THE NEW HEADQUARTERS OF THE FIRE DEPARTMENT OF THE CITY OF NEW YORK.

[*See first page.*]

The fire department of the city of New York has recently taken possession of its new headquarters, 157 and 159 East Sixty-seventh Street, some illustrations of which are given. A few words as to the organization of the corps will be appropriate. Under the control of its able president, Mr. Henry D. Purroy, it has reached such a degree of efficiency that few fire departments of the world will bear comparison with it.

By law four bureaus are established. The first of these is entitled the Bureau of Chief of Department. This includes the uniformed force, devoted to the extinguishing of fires. It contains 972 men actively engaged in attendance on fires, the city's "firemen," and 35 men who are relieved from attendance at fires, but are employed in other services. This naturally is the most prominent and most important division. The next of the bureaus is entitled the Bureau of Inspectors of Combustibles. Ten names compose the roll of this division. Their work relates to the prevention of fires by supervising the storage of oil, of fireworks, and of other combustible goods. Next comes the Bureau of the Fire Marshal, employing four officials. The duties of this bureau relate to the determination of the causes of fires and the detection of incendiarism. Many of the indictments for the crime of arson are brought before the grand jury on information furnished by the fire marshal. The fourth bureau is the Bureau of Inspection of Buildings The erection and alteration of buildings are in its charge, in order that the operations may be carried out in accordance with law. The force of this bureau numbers 63.

The telegraph service is in the hands of a force numbering 18 men and officers. On this department the efficiency of the fire-extinguishing bureau in great part depends. As will be seen later, the attendance of the engines at fires depends entirely upon the proper working of the electrical apparatus, even the horses being released by electricity from their stalls.

The hospital stables for treatment of sick horses employ a temporary force of 6 men, the repair shops 65, and for treatment of injured firemen one medical and two vice-medical officers are retained. Three fire commissioners compose the governing board. In the headquarters building the secretary and assistants, with clerks, etc., aggregate fifteen.

The fire engines and other apparatus are distributed through the city in a number of engine houses. The number of fire companies is fifty-five. There are also nineteen hook and ladder trucks and two fire boats. Of the engine companies, nine are called "double companies," possessing a double complement of men and apparatus, so that when the first set goes to a fire the next move up and take their places, ready for a second alarm. It was for companies of this class that Commissioner Purroy proposed the double engine house already described by us.* Two of the hook and ladder truck companies are also double. Three water towers complete the census of apparatus. Each engine, it should be noted, has its own tender or hose cart. Two scaling ladders are attached to each tender.

No branch of governmental service is more dependent for its efficiency upon the personal character of its members than is the fire service. Not only are fires to be extinguished, but lives are to be saved and deeds of absolute heroism are every year enacted. The work depends not only on disciplined forces, but on the individual as well. Hence great care is exercised in choosing the members. The following is the system in use in making the selection. The application for a position is made in writing, and the paper is sent to the chief of battalion in whose district the man resides. The chief makes inquiries as to the man's personal qualities of the police of his district. If this report is satisfactory, the applicant has to submit to a physical examination to decide as to his bodily soundness and height and weight. Five feet seven inches and 140 pounds are the minimum. In measuring the height, a curious arrangement is used to avoid imposition. Under each heel as the man stands on the platform of the measuring apparatus is a little trap door, pressed upward by a spring. When pressed down to their seat, an electric contact is made and a bell rings. The subject of measurement, therefore, has to press these down and keep the bell ringing. This prevents him from raising his heels from the ground, and so apparently increasing his height.

This examination having been passed, he is referred to the civil service commissioner, who examines him, not only mentally, but physically. He is taken to a gymnasium, where he has to "walk the ladder," and do various other gymnastic exercises to test his corporeal qualities. In the headquarters a very fine gymnasium is included, and it is designed to use it in these examinations. Hitherto a private gymnasium has been engaged. If the civil service examinations are successfully passed, the applicant is put upon probation for thirty days. Part of the time is spent in the life-saving school, where he is taught the use of the scaling ladders, life lines, etc. Part of the time is spent with an engine company, where he attends fires and sees the actual work. All the officers with whom he comes in contact report upon his character and qualities. If the report is favorable, he undergoes a new physical examination, as latent defects may have been developed in his thirty days of probational service. If this examination is successfully passed, he receives his appointment to the third grade, and for the first time puts on his uniform.

The above examination and probation is certain to develop any weakness or incapacity in the applicant. It may be taken as a model in its way, for its thoroughness and practical character.

The use of the scaling ladder, which is an important subject in the training school, is illustrated. It consists of a pole with a long hook at its top, with serrated edges. Through the pole short pieces of wood are thrust and secured, forming steps. At a fire the front of a building can be scaled in a few minutes by these simple appliances. The fireman hooks one into the first story window. He climbs it rapidly, carrying another one with him. When near the top of the first ladder, he hooks himself to it by a large hook attached to his belt, and thus steadied he can lean back, pass up the other ladder, and hook it into the window of the story above. He unhooks himself, climbs the second ladder, carrying the first one with him, and by repeating these movements can go as high on the building as he wishes. By having others follow him, a complete string of ladders may be raised. He can travel laterally from one window to another by the same ladders, and thus swing across the face of a building. Up these ladders life lines are carried, and persons can be brought down these to the ground. A fireman, by twisting the ropes in the hook on his belt, acquires a sufficient purchase or brake power to be able to carry several men down the line safely. These form the main life-saving appliances. In addition thereto, guns are used for shooting lines up to the tops of buildings, battering rams for breaking in doors, and many other minor apparatus are provided. The life-saving school deals with these methods. Formerly there was a special life-saving corps. Now every fireman is taught the system before he is appointed.

The order of rank in the service is as follows, beginning with the lowest: Fireman of third, second, and first grades, engineer of steamer, assistant foreman, foreman, chief of battalions, twelve in number, second and first assistant chief, each in charge of six battalions, and chief. The salaries range from $1,000 to $5,000. Of these officials, the engineers of steamers require a special knowledge. A man may be promoted without ever filling this post. The tendency, however, among the men is to qualify for it, and keep in the line of promotion to it.

The electrical service, whose central office is in the new building, we have illustrated in some detail. Under the management of Mr. J. Elliot Smith, the superintendent of telegraphs, it is kept in a state of the highest efficiency, and the system, now in the highest state of perfection, is largely due to him. In general terms, the city is covered with three separate systems of circuits, all starting from the central office. The first of these systems is the alarm circuits. All of these radiate from the building, each including from fifteen to twenty-five of the telegraph pole and lamp-post alarm boxes. Each circuit has its individual number and each alarm box also has its serial number, irrespective of its circuit. When a fire occurs, and the handle in the alarm box has been pulled down by the person opening it, the apparatus within it automatically rings out its signal number five times in succession. This is received at the central office. Its effect there is twofold. It drops a shutter disclosing the circuit number, and it actuates the receiving register. On the broad strip of paper passing through this instrument, the alarm box number is printed off five times. The switch board seen on the left of the fire telegraph room is used for the next manipulations. At its top are a row of the drop shutters, whose fall discloses to the operator the circuit number. So far all the work has been done upon one set of circuits. The other sets, the second and third ones, are parallel, and go to all the engine houses. Each set includes eight circuits, and these cover the whole city. The second set actuates a six inch gong and a detaching apparatus that releases the horses. They are worked by eight relays, situated on the same side of the office in the rear. The third set rings the large gong in the engine houses, and are quite independent of the second set.

As soon as the signal sounds, the operator runs to the switch board and counts the signal. If it comes properly, he pulls down one of the switch handles that is situated at the bottom of the switch board, selecting the one that comes under the open drop shutter. This throws the eight relays of the second system, called the "combination circuits," into the alarm box circuit, and as the fire signals keep coming, they are automatically rung all over the city in every engine house. This releases all the horses, and wakes all the men. The horses take their places, are harnessed, and in a few seconds every engine, tender, hook and ladder truck, and water tower in the city is ready for service.

It may happen that the five signals from the alarm box run out before the operator can note the adjustment and depress the switch. If so, he notes the signal, referring to the receiving register if necessary, and sends it out by a Morse key. As soon as he disposes of the alarm thus, he goes to the button transmitter. In it he inserts a notched button corresponding to the alarm, and starts the transmitter. This repeats the signal upon the gong circuits.

The signals are noted in all the engine houses. To each signal ten engines and trucks or upward are assigned. Of these, when the complement is complete, three engines and two trucks are assigned to the first alarm, four engines to the second, and four engines to the third. The engines and trucks assigned to the given signal remain in the houses with horses harnessed, except those assigned to the first alarm, which at once proceed to the scene of the fire. All through the rest of the city the horses are unharnessed and the men retire. If the officer in command at the fire finds it too large for the force present, he opens, by the department key, which all officers carry, the inner compartment of the alarm box and sends the "second alarm," prefacing the box number by ten strokes. This is received at the central station, and by the combination transmitting repeater is sent to every engine and truck house in the city. Again all is astir and the entire force of the city is again ready, while the four engines and two trucks assigned to the second call of that number go to the fire. In the same way the "third call" and urgency calls for more companies are sent to the central office, and sent out from it on the large gong circuits by the combination transmitting repeater.

This instrument has on its face four disks. Each of them can be set to ring any desired number, and when the machine is started it rings the four numbers, if so many are set, in succession. Thus an immense number of combinations are provided for by it.

On the right of the telegraph room are a series of switches and galvanometers, for testing the different lines.

The new building, situated in 67th Street, between Third and Lexington Avenues, contains the general offices of the bureaus and of the commissioners. It is fifty feet wide, with a yard back of it reaching to 68th Street. It is built of brown stone and brick, and is finished inside with oak. It is fireproof. A hydraulic elevator and electric lights are provided, the latter actuated by a Brush dynamo. An engine company and hook and ladder truck company are accommodated also on its lower floors. The life-saving school practice the use of the scaling ladders upon its rear windows. Its tower, in iron, is one of its most beautiful features. It is notable as being the only municipal building in the city constructed within the estimates. The building was designed by N. Le Brun & Son, architects to the department.

* See SCIENTIFIC AMERICAN, vol. lv., page 170.

Amidogen.

A brilliant discovery is announced in the current number of the *Berichte der Deut. Chem. Ges.* by Dr. Theodor Curtius, who has succeeded in preparing the long sort for hydride of nitrogen, $(NH_2)_2$, amidogen, diamide, or hydrazine, as it is variously termed. This remarkable body, which has hitherto baffled all attempts at isolation, is now shown to be a gas, perfectly stable up to a very high temperature, of a peculiar odor, differing from that of ammonia, exceedingly soluble in water, and of basic properties. In the course of his work upon the diazo compounds of the fatty series, Dr. Curtius treated diazo acetic ether with hot, strong potash, and obtained the potassium salt of a new diazo fatty acid, which, on addition of mineral acids, yielded yellow tabular crystals of the free diazo acid. On digesting the yellow aqueous solution of this acid with very dilute sulphuric acid, the color disappeared without the usual evolution of nitrogen; and on cooling a magnificently crystalline substance separated out, which was shown by analysis to be no other than the sulphate of amidogen, $(NH_2)_2 . H_2SO_4$. These crystals remained unchanged at 250°, but on strongly heating over a flame melted with explosive evolution of gas and deposition of sulphur. On warming this salt with potash solution the free diamide, $(NH_2)_2$, was expelled as a gas which changed red litmus into blue, and rendered itself evident by its irritating odor. The gas fumed in contact with hydrochloric acid, forming the hydrochloride, and on leading it into sulphuric acid reformed the sulphate. It possessed energetic reducing properties, reducing Fehling's and ammoniacal silver solutions in the cold, gave a dense red precipitate with neutral copper sulphate, and formed crystalline compounds with aromatic aldehydes and ketones. It is very seldom that chemistry is enriched by the discovery of a new gas, and the intrinsic value of the isolation of amidogen to both organic and inorganic chemistry renders the communication of Dr. Curtius one of exceptional and of far more than passing interest.—*Nature.*

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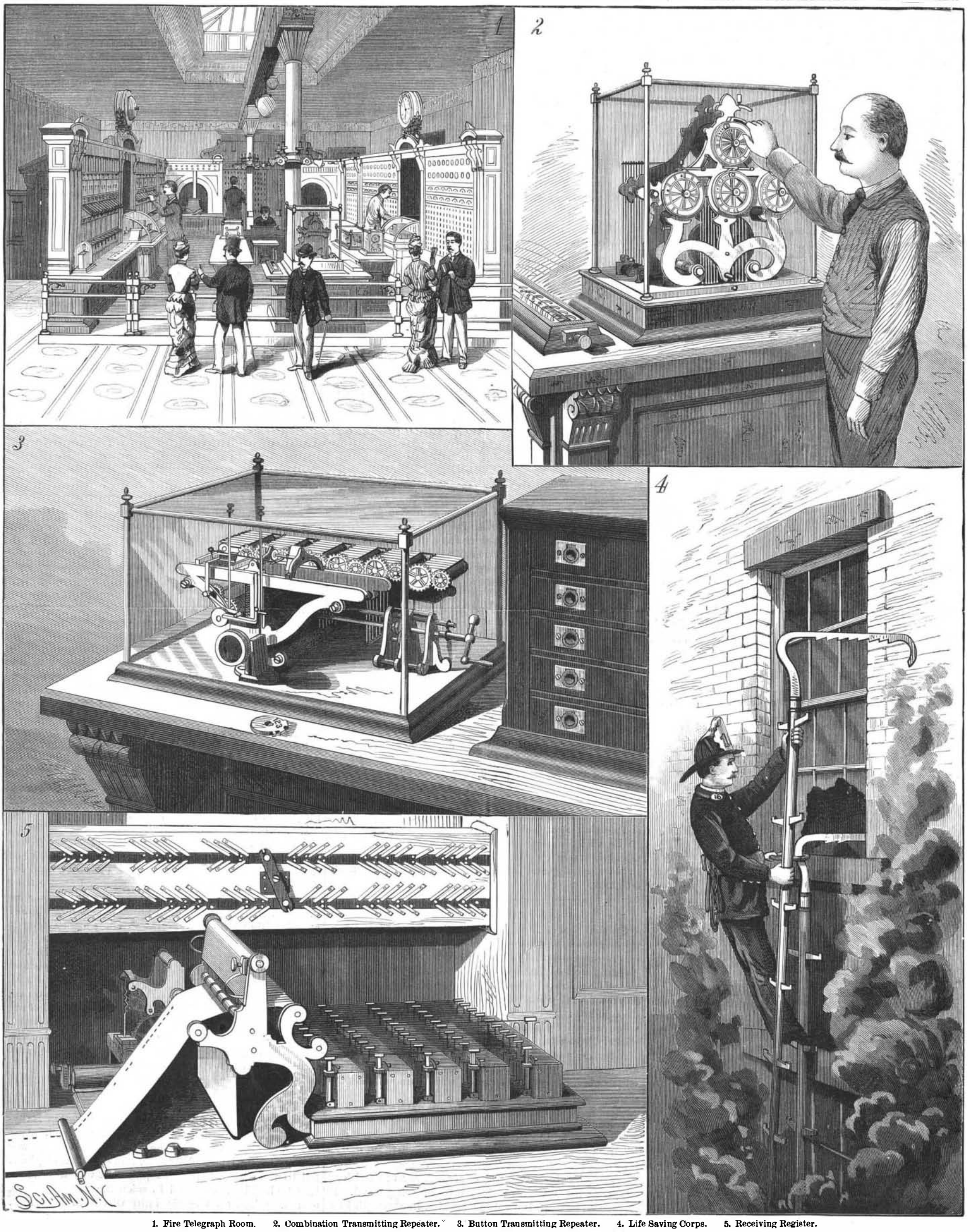

1. Fire Telegraph Room. 2. Combination Transmitting Repeater. 3. Button Transmitting Repeater. 4. Life Saving Corps. 5. Receiving Register.

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