REPORT

OF

THE COMMISSIONER OF PATENTS,

SHOWING

The operations of the Patent Office during the year 1843.

FEBRUARY 13, 1844.
Referred to the Committee on Patents and the Patent Office.

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PATENT OFFICE, *January* 31, 1844.

The act of March, 1837, requires the Commissioner of Patents to lay before Congress "a detailed statement of the expenditures and payments made by him from the patent fund;" also, a list of all patents which have been granted during the preceding year, designating under proper heads the subjects of such patents, and furnishing an alphabetical list of the patentees, with their places of residence; and, also, a list of all patents which have expired during the same period, with such other information of the state and condition of the Patent Office as may be useful to Congress and the people.

The act of March 3, 1839, likewise appropriated from the patent fund a certain amount, to be expended, by the Commissioner of Patents, in the collection of agricultural statistics, and to be applied to other agricultural purposes, for which he was to account in his annual report. Similar appropriations for the same purpose have been made in successive years.

In obedience to said acts, the Commissioner of Patents has the honor to submit his report for the year ending with the close of 1843.

Five hundred and thirty-one patents have been issued during the year 1843, including eleven reissues, fourteen designs, and two additional improvements to former patents; of which classified and alphabetical lists are annexed, marked L and M.

During the same period, four hundred and forty-six patents have expired, as per list marked N.

The applications for patents during the year past amount to eight hundred and nineteen, and the number of caveats filed was three hundred and seventeen.

The receipts of the office for 1843 amount to thirty-five thousand three hundred and fifteen dollars and eighty-one cents, from which are to be deducted the amount paid on applications withdrawn, as per statement marked A, six thousand and twenty-six dollars and sixty-six cents.

The ordinary expenses of the Patent Office for the past year, including payments for the library and for agricultural statistics, have been twenty-four thousand seven hundred and fifty dollars and thirty cents, leaving a nett balance of four thousand five hundred and thirty-eight dollars and eighty-five cents to be credited to the patent fund, as per statement marked B. In the above expenditure is also included the payment for the furnaces, as hereafter mentioned.

For the restoration of models, records, and drawings, under the act of March 3, 1837, $4,586 93 have been expended, as per statement marked C.

The whole number of patents issued by the United States, up to January 1844, was thirteen thousand five hundred and twenty-three.

The patents granted for the year, it will be seen, have exceeded those of the previous year by twenty-four, and the excess of applications has amounted to fifty-eight.

Such has been the progress of improvement in the arts, that every year presents a renewed demand for greater accommodation in the Patent Office. Were the Patent Office building to be occupied simply for the purposes of the Patent Office, as originally designed, it would furnish all the necessary room for many years to come. But Congress has directed, that certain articles of value, belonging to the Government, and especially those received from the exploring expedition, should be deposited in the large upper hall, called the National Gallery. As it could scarcely be supposed that the intention of Congress was to exclude the Commissioner of Patents from the use of the room, so far as needed, it has thus far been occupied in common, by which arrangement the Government, it is believed, has been well accommodated. The charge of the articles deposited there has, since July, been committed to the Commissioner of Patents, who has now the control of the whole building, and will endeavor with all vigilance to protect the property intrusted to his care. The various articles brought home by the exploring expedition have been newly classified and rearranged, under the direction of Captain Wilkes; so that they now present to the visiter a gratifying and instructive exhibition of the curiosities of nature and art. Together with these, and the articles received in compliance with the wishes of the different departments, a few more have been allowed a place, which belong to the National Institute.

It must be obvious to every observer, that the hall, in its present size, though ample enough for its original design, cannot afford room for all the objects to which it is appropriated, especially as these articles are continually increasing.

The first story is absolutely insufficient to allow the models a suitable space, while but a part of the curiosities which the exploring expedition had gathered have even been opened, leaving one hundred and thirty boxes still untouched. The Commissioner of Patents has felt obliged to decline, for the present, many specimens and curious fabrics offered by the manufacturers. Should, then, this cherished object of exhibiting here such works of skill and samples of American industry be wholly disregarded, it will be, to say the least, a serious disappointment to multitudes throughout the nation.

In devising the best method for restoring the models lost by the fire of 1836, it was believed, as has been observed in a former report, that many models would be presented for exhibition, in the hope of promoting the sale of manufactured articles, and thus the loss in part be repaired, without charge to the Government. The extreme difficulty of effecting such a restoration, after the entire destruction of the models and papers, cannot easily be appreciated.

If, with every aid ingenuity can invent, the great loss can finally be repaired, no facility for this purpose, it is presumed, will be withheld by the Government.

Can room, then, be provided, so that all the kindred objects which have a claim on the Government shall be accommodated? In reply to this question, I take the liberty to repeat the suggestion made in my report of last year, that, by erecting a wing on the west end of the Patent Office building, additions could easily be made, large enough not only to accommodate all, but to afford room enough for the immediate commencement of lectures under the Smithsonian bequest—a disposition of the fund, I may be permitted to remark, which is anxiously expected by many citizens of the United States.

The depositories of science and art in the Patent Office, with the adjoining botanical garden of exotic plants, would afford constantly increasing facilities for this purpose, while the offer of free lectures could not fail to produce the most happy results. Thousands would resort hither, from every part of our land, to attend a course of lectures at the seat of Government. Talents which lie buried, and are now lost to the country, would be drawn forth; and the effects of the instruction obtained would be exhibited in the increased improvement of the people in the various States of the Union.

The report on agricultural statistics will be found in the document marked D. In the preparation of this report, an extended correspondence has been opened, both at home and abroad, numerous American and foreign publications have been procured and consulted, and the result is presented with an increasing confidence in its accuracy. The deep interest which is felt in this part of the report of the Commissioner of Patents has been manifested in the constant application to this office for copies, which could not be supplied, notwithstanding the extra number printed by order of Congress. Additional information has been obtained respecting further improvements in manures, crops, seeds, and implements, and such new applications of agricultural productions as promise to be useful to our country. Twelve thousand packages of seeds will have been distributed from the Patent Office this year; and when we recollect, as mentioned in a former report, that the improvement of 10 per cent. by the selection of seeds would increase the value of the agricultural products $30,000,000 annually, the attempt thus far made by this office must be deemed a good beginning for still more extended benefits.

As one means to the end proposed, a more systematic effort to obtain suitable seeds, through the instrumentality of our diplomatic corps, would be desirable. In foreign publications, notices of superior varieties of grain occur, showing, in the simplest manner, the items of expense; and some of these varieties could doubtless be advantageously acclimated in our country. For instance: rice is now cultivated in high latitudes of Europe; a hardy kind also flourishes on the edge of the snows of the Himalaya mountains; and there is every reason to believe that we can raise upland rice wherever Indian corn will ripen. Such is now the opinion in Europe, and some seed has been ordered, which I hope before long to receive for distribution.

The public journals in England and this country have also given accounts of an extraordinary kind of grain, called the multicole rye, raised in the west of France, the prolific qualities of which almost exceed belief. Such accounts of it as could be obtained will be found in the agricultural statistics, under the proper head. The numerous inquiries for the seed induced me to import a few bushels from France for distribution; and even should the product fall far below the amount mentioned as common there, the experiment will be gratifying to many.

My attention has also been turned to our foreign produce market, and to ascertain the defects of our shipments, and what agricultural articles could further be added to our marketable products abroad; and much information on these subjects, as well as the preparation of articles for our foreign trade, will be found in the agricultural statistics and the appendix there subjoined. A tariff of duties on American agricultural productions in foreign countries, the price of freight, and a number of *pro forma* bills of sale, have likewise been added, for the benefit of both the exporter and producer. The information given in that paper, also, in respect to granulating and clarifying sugar, preserving butter in hot climates, and flour for exportation, the further applications of lard and lard oil, feeding of stock, varieties of products, manures, and other topics, will, it is believed, interest a large portion of the people of our country.

In my last report I alluded to the importance of appropriating more labor to the preparation of agricultural statistics. The annual reports will show that much time is necessarily occupied in collecting information. The materials are to be gathered both at home and from abroad. Vastly more might be done, and with still greater accuracy, were the whole energies of an individual devoted to this subject. The present duty, on my part, is, in a great measure, performed out of office hours. The examination of agricultural journals and correspondence are the means now chiefly employed for the purpose of gaining information. Personal conversation and occasional journeys have likewise afforded some aid in the prosecution of the object. While engaged in this duty, I have felt a strong desire to visit the cotton, rice, and sugar plantations, as well as the corn and wheat growing sections of our country, to examine the course of improvements or the reason of failures, and to gather all the information practicable for the public benefit. The expense of such an exploration would be small, and might be charged to the patent fund, leaving still an annual surplus for other purposes. Allusion to personal feelings may possibly seem out of place. The past, however, is a pledge that I cherish at least a strong desire to aid the agricultural community, embracing by far the larger portion of our whole population.

During the eight years that I have had the honor to superintend the bureau intrusted to my charge, it has been wholly reorganized; and within this time, it will be recollected, all its papers and records have been destroyed, but are now mostly restored. Having been instrumental in the reorganization, I felt desirous to carry out the plan then proposed. The time has now arrived when my duties might be changed, without injury to the public service. I pretend not to say how much could be done, but I venture the opinion that an appropriation to cover the expenses of a single year in the prosecution of an object so important would never be regretted. The country might understand more fully its resources, and Congress be enabled to legislate with still greater prospect of benefiting all the parts of our common Union.

I have this year caused to be prepared, and it might be printed as an appendix to my report, the *claims* of patents granted during the year. Should Congress think proper to publish the same, the people of this country would know how far they are restricted in the use of common rights. At the present moment, no periodical publishes these claims, and hence the daily applications made to this office for the same. Nearly one-half of the applications for patents are rejected; others, on an average, are reduced at least one-third; so that in many cases little remains, and yet there is enough to sustain a patent, and justify the inventor in making sales. The object presented by the patentee may be one captivating to the eye, and of great importance, while the claim allowed is of little consequence, as it may merely be a combination of some trifling part, which can be omitted without much injury, or avoided by a substitution of something else equally useful. This remark may be illustrated by a single example—that of "Bommer's" (so called) "patent manure." In this case a patent was obtained, and contributions levied on the farmers of our country, for a mere process, highly extolled by most of the agricultural journals; but a reference to the claim allowed shows us that another person, not Bommer, was the patentee of the process, which he alleged to be an improvement on a French invention. In the claim allowed him, the right was given, not of making the *ley* or *liquid preparation* used in the manufacture, for this was already known, but simply for *pouring* the ley in a particular manner upon the heap as prepared. On reading the claim allowed, any one would see its extent, and would at once be spared the payment of twenty dollars demanded for the patent right. Jaufrett's patent, under the name of Rosser, by whom it was introduced into England, of which the American claims to be an improvement, will be found in full, with other information respecting it, in appendix, No. 22, subjoined to the agricultural statistics.

The publication of these claims would also aid the officers in their daily examinations, as they present, in a few pages, the substance of every patent granted during the year; it would save the demand for many copies, which is now a severe tax on the office, as the charge allowed is but ten cents per hundred words, and the claims will not average above 12 or 15 lines each—a compensation wholly inadequate for the time bestowed in searching out and copying them.

It may be added, that foreign nations, with few exceptions, publish *in extenso* the patents granted in their respective countries. The same thing has been attempted in this country, but, from want of the necessary patronage, even the publication of the claims has not been continued, except for a short time, by any periodical. Several editors have offered to publish the claims, provided they could be furnished to them free of charge. It is confidently hoped, therefore, that Congress will see fit to publish the same with the present annual report, that the country at large may be acquainted with the rights conferred on inventors. The document will be especially useful to those who are employed to aid in preparing the papers of future applicants for patents.

It has been suggested that a notice of the progress of the arts should form a more prominent part in the annual report of the Commissioner of Patents. I trust, therefore, that a glance at the improvements made within a few years will now be considered a valuable addition to the topics heretofore embraced in my reports. The subject is too comprehensive a one for great detail; but the papers prepared for this purpose (marked E

and F) are full of encouragement and gratification to the American people. The advancement of the arts, from year to year, taxes our credulity, and seems to presage the arrival of that period when human improvement must end.

Another consideration has induced me to request the examiners in this office to prepare these reports on the progress of inventions. The experience and information which they have acquired are the result of long study and close observation, and hence the propriety of recording the knowledge, which might be lost in the event of their being taken from their labors. The importance of this collected information to the public generally, but more especially to those who at any time hereafter might be called to fill the same station, will be readily appreciated on a perusal of these papers. I ought also to remark, that the salaries paid to the examiners and some of the clerks are an inadequate compensation for their invaluable services. If there is any bureau where are needed scientific attainments of a high order, it is in the Patent Office.

The furnaces first erected to warm the Patent Office, like those in the General Post Office, have proved injurious to health, by the escape of gas, and were also made of such perishable materials that it has become necessary to take them out, and substitute others of cast iron, of new construction, which have been recently patented. These cost far less at the outset, require a smaller supply of coal, need but trifling repairs, and can be easily introduced. This absolutely necessary expense has been charged to the patent fund, under the head of contingencies for repairs. In the operation of these new furnaces, a curious effect is produced by particular ventilation, and deserves remark. Ventilation is often obtained through the ceiling only; but, so far as respects rooms heated by hot air furnaces *only*, this method is an incorrect one. If the temperature of the different parts of the room be tested by a thermometer, it will be found that the upper part heats first; and if no outlet be given, the draught of hot air ceases, the room being filled. Let an aperture be made at the top of the room, and the warm air instantly escapes. But if an opening be made near the floor, the cold air within the room passes out, and the warm air descends to fill the space. An experiment proving this was tried in drying clothes in a room without ventilation, heated by air furnaces; the clothes that were in the upper part of the room dried well, while those in the lower part still continued moist; as soon, however, as an aperture was made for ventilation below, a draught was given to the furnace, the cold air expelled, and the clothes dried rapidly. The public will thus see how easily a serious difficulty in heating rooms may be overcome.

In my last report an account was given of a mode of constructing cheap cottages, of unburnt brick. The numerous experiments of a similar kind since attempted in the United States, and the satisfaction then experienced, together with the repeated inquiries on this subject, lead me to remark, that, from accounts of the similar use of such bricks in Egypt, it is proved that they have been found, undecayed and sound, in arches which have even stood the test of two thousand years. The cottage, erected by myself, on Massachusetts avenue, in full sight of the Capitol, and which is two stories in height, stands well; appears as handsome as the best brick houses; and, being warm in winter and cool in summer, justifies me fully in recommending a similar mode of building, especially where clay is abundant and timber scarce.

Some have doubted the policy of erecting such houses in cold climates; but it may be remarked, that in Canada these buildings have been successfully proved, as will be seen by a reference to the paper marked G. Some facts have been collected respecting plank roads, that may be interesting to those sections of our country where facilities for the transportation of passengers and produce are so much needed. The description of these roads, as used in Canada, may be found in an appendix, belonging to the agricultural statistics, marked D.

By a valuable machine, with ten yoke of oxen, and five hands, a ditch of suitable depth for draining lands, (fourteen inches deep, and twenty-eight inches wide at the top,) ten miles may be excavated in one day, at an expense, by contract, of not more than three cents per rod. A larger machine, with a greater number of oxen, will excavate a ditch three feet deep. The great importance of such an instrument on the prairies of the West will at once be seen and acknowledged.

A description of a process for preserving wood, by Dr. Boucherie, as furnished by a report of the French Academy, may be found in another paper, marked H. By means of another preparation—exhausting the air, and then infusing sulphate of iron or other substances into the pores of wood, for railroads—it is said the wood has been rendered so hard that the iron wheel of the car leaves no trace after more than a year's use of this "metallic" wood.

The rapid improvement of the arts may help to account for the reduction of price, as to many articles of manufacture, and especially in some that are usually ranked among the necessaries of life. Individuals now in Congress can recollect of having, 30 years since, purchased shirting at sixty-two and a half cents per yard, who, the last year, have bought that which was equally good for eleven cents per yard only.

Hosiery, too, is now made in this country with astonishing rapidity, by the aid of the power weaving loom—an American invention, and which has not yet been introduced into England. While, there, it is a full day's work to knit, by hand, two pairs of drawers, a girl here, (at $2 50 per week,) will make, by the power loom, twenty pairs in the same time. A piece twenty-eight inches in width, and one inch long, can be knit in one minute.

The expense of manufacturing this article has thus been reduced to about one-tenth of the former method by hand looms. The importance of this improvement may be estimated from the fact that the quantity of hosiery used in the United States is valued at $2,500,000, and the stockings, woven shirts, and drawers, made in this country, at $500,000.

The little article of hooks and eyes is another illustration of the same progress of inventive industry. Thirty years ago, the price was $1 50 the gross pairs; now, the same quantity may be purchased for from fifteen to twenty cents. At one establishment in New Britain, Connecticut, eighty to one hundred thousand pairs per day are made, and plated by a galvanic battery or the cold silver process. The value of this article consumed in a year in this country is said to be $750,000.

Another article very essential to the husbandman, horse shoes, furnishes a similar proof of the bearing of the progress of invention. An improved kind of horse shoes, made at Troy, New York, for some time past, is now sold at the price of only five cents per pound, ready prepared to be used in shoeing the animal. At a factory recently erected, 50 tons of these are

now turned out per day; and it is thought that they can be made and sent to Europe at as good a profit as is derived from American clocks, which have handsomely remunerated the exporter.

The improvements in the manufacture and making up of leather have also greatly reduced the price of another useful article, shoes.

By further inventions, to render leather water-proof, likewise, much has been done to protect the health and promote economy. Those who have not turned their attention to this subject may be surprised to learn that leather made water-proof, in the best manner, will last at least one-third longer than other kinds. Allowing, therefore, $3 per head for each person in the United States for shoes, the cost of this article in the whole country would be $50,000,000; one-third of which saved would be over $16,000,000. Some of the preparations for rendering leather water-proof are much less expensive than others. A very simple composition of rosin, beeswax, and tallow, applied warm, both to the soles and uppers, so that the leather is thoroughly saturated with the mixture, has been found to be very effectual for the purpose

During my late visit to New York, I visited the sugar works of Messrs. Tyler and Mapes, in Leonard street; which establishment has adopted the new process of sugar making invented by Professor Mapes. By this process, they manufacture from 15,000 to 20,000 pounds of sugar per day, from common West India molasses, and generally of a quality superior to that made from the cane in Louisiana. They often use molasses which has become sour, with good effect.

I also saw the new evaporator, invented by Professor Mapes, at a sugar house in Vandam street. This evaporator is of a small size, something less than five feet square and twelve inches deep; it was charged with a solution of sugar at 30° Beaumé, (say 125 gallons,) and commenced boiling rapidly in less than 30 seconds from the time of turning on the steam. This pan will reduce sufficient of such liquor (taken lukewarm) to the proof or sugar point, in 15 minutes, to make 1,000 pounds of sugar—and this, as the proprietor of the establishment informed me, of a quality far superior to that which he was enabled to make by the usual process. Indeed, so rapid is its action, that the same quantity of sugar which required twelve hours for its manipulation is now finished with ease in three hours, giving a larger yield and better quality.

As Professor Mapes is now taking patents in this country and abroad for this evaporator, a new filter, and some other improvements connected with sugar making and sugar refining, I cannot with propriety describe his machines; but, from what I saw, I am convinced that they are calculated to effect a great change in the whole system of sugar making in Louisiana and the West India islands.

His largest sized evaporator is capable of evaporating 1,000 gallons, or more, of water per hour, and the smallest (such as is described above) from 230 to 250 gallons per hour.

As an evidence of the improvement in making loaf sugar, I would add, that, by the new process, the refining by the aid of clay is abandoned. This old process required at least thirty days to complete the loaf for market, whereas the improved mode accomplishes the same in six days—thus making a vast saving in time, machinery, and room. This evaporator will undoubtedly be introduced for salt making, concentration of extracts of dye woods, &c.

In the paper marked I will be found a description of the electro-magnetic telegraph, illustrated by plates in language so familiar as to enable any person to understand one of the great improvements of the age—one that is destined to exercise a great and it is believed happy effect, in the transmission of intelligence from one section of the country to another. Experiments already made, in England and on the continent, leave no doubt of its practicability; and this will, ere long, be further tested on the railroad route between Washington and Baltimore. The choice as to the mode of communication, by wires placed within leaden pipes under ground, or through similar wires suspended in the air, has occasioned much perplexity to the scientific; but the latter will probably be found much the most economical in its first structure, as well as in the facility of repair. The rapidity of communication is truly astonishing; it is instantaneous. The rate at which the electro-magnetic fluid passes, according to Mr. Wheatstone, is 288,000 miles, equal to eleven and a half times around the globe, in one second. We see "the streak" of lightning in the heavens, but it leaves no trace; the stream of electricity has passed in less than the twinkling of an eye, and is gone far beyond our sight. In the same manner, with equal swiftness, the electro-magnetic fluid unerringly conveys the intelligence intrusted to its operation.

Foreigners are now claiming the merit of the invention to reduce this discovery to practice; yet history, it is believed, will hereafter accredit the highest and most deserved commendation to one of our countrymen.

A new field is thus laid open for the researches of science, and new discoveries may yet be expected; experiments have already been made in this country, with wires of 160 miles in length, insulated in coils, with perfect success. A small battery of 100 pairs of plates was sufficient for the operation of the whole distance. In effecting the transmission of intelligence by the telegraph, the artificial magnet (see the paper I, above mentioned) created by electricity sets in motion an apparatus which gives on paper certain characters representing letters of the alphabet. Communications are thus recorded, either by day or night, on a revolving cylinder, without even superintendence, and may be transcribed at leisure.

The medium employed is simply a copper wire, insulated and extended on posts, at an expense not exceeding $150 per mile. It is confidently believed that proprietors will thus connect their dwellings with the places of their mechanical operations. How easily, for instance, could Boston and Lowell be thus connected. The same posts, too, would answer for many lines of communication. Each wire, however, must be insulated; and, strange as it may seem, if two wires are placed horizontally, at some distance apart, and one is charged, a similar effect will be produced on the other.

Among the most curious effects attending this discovery is the transmission of intelligence through a single wire at the same time from opposite points. Thus, on a wire reaching from Washington to Baltimore, a message by electricity will pass another traversing in the contrary direction, (turning out, as it were,) without any detention. Like the rays of light, electricity, too, is extremely subtle. Nor is the fact less astonishing, that the ground itself is a good conductor, and supplies the place of another wire, which is necessary in ordinary cases before any effect is produced.

The advantages of this mode of communication must be obvious, both in war and peace. The East and the West, the North and the South, can enjoy the earliest intelligence of the markets, and thus be prepared against

speculators. Criminals will be deterred from the commission of crimes, under a hope of escape upon the "iron horse;" for the mandate of justice, outrunning their flight, will greet their arrival at the first stopping place. The numerous inquiries respecting the telegraph have led me to notice it with this particularity.

I may further add, that the plates illustrating the electro-magnetic telegraph exhibit another important invention—that of preparing maps and plates by the process called cerography. This is a new art. It is now more than nine years since a gentleman of New York city conceived the idea of this new mode of engraving, which combines, in a good degree, the peculiar advantages of the old methods, viz: the facility of lithography in preparing the plate for the press, the clear, fine, flowing lines of copperplate engraving, and the durability under the press and rapidity in printing of wood engraving. The value of cerography in furnishing the community with *cheap* maps may be inferred from the fact that the eight quarto maps furnished gratuitously to the 17,000 subscribers of the New York Observer, published by the inventor, if charged at the rates usually allowed for maps of the same size in England and the United States, would have cost $125,000.

A description of the mode of laying the pipes for the telegraph, by means of a newly invented plough, will likewise be found in the paper marked K.

Intimately connected with this branch of science, employed in effecting the results obtained by the telegraph, are the medicinal applications by the magnetic battery, mentioned in the report of one of the examiners. This same wonderful agent—the electro-magnetic fluid—which also gilds the metals and separates the beautiful ores, dissolves the calculus (stone in the bladder) without pain, rescuing thus many victims otherwise doomed to a lingering death, or the sad alternative of a most excruciating operation. The facility with which medicines are infused into the system by the aid of this battery leads us to hail the approach of a quicker alleviation of human woes, and the future success of experiments fraught with the brightest anticipations.

The experiment of illuminating the streets of Paris by means of the electric spark has, as communicated in the late scientific journals, been also most successful; and further developments of this application of electricity may be expected. This is, indeed, as it were, chaining the lightning to subserve the purposes of human improvement.

On the review of the whole combined variety of topics embraced in this report, I trust, should it at first seem unduly extended, it will be found, that while nothing collected during the past year, which is deemed interesting, has been withheld, so nothing has been added unworthy of perusal.

All of which is respectfully submitted.

HENRY L. ELLSWORTH,
Commissioner of Patents.

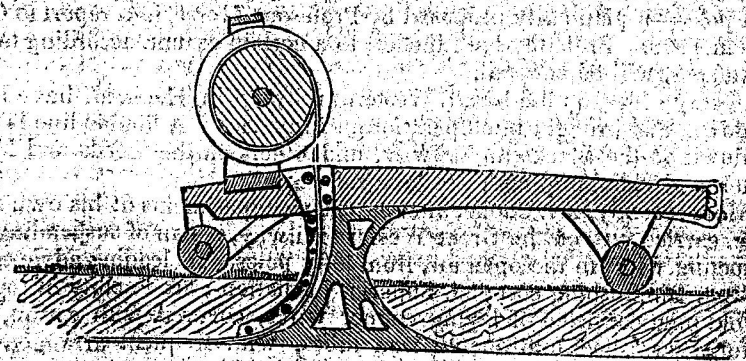
The Hon. the PRESIDENT
of the Senate of the United States.

will still be occasionally applied, in conjunction with the new one, in tunnels, towns, &c.

"The last advantage which need be noticed, in connexion with this important step (placing on poles) in the invention, arises from the very perfect insulation from the earth. This allows of the employment as half of the conducting circuit, without risk of the current finding a shorter course through some imperfectly insulated point. For nearly two years, Mr. Cooke has tried this plan successfully on the Blackwall railway, and since on the Manchester and Leeds railway; but when the wires are enclosed in an iron pipe, there is always danger of a contact—either partial, from a few drops of moisture, or perfect, from the metals of the wire and pipe touching; in which case, the electricity takes a shorter course, instead of performing its entire circuit, and no signal is given at the distant terminus, though appearing very strong at the point whence it sets out. With the wires suspended in the air, no such danger exists; whilst two advantages spring from the employment of the earth as a conductor—1st. One wire is saved in each circuit, thus dimmishing complexity and cost; 2d. The earth acting as a great reservoir of electricity, or, as some think, as an excellent conductor, the resistance offered to the transmission of electricity is vastly diminished, and the battery is able to work through a much greater distance with a small conducting wire."—*Civil Engineer and Architect's Journal, June*, 1843, *page* 21.

The following experiment, recently tried at Washington, shows, in an interesting manner, the rapidity with which intelligence is transmitted. As the train of cars was coming from Baltimore, a person stationed four miles off, at the instant the locomotive was opposite to him, gave notice of the fact that the cars were coming; and this news was received, and the acknowledgment of its reception at Washington returned, before the last car of the train had passed. As each circuit, to be complete, must, in both cases, reach from one end to the other, and back, the whole distance thus traversed in the time mentioned above must have been sixteen miles, besides the stopping of the machinery.

K.



The above cut represents an invention of merit and simplicity for laying lead pipes in the earth by animal power, and without excavation by hand.

It is unnecessary to describe the operation, as it must be obvious from the inspection of the cut, which represents a profile or side view of the machine, with one side taken off, so as to exhibit the interior curvature through which the lead pipe passes from the drum, on which it is coiled, into the earth beneath. The thickness of the share, made of cast iron, is in proportion to the size of the pipe desired to be laid; and, of course, it is moved through the earth with corresponding ease, causing but a narrow cut or crack in the earth, which readily closes as the machine advances; the pipe being left at the bottom of the trench, or as deep in the ground as the machine was gauged to run, by an adjustment of the wheels. It is the invention of Mr. Ezra Cornell, of Ithica, New York, suggested originally for the purpose of laying pipe for Professor Morse's telegraph, but is adapted no less to the laying of lead pipe for conducting water. The pipe for the telegraph has been laid by it for the distance of about ten miles on the railroad from Baltimore to this city. In illustration of the rapidity and success of its work, four hundred and fifty feet of pipe was laid at the depth of twenty inches, and completely covered, in the short time of five minutes, including one stop of nearly three minutes. It is estimated that three miles of pipe can be easily laid in a day with this machine, when the ground is free from obstruction, requiring a team of from two to four yoke of oxen or spans of horses, according to the nature of the soil and depth at which the pipe is laid. One may readily imagine that the power requisite to move so thin a blade as this instrument has, through all ordinary soils, cannot be great. To the agriculturist this invention is deemed important, as affording facilities for irrigation or watering his stock; more especially since lead pipe is now made with the rapidity of three miles in length per day, and at an actual expense not exceeding one-half cent per pound, and is now afforded in quantities at $5 per hundred weight—a great contrast to former years, when it was imported from Europe, previous to the late American invention.