BEFORE THE

HON. COMMISSIONER OF PATENTS.

IN THE MATTER

Of the Application of Dr. W. F. CHANNING and MOSES G. FARMER, for an Extension of their Letters Patent for an Electro-Magnetic Fire Alarm Telegraph, granted May 19, 1857.

EXAMINER'S REPORT.

WASHINGTON:
POWELL, GINCK & CO., PRS., 632 F STREET,
1871.

May 8. 1871

U. S. PATENT OFFICE, *Room* 151.

Hon. M. D. LEGGETT,

Commissioner of Patents:

SIR: In the matter of the application of Dr. W. F. Channing and Moses G. Farmer for the extension of their patent for an Electro-Magnetic Fire-Alarm Telegraph, patented May 19, 1857, I have the honor to submit the following report:

The invention in question is the well-known Fire-Alarm Telegraph now in use in the principal cities of this country, the object of which is to give, by means of the agency of electricity, an immediate notice to the public and fire department of a city or town, of the existence and location of a fire, as soon as it is discovered.

This is accomplished by means of a series of signal stations distributed throughout the municipality and electrically connected together, from which notice of a fire is transmitted, with a series of alarm stations also electrically connected with the signal stations and with each other, from which an alarm, corresponding to the signal transmitted, is simultaneously sounded.

In adapting this system to large towns there is provided a central station, which may be located at the municipal headquarters, with which the series of signal stations and the series of alarm stations are each, respectively, in electrical communication, at which the signal sent from the signal station is received, and from which the same signal is transmitted to the alarm stations, and there automatically sounded; each series being included in separate and independent circuits.

The details of the system are as follows:

First. The signal system, the object of which is to con-

vey to the central station information as to the existence and location of a fire.

The area of the town or city is divided into districts, in each of which there is placed one or more signal stations. Each of these stations consists of a cast-iron box conveniently placed so as to afford ready access. This box contains a gong or bell; an electro-magnet, to the armature of which is attached a lever provided with a hammer which strikes the bell; a signal key included in the circuit passing through all the boxes; and a wheel or cylinder, rotated by a crank, or by means of a series of wheels actuated by a weight or spring and bearing upon its periphery a series of cams or projections which bear against the key and cause a momentary interruption of the circuit, by depressing said key when the wheel is rotated. These cams are arranged in two groups, one corresponding to the number of the district, the other to the number of the box in that district, and, consequently, on the rotation of the wheel, which is done by the crank on the discovery of the fire, transmit a definite signal indicating the exact location of the box in the neighborhood of which the fire has broken out.

Second. The central station:

This is in electrical communication with both the signal and alarm stations, and is provided with an alarm, giving notice that a message has been transmitted from a signal box; a Morse register which receives the message, a transmitting apparatus for establishing communication with the alarm stations and sending the message to the alarm bells; and a galvanic battery.

Third. The alarm stations:

These are located in the bell-towers of the churches or in other suitable positions, and contain bell-striking machinery, automatically set in operation by electro-magnetic

agency, so as to strike upon the bell as many blows as there are signals sent from the central station. These will correspond to the signal sent from the signal box; these stations are connected electrically, and consequently the bells will be struck synchronously, and the public will therefore receive notice by means of a definite alarm of the existence of a fire, and of the number of the district and station box from which the signal indicating it was transmitted.

It is not claimed that the mechanical devices used in this system are in themselves novel, as their equivalents are found in electro-magnetic apparatus in use at the time of this invention; but it is to the combination of these elements when organized into a system having a definite and specific function, *i. e.*, the giving public notice of the existence of a fire telegraphically, by means of a definite signal, which will indicate its location, to which the invention is limited.

The claims are as follows:

First. We claim the signal system herein described, consisting of a series of signal stations, scattered at short intervals, through a whole city or town, or any part thereof, and telegraphically connected with a common center or point, or with each other, by one or more signal circuits, by which means a constant communication may be established and maintained between all parts of a city or town, however extended, and with the center or centers at which the signal circuits converge or meet, so that the moment a fire occurs its existence and locality may at once be known at the center of the system, and efforts for subduing it properly directed.

Second. We claim the alarm system herein described, consisting of a series of alarm stations, suitably distributed throughout a whole city or town, or any part thereof, and telegraphically connected with a central station, by one

or more alarm circuits, by which means a public alarm of the existence and location of a fire may be given at different points.

Third. We claim in combination with the alarm system for striking the number of the district upon the alarm-bells, the signal system for communicating the number of the station at which the fire occurs to all the signal stations, as well as for communicating an alarm to the central station.

These claims, fairly construed in connection with the explanations contained in the specification in accordance with the rule of law, (see Turrill *vs.* Michigan R. R., &c., 1 Wallace, 491, and Page *vs.* Ferry, 1st Fisher, 302,) are limited to the system put into practical operation by the inventors.

In regard to the novelty of this invention, the following facts are submitted :

It appears, from the statement and testimony, that Dr. Channing first conceived the idea of using a telegraphic system for giving an alarm of fire in 1839 ; that in 1842 he communicated his plan to Dr. Chas. T. Jackson, of Boston, Massachusetts ; that May 30th, 1845, he published an article in the Boston Daily Advertiser, in which he showed in general terms how a fire-alarm telegraph could be constructed and made practicable, describing a system of signal and alarm stations and a central station, (see Exhibit No. 7,) and that in March, of 1851, he submitted a memorial to the Mayor and Common Council of Boston, calling attention to his plan for the " Application of the Electric Telegraph to Signalizing Alarms of Fire," and described in full a method by which the plan submitted could be practically realized. (See Exhibit No. 8.)

This memorial was referred to a committee. June 5th, 1851, a favorable report was made and a special committee appointed, with full power to " contract forthwith for the erection of suitable apparatus *to test* the telegraphic sys-

tem of fire-alarm, with a view to its permanent adoption *if found practicable*, and that a sum not exceeding ten thousand dollars be, and the same hereby is appropriated for that purpose, to be expended under direction of that committee."

It also appears, from the testimony, that early in the spring of 1851 Dr. Channing made the acquaintance of Mr. M. G. Farmer, one of the joint applicants for this extension, an electrical engineer of great mechanical skill and scientific acquirements, and immediately entered into arrangements with him to assist in the construction of the system submitted to the consideration of the city government. Mr. Farmer commenced his work at once, giving it his undivided attention, and December 29th, 1851, was appointed by the city of Boston "to superintend and take charge of the entire apparatus of the telegraphic system of fire-alarms for the six months next ensuing."

Mr. Farmer's attention had previously been called to a means of giving alarms of fire by the electric telegraph, and in 1848 had invented apparatus controlled by electricity and capable of striking large bells; this was, with some mechanical modifications, used in the system which he was constructing in 1851, and formed the subject of a patent by him May 4th, 1852.

It appears from the testimony of C. C. Coffin, Dr. Channing, Joseph M. Wightman, and M. G. Farmer, that great difficulty was found in reducing the proposed system to a practical form; that the apparatus was frequently altered, modified, and reconstructed; that constant experimental trials were necessary, and a much larger sum expended than was at first deemed sufficient, and that the system was not ready for adoption until the spring of 1852. April 12th of that year an experimental use of the system of alarms was authorized for one month. April 29th the first alarm was struck, and May 24th the continued use of the system authorized by the city, from which time it became a part of the municipal organization.

May 13th, 1854, Messrs. Channing and Farmer applied for a patent for the invention of which they considered themselves the joint inventors, and May 19th, 1857, a patent was granted.

It is the opinion of the Examiner that at the time the application for a patent was made, no other system of fire-alarm telegraph existed which embraced the features found in that of the applicant, and which could be considered an anticipation.

Two systems are referred to in the record, one a system in use in New York, the other in Berlin. In the former, bell-striking machinery was placed in bell-towers located in each of the fire districts into which the city was divided, which were struck by watchmen stationed in the towers, while, for the purpose of communication, said towers were connected by the Morse telegraph. (See depositions of James L. Perley, Charles L. Chapin, and Hervey Waters.) In the latter, constructed by Lieut. Siemens, of Berlin, in 1851, the city was provided with forty-six signal stations, connected with each other and with a central station for the purpose of allowing private communications for the police and fire department. The instrument used was the dial-telegraph of Siemens & Halskie.

Neither of these systems contains the combination found in the Boston Telegraph.

No reason is found for doubting the novelty of the invention, a patent for which is now sought to be extended, nor its utility in the sense contemplated by the law.

By the terms of section 65 of the statute of July 8th, 1870, the Examiner having charge of the class to which the invention belongs is required, upon the application for extension, to report to the Commissioner whether the invention in question was new and patentable at the time the patent was granted.

Under this requirement, it is proper that an inquiry

should be raised whether, previous to the grant of the patent the inventor had not forfeited his right to the same by a non-fulfillment of the statutory provisions upon which the grant of the patent depends—whether the invention had been known or used by others in this country, patented, or described in any printed publication in this or any foreign country, before his invention or discovery thereof, and not in public use or on sale for more than two years prior to the application therefor.

It is, therefore, proper to inquire what was the effect of the use of the invention by the city of Boston, prior to May 13th, 1852, and of the publication of the description of the invention in the memorial submitted March 24th, 1851, and in the article in Silliman's Journal of January, 1852, whether the first was a public use of the invention, and whether the second was a dedication to the public.

In regard to the first point, the decision in the case of Howe *vs.* Underwood, 1st Fisher, 160, is important. It was there laid down that a machine, in order to anticipate any subsequent discovery, must be perfected—that is, made so as to be of practical utility, and not merely experimental and ending in experiment. Until of practical utility, the public attention is not called to the invention; it does not give to the public that which the public lays hold of as beneficial; it is in the eye of the patent law a nullity; it gives nothing to the public. In the case of Winans *vs.* the Schenectady Railroad Company, 2 Blatchf., 279, it was decided that experimental use does not defeat a patent, and the law allows an inventor a reasonable time to perfect his invention by experiments; and that these could be made in this instance only by putting the car into the service of those controlling lines of railroads. The case of Wyeth *vs.* Stone, 1 Story, R. 273, is also in point, as also the recent case of the Nicholson pavement, in which Judge Drummond, of the northern district of

Illinois, decided that five years' public use of the pavement was experimental.

In the present case the very character of the invention was such that its practical utility could only be tested by a public use, by incorporating it with a municipal organization ; and, therefore, such public use as would defeat the patent should not be implied.

Upon a careful review of the testimony, the Examiner is of the opinion that the invention cannot be considered as perfected until May 24th, 1852, when its experimental use was discontinued, and it became part of the municipal system.

In the case of Pitts *vs.* Hall, it was laid down that dedication is in the nature of the forfeiture of a right which the law does not favor, and therefore should be made out beyond all reasonable doubt.

It would seem a hardship to conclude that the publication of the description of the invention in Silliman's Journal, and elsewhere, was such an act as would amount to a dedication to the public without the expression of that intention on the part of the inventors, which does not appear.

Value and Importance of the Invention to the Public.

In providing means for extinguishing fires, the rapidity with which these means can be applied after the occurrence of a fire is regarded as the first consideration, and upon this depends the great importance of the invention in question.

It is shown, by the testimony of those familiar with the operation of the fire departments in the prominent cities of the country, that the saving of time in applying the means of extinction of a fire effected by the use of a telegraphic system, instead of the old method of giving an alarm by calling "Fire!" in the streets and by a rapid ringing of the church bells, is from ten to twenty minutes, thereby pre-

venting great losses which would otherwise be unavoidable.

John L. Hayes, of Boston, a gentleman who has carefully investigated the causes and best methods of preventing fires in manufacturing establishments, and has written a pamphlet upon that subject, gives as his opinion, that if this invention were applied in the principal cities of the country an annual saving of two millions of dollars would be effected. His estimate is based upon the report of the Commissioner of Insurance of the State of Massachusetts for 1869, who gives the losses by fires in the principal cities of the United States for that year as twenty-two millions of dollars, and upon the assumption that one-tenth of that amount would be saved by the saving of time effected in reaching the seat of the conflagration by the use of the telegraphic system.

Joseph L. Perley, Chief Engineer of the Fire Department of the city of New York, states that the value of the system would be difficult to estimate; that he knows cases where lives have been saved by its use, and that the value in money would amount to millions.

R. C. Elliott, formerly Chief Engineer of the Fire Department of Pittsburg, states that while under the old system it took sometimes twenty minutes to receive the alarm at the engine-houses, under the Fire-Alarm Telegraph system it takes about thirty to thirty-five seconds, and estimates the value of the system to the city of Pittsburg as $100,000 annually.

Jacob C. Cuyler, Chief Engineer of the Fire Department of Albany, states that under the telegraph system all the fire apparatus will be on the ground in less than ten minutes from the discovery of the fire; and estimates the yearly value of the system to the city of Albany as $250,000. He recites two instances in which the losses by fire were $3,064 19 and $2,650, when under the old plan the loss would have been from $75,000 to $100,000, and $150,000, respectively.

E. R. Carhuff, Chief Engineer of the Fire Department of the city of Newark, states that by the use of the new system one engine is found sufficient, while under the old system five were required, and estimates the saving to the city as from $30,000 to $40,000 for the last year.

R. S. Lawrence, chairman of the Board of Fire Commissioners of the city of Hartford for the last six years, states that when a fire is within three-quarters of a mile of the State House, from seven to ten minutes is a fair average before the fire is reached.

A. P. Kimball, Chief Engineer of the Fire Department of the town of Fitchburg, states that the Fire-Alarm Telegraph system was introduced into the town on the 7th of March last; that it has been found of great value, and that it has already been the means of saving property by diminishing the time required to reach a fire, exceeding in value the whole cost of the system to the town.

J. W. Stover, the agent for Gamewell & Co., the present owners of the patent, states that the Fire-Alarm Telegraph has been erected in Newark, Milwaukee, Richmond, Cambridge, Peoria, Troy, Hartford, Fall River, Toledo, New Haven, Dayton, Albany, Lawrence, Springfield, Jersey City, and Savannah. It also appears from the statement that it has been introduced into forty of the principal towns of the United States.

It would thus appear that this invention is of the highest importance and value.

Remuneration received by the Inventors, and Diligence used by them in Introducing the Invention to Public Notice.

There is some difficulty in ascertaining the exact remuneration received from this invention, for the reason that other patents than that which is sought to be extended were embraced in the sales made by the inventors and patentees. The total amount is given in the statement as $25,318 64. A liberal apportionment of the said

sum would allow one-half of the same as derived from this patent, which would be $12,659 32.

It also appears from the record, that besides the publication of the article in the Boston Daily Advertiser, in 1845, before referred to, intended to awaken public interest in the invention, Dr. Channing made other efforts to excite attention, by presenting his system personally to many persons in Boston who, in his judgment, would be likely to appreciate the importance and the advantages of a Telegraphic Fire Alarm ; that in 1851 he made vigorous efforts to attract the attention of the government of the city of Boston, by the presentation of the memorial before referred to, and by personal interviews and solicitations ; that while the alarm system was in progress of construction, communications were prepared and published in the papers, and that an elaborate communication describing the invention, was published in January, in vol. 13 of the American Journal of Arts and Sciences.

After the success of the system in Boston, constant efforts were made to introduce the invention in other cities. A public exhibition, by means of expensive and elaborate apparatus, was made in Cincinnati, Providence, and New York, and the attention of the authorities of the cities of Philadelphia and Buffalo called to the system.

In 1854, after application for the patent, Dr. Channing undertook the business management of the invention and entered into an arrangement with Mr. W. C. Russell, of the city of New York, to introduce the invention into that city and Brooklyn, (see Exhibit No. 12,) who made vigorous efforts to introduce the invention, abandoning his legal business, and giving this work his undivided attention. Dr. Channing also made a contract with G. Ordiorne, of Boston, in 1855, to introduce the invention into New York and to sell the patent, but neither of these arrangements was successful. This was owing to the fact that the invention was novel ; that its importance was

not realized; that opposition was experienced from parties interested in other systems, and moreover to the exceeding difficulty which is always found in introducing innovations into the fire department of a city. Dr. Channing also had negotiations with Mr. Rogers, of Baltimore, and Mr. Clute, of New Orleans. In March, 1855, in prosecution of his plans to awaken public attention to the national importance of his invention, he delivered a lecture before the Smithsonian Institution in Washington upon his system, and in the same year succeeded in effecting a sale of the patent for the Southern and Western States to Gamewell & Co.

It appears that Dr. Channing's efforts were restricted by pecuniary disabilities, and that at the time of the first sale to Gamewell & Co., he was in debt for five thousand dollars.

The following extracts from the testimony of C. L. Chapin, Superintendent of the Telegraph in New York, and Mr. Carhuff, Chief Engineer of the Fire Department of Newark, are submitted in regard to the question as to the effect of the patent upon the public interests. Mr. Chapin's testimony is as follows:

Q. 6. What, in your judgment, would be the effect upon the construction and operation of Fire-Alarm Telegraph, under the system in use in this city, of throwing the same open to general competition?

A. I should say most disastrous to the interests of the Fire Department and to the public.

Q. 7. State, if you please, your reasons for such opinion.

A The field would be open to applicants who would, under the ordinary rules of contracts, enter bids at prices which would not permit them to erect the system in that perfected state which the interests of the Fire Department of this city demand. I consider that the system should be controlled by parties only who, in its introduction, can command that remuneration which will enable them to build a system as planned, and also enable them to grant such improvements as experience and circumstances suggest in the progress of the erection.

Mr. Carhuff says, in reply to R. Q. 1: What, in your judgment, would be the effect upon the construction of the Fire-Alarm Telegraph so far as relates to the completeness and efficiency of its operation, by throwing the same open to competing contractors, instead of the same being protected in the hands of its originator, or persons skilled in the construction and operation of the same.

A. I believe it would be very detrimental to the system of Fire-Alarm Telegraph, for I believe it takes years of experience to obviate the many little difficulties on the lines, by men putting up lines, who have had no experience. There are many little difficulties occurring, that men who are constantly called to adjust those difficulties, learn how and where to evade them.

I believe the American Fire-Alarm to be the best fire-alarm now in use in the country. Have seen all the others, and visited cities where they are in operation. It should not be taken out of their hands. If I were to re-erect the line in our city, I should put it up even more expensively and more thoroughly than the present one, which I consider as good as any.

R. Q. 2. State whether or not, in your judgment, a general competition in contracting for the erection of Fire-Alarm Telegraph would tend to induce cheap construction, and what would be the effect upon the character and efficiency of such Fire-Alarm by such attempted economy.

A. I believe it would be very detrimental; a Fire-Alarm Telegraph is either good or *good for nothing;* as we depend entirely upon the alarm from telegraph, and would not turn out if we saw a light at a distance, unless we got an alarm by telegraph, the telegraph being poor, the buildings would probably burn down before we could find if there was a fire, if we did not get the numbers correct. The present line, since I have had charge of it, and since we have had it, has never failed to give an alarm correctly.

In view of the facts as above stated, the Examiner in this case would recommend the extension of the patent of May 19th, 1857, to Messrs. Channing and Farmer.

I have the honor to be,
Very respectfully, your obedient servant,
B. S. HEDRICK,
Examiner.

MAY 8th, 1871.