not less than sixty thousand dollars, while the saving in paper and binding would not be more than thirty thousand dollars. For these reasons the Commissioner favors the performance of the work in the Patent Office. He also recommends an advance in the price of single copies and the accompanying drawings, making the minimum price ten cents, and the maximum fifty cents, the price of uncertified printed copies between these limits, to be fixed by the determination of the Commissioner.]

By Section 20 of the Patent Act, approved July 8, 1870, the Commissioner of Patents is authorized to print or cause to be printed copies of the claims of current issues of patents, and copies of such laws, decisions, rules, regulations, and circulars as may be necessary for the information of the public.

Under this provision of law, the Office has for some time past been issuing a weekly "List of Patents" which contains the number, title, and claim of each patent issued, together with the name and residence of the patentee.

This publication costs the Government about five thousand dollars per annum. It is sold to subscribers at five dollars a year; and the amount realized from this source during the last year, is thirty-three hundred and sixty-eight dollars. The amount paid for advertising applications for the extension of patents during the same time is twenty-nine hundred and twenty-three dollars.

I would respectfully recommend that the Commissioner of Patents be authorized to enlarge the scope of the periodical publication named, so as to make it an official gazette, in which all the advertisements pertaining to the business of the office shall be inserted, in lieu of all other advertising as now required by law. At present the law requires that the Commissioner shall publish a notice of every extension application in one newspaper in the City of Washington, and in such other papers, published in the section most interested adversely to the extension of the patent, as he may deem proper. Under this law the patronage of the Office is distributed among three of the Washington papers, and a second copy of the advertisement is usually sent to some paper in the vicinity of the residence of the patentee. This is at best an imperfect system of accomplishing the work intended, as there is no one paper in the entire country which contains all the advertisements of the Office, and which, therefore, a person concerned, professionally or otherwise, in extension applications can take, and feel assurance that the very case for which he is watching may not escape his eye. By the proposed change in this regard, all uncertainty of this kind would disappear; the public, both inventors and attorneys, would be much better served, since in connection with the list of claims they would receive the official advertisements without further expense; and a considerable saving to the government would be effected, both by the cessation of further payments for advertising, and by the largely increased circulation which by this means would be secured for the publication already authorized by law.

By Section 63 of the Patent Act, it is provided that an application for the extension of a patent shall be filed "not more than six months nor less than ninety days before the expiration of the original term of the patent." Under this section, applications are generally delayed until the last moment; and then it frequently happens, if the case be an important one, in which opposition is entered, and the taking of a large amount of testimony, to be obtained in remote and widely separated sections of the country, becomes necessary, that the application cannot be prepared for hearing until so late a day as to cause the careful consideration of it prior to the expiration of the patent, seriously to interfere with the Commissioner's duties in relation to other matters. It frequently happens, too, that on the day of hearing, a fatal defect in the presentation of the case is developed, which, if there were further time at the disposal of the party, might be remedied. For these reasons, every such case, in my judgment, should be brought to a hearing at least four weeks before the date of the expiration of the patent. To this end, the application must be filed in the office at an earlier day than is now required by law. I would suggest that nine months be fixed as the maximum limit, and six as the minimum.

The business of the Patent Office for the past year is perhaps sufficiently exhibited by the tables already given, and does not call for any extended remark. I cannot, however, close this brief report without referring to the eminent service rendered by the late Commissioner, the Hon. Samuel S. Fisher, whose energy and ability in the discharge of his official duties have done so much to correct and systematize the practice of the office.

The periodical publication of the Commissioner's decisions, whereby the examiners, as well as attorneys, have received early information of the principles which controlled the head of the office in deciding the cases brought to his personal attention, has proved a marked and most valuable feature of the late administration. Great care was also exercised in the filling of vacancies, the appointments being made with special reference to the merits of the persons receiving them, and in many instances after they had passed the ordeal of a severe competitive examination.

The manifest improvement thus effected, in the personnel of the Office, reflects credit upon the officer under whose administration it was brought about. The impress which he has left behind him will be lasting, and his official connection with the patent system will long be remembered with satisfaction and pleasure.

Respectfully submitted.

SAMUEL A. DUNCAN, Acting Commissioner.

* For economy of space, we have condensed that portion of the report relating to reproduction of drawings.—Eds.

New Patent Law of 1870.

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