THE GREAT STORM IN NEW YORK AND VICINITY.

A snow storm of very great severity, preceded by rain, visited New York and vicinity on the 11th, 12th, and 13th of the present month. For over 48 hours a very heavy northwest wind storm prevailed, and caused the snow to drift in all directions. In area the storm may be said to have reached from the line of Boston on the north to points south of Washington, and as far as the middle of the State of New York toward the west. New York City was about at the center, but the cities on the Hudson River suffered still more. In Troy and Albany the depths exceeded those reached in the metropolis.

At this and other ports there was considerable injury to the shipping.

At the Delaware Breakwater, constructed for protection from easterly gales, much damage was also done, as the breakwater in this case was of little utility.

In and around this city the railroad communication was cut off, vessels were detained from reaching the harbor, telegraph lines were torn down, for two days an almost total suspension of business occurred, and for a week from the beginning of the storm its effects were still felt in the stagnation of business interests. Articles of food became scarce, milk was not to be had in the city, and patent condensed milk had to be used by all. The price of all provisions tended to rise, notably that of meat and poultry. In the suburbs, where many business men reside, thousands were detained either in their houses or on trains of cars. On all the roads the morning trains of Monday were stopped by the storm, and in some cases two nights were spent by the belated passengers on board the trains. The New Jersey railroads, and those running from the Grand Central Depot toward the north and east, suffered greatly. Where the trains were delayed at stations the capacity of the neighboring country was taxed to its utmost to provide food for the passengers. In many cases the houses in the vicinity afforded refuge to the passengers, and contributions of coffee and food in general were sent to the depots for the use of all. At some places long lines of cars and engines, representing ten or more separate trains, were snow-bound. The suspension of mail facilities was absolute for over 48 hours.

The great cause of trouble on the railroads here was the want of adequate snow plows. The snow, while in places very deep, on an average did not cover the tracks to a greater depth than three feet, and there is little doubt that a single really competent snow clearer plow, such as the rotary steam snow shovel, would have been enough to clear all the roads in a short space of time. Had a single road possessed such an apparatus, it could have run it up and down its own tracks and cleared them, and then transferred it to the next road, and thus secured an early resumption of traffic. But a storm like this is to be looked upon in the same light as an earthquake. It was unprecedented, and may never happen again in the lifetime of any of us.

The immediate effect of the storm in the city was to suspend all traffic on the surface street roads. The elevated roads, it would be supposed, would be free from trouble, but, owing to the position of their rails, on each side of which two heavy wooden guard rails are bolted down, they experienced much difficulty. The rain coated the rails with ice, snow was deposited upon the ice, and the increasing fall of snow rapidly filled up the space. burying the rail completely, and preventing transit over the road, not enough to keep it clear. In some instances the cars were all day in going the length of the road. The people, in many cases, came down from the cars on ladders, the trains being detained between stations. It is obvious there is room here for some method of keeping this space clear of snow, whether by the application of steam, which, in so limited a space, would seem practicable, or by the use of a proper scraper. The effects of the storm are shown in some of our views in various parts of the city.

We give a view of the scene in front of the office of

HOOK AND LADDER No. 14, ON 125th STREET.

the SCIENTIFIC AMERICAN on Broadway, where every effort was made to get the cars through, but it was without avail, and they were dragged by main force through the snow entirely off the track. Eventually the cars were abandoned, and the horses were returned to the stable. The same story was repeated all over the city. The entrance to the Fourth Avenue tunnel and the viaduct leading thereto were badly blockaded. On the viaduct south of the 98th Street bridge, a line of cars extended back as far as the eye could reach, and the entrance to the tunnel was completely blocked with snow. The New York Central had no plows capable of clearing their tracks.

In Jersey City a line of six locomotives had attempted to plow their way through the drifts, the leading locomotive being a very heavy six-wheeled engine of the Mogul type. At the Grove Street crossing, one much frequented by passengers, it was driven off the track. Fortunately no injury was done to the surrounding houses or to passers-by.

The fire department awoke to the necessities of the hour, by setting to work to build sleighs and hire all suitable ones, in order to use them for the transportation of engines, hose, and ladders to fires. The telephone company finding its wires were, in many instances, crossed by the electric light wires, it became necessary as a precaution against conflagration to shut off the light currents, so that the city was, for one or two nights, practically without illumination. Coal was delivered with great difficulty to many private residences. In this and other features of the situation, a powerful argument was found for the introduction of underground transportation. Thus the steam supply company supplied steam without interruption to all its customers. The gas companies supplied gas without trouble, while coal and all objects that had to be transported on the surface were only with great delay and at the cost of great efforts delivered to those requiring them.

To dispose of the heaps of snow various means were adopted. Fires were built against the heaps, and did some execution. In other places jets of steam were used to melt the accumulation. All these methods were more or less effectual, but the immense quantities of snow and the latent heat question made them a very secondary means of grappling with the problem. Carting the snow to the docks and dumping it into the river was the most efficient of the methods adopted.

The East River bridge was operated at a disadvantage, the cable transport having stopped. In the midst of the blockade thus occasioned an ice bridge formed across the East River, and several thousand people crossed upon it.

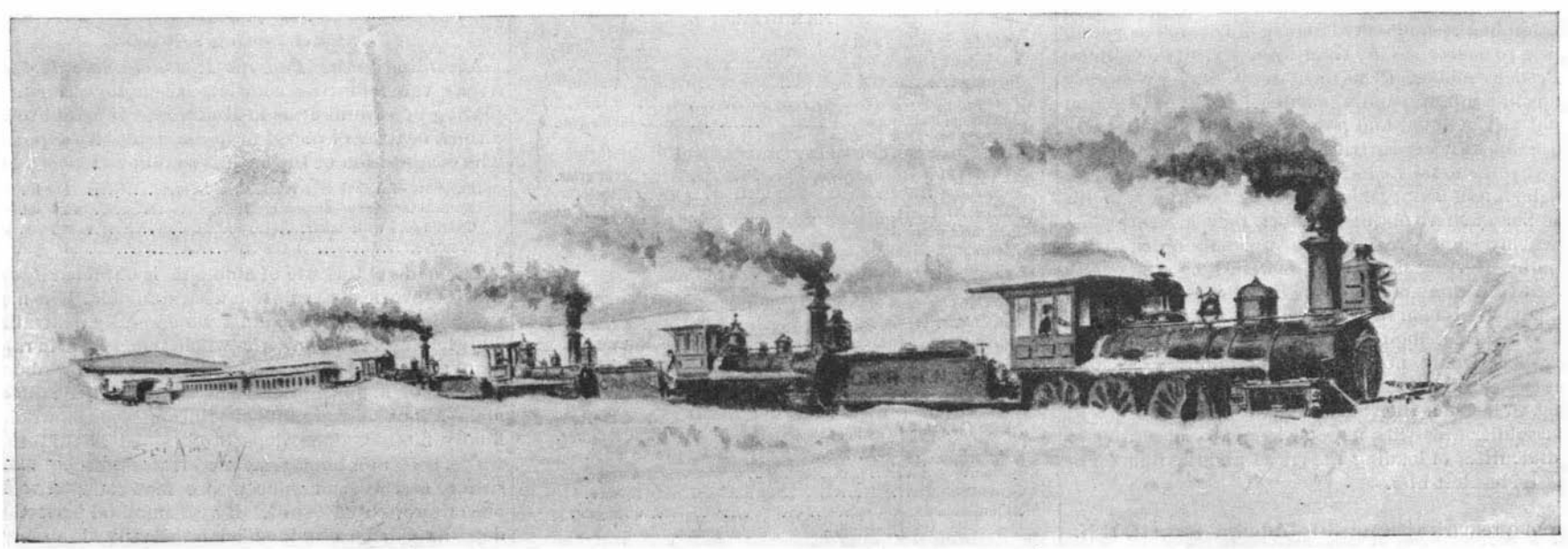
A very sad feature was the loss of life. Owing to the exposure, a number of people perished in the city and suburbs. It is yet too soon to say what the loss of life is, but it will include quite a large number when all is told. The storm is popularly called "the blizzard." It approached pretty closely to the Western definition of that type of storm, "three feet of snow and all of it in the air." It is quite conceivable that but for the thickly settled country a very great loss of life might have been among the effects of the visitation.

114th STREET LOOKING EAST.

Fire-Proofing.

We have observed what *The Sanitary News* well states, *i. e.*, that fireproof building material is coming in quite general use in the larger and finer class of buildings in our larger cities. Fire ruins show that porous terra cotta bricks and blocks best resist fire, water, and frost; next to these in the order of fire-resisting qualities come concretes and burned clay work. In the best work done, the iron work is incased in porous terra cotta, tile, or brick work in roof, floor, and tile construction. The hollow tiles are faced with vitreous tile, slate or any good weather proof coating, or with a single thickness of brick. Iron and steel framework incased in fireproof materials gives the best possible results. There is a growing preference for light porous walls of hollow material protecting an iron or wooden framework. Massive or heavy walls of brick or stone will do for architecture, but they are not as much of a mechanical necessity as they were regarded a few years ago.

A CONTEMPORARY truthfully says that grindstones, large or small, good or indifferent, are hopelessly ruined by running out of true. A wobbly grindstone and a nervous, passionate mechanic make a combination that will spoil every tool in the shop that needs grindstone treatment.



A TRAIN OF TWO CARS AND FIVE LOCOMOTIVES PLOWING THROUGH THE SNOW.

An Engineer's Life at Sea.

We continue from our issue of March 3 the article under the above title, from the *Practical Engineer*.

As soon as 12 o'clock comes, day or night, the third engineer goes on duty. His first care is to go round the engines to ascertain if all working parts are keeping cool, if the bilge pumps are at work, if the water is well up in the gauge glasses, if the firemen have relieved each other properly, and if all is in order in the stoke-hole. He must see if the oil boxes are full, and the lamps burning brightly. He must also go to the stern gland through the tunnel, to make sure that it is cool, and on the way up must see that the thrust block is not heating. He may also have to use his wits to prevent tricks being played upon him by the one whom he relieves, as sometimes affairs get unaccountably wrong as soon as the other is gone, and then upon him will rest the duty of putting them right. A common trick is to pour water on the plunger of the feed or bilge pumps to give a false idea of their being cool, or to make them suck in cold water through their pet cocks, that the tyro may imagine them to be properly working when they are not. It is therefore best to leave these pumps to be examined last, so that they may return to their normal condition before examining them. These and many other illusions one, in time, gets an adept at detecting; but on the first watch no one will try to impose on our tyro, and for the credit of engineers it may be added that it is a rare occurrence for any one to try to pass on anything seriously out of order, for each one knows well that when anything of serious import occurs, every engineer has to turn out to put it right.

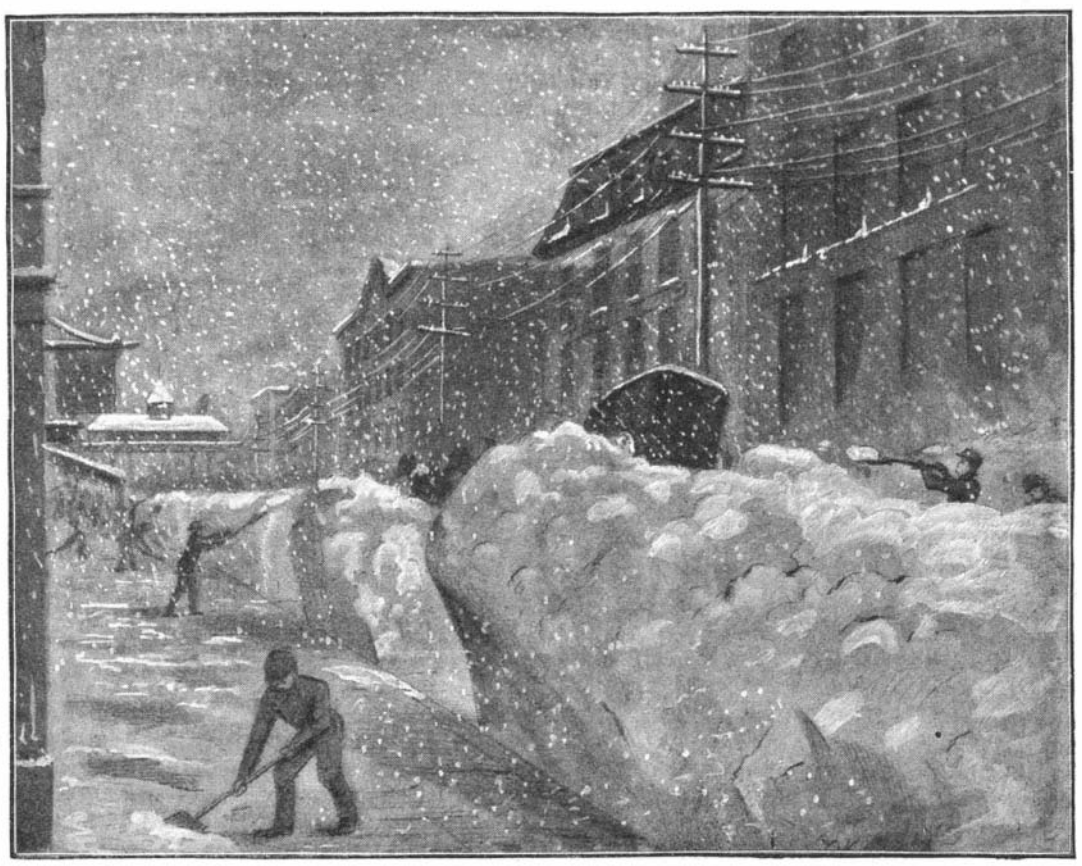
The third will relieve the second or the chief as may have been arranged by the latter when setting the watches, and he goes with a parting injunction to be sure and call him should anything go wrong or anything happen which is not well understood by the inexperienced one, who now finds himself left alone. The departing feet disappear up the ladder. He experiences a strange feeling of desertion. He is as one in a haunted room, surrounded by visionary possibilities of all kinds of disaster to the engines or to himself. He takes another look at the laboring monster beside him, but it is intent upon its work and makes no movement of recognition. He sees the crossheads flashing up and down with steady beat, with the pendulum swing of the connecting rods below, while in their strong grasp the cranks swiftly and ceaselessly revolve. The restless forces at work give our third a feeling of companionship during these midnight hours, though he likes also to remember that the firemen are not far off.

After seeing that all is working well, he must try to familiarize himself with the engines from every point of view. They are quite different to the same engines at rest, and from every new point of view they appear in a new aspect. From above and below, from front and back, they must be studied till all novelty about them disappears. Several watches pass before a thorough mastery of their details can be had, and to attain this the keenest observation is needed. No scrutiny can be too minute, and nothing is too trifling to be noticed and reflected upon. When the engines are well understood, perhaps the most striking point of view is from near the thrust block. By looking forward between the columns all the principal moving parts may be seen in one small field of view. Close by, in rapid swing, is the low pressure connecting rod, with its crosshead above, darting along its well-oiled guides. Behind it may be seen the eccentric rods crossing and recrossing each other in their erratic dance, with the curtseying quadrants above, while through their midst rushes the high pressure connecting rod, and crank brasses, intent only on their work. To the left are the circulating and air pumps, and the bilge and feed pumps, one behind the other, all driven from the low pressure crosshead by broad oscillating levers. To one really interested in the engines, as all good engineers are, these rushing, whirling masses of metal have a strange fascination, and force many curious thoughts on the solitary watcher who now alone is responsible for the safe working of the engines.

Next to familiarity with the engines, the third must get a correct idea of his relative position on board. This will soon be learned. As a rule, he will have to do the ordinary engineering work required on board, under supervision of the second, who also has the immediate control of the firemen, and is responsible to the chief for the correct carrying out of his instructions. The position of second is an arduous and responsible one. Every detail has to pass his inspection, and through him all orders pass to the third and to the firemen. The donkeyman, however, who goes on watch with the chief, and does all the work then required, is more directly under the control of the latter. With regard to the chief engineer, it will be found that the less he interferes with the work the more he will be respected, and the better will the work be done, if he has capable engineers under him. He compares notes with the second, consults him, and arranges with him what work is to be done when in port, or in reference to working of the men and engines at sea. His dealings should be entirely with the second, or the work will not be well done, and jealousy and bad feeling will soon appear. He may and must be firm, but the hand of iron should be as far as possible concealed under the velvet glove of courtesy. A bullying chief, or one who finds it necessary to display his authority, simply shows his weakness. He may be feared and disliked, but he cannot be respected. Whatever be the cause, whether imperfect education or roughness of up-bringing, it can hardly be denied that the self-assertive chief is too often to be met with, though there are many bright exceptions. As might be expected also, this unworthy kind of self-esteem is often in inverse ratio to a man's capabilities, or to his position, as for instance the most self-opinionated men may be found among the more inefficient of the firemen, to whom orders must be given, but who must never be reasoned with. Among firemen, however, as among engineers, may be found many noteworthy exceptions.

All the parts of human mechanism on board bear a certain analogy to those of the engines. The chief engineer may be compared to the steam which drives all, but which is most effective when least seen and heard. The second is like the main driving parts of the engine, the third like the main parts driven, while the firemen in their varying degrees of excellence form the rest of the mechanism. Only when each part is in its proper place, and fulfilling its proper functions, can there be peace among engines or men, so that the full effective power of each can be developed.

Thus we find that one of the first duties of a third is to understand not only the inter-relations of the various parts of the engines, but also his own relative position in the higher human mechanism of which he forms an important part.



VIEW ON GRAND STREET.

Poison in Respired Air.

Messrs. Brown-Sequard and D'Arsonval have communicated (*Compt. Rend.*, cvi., 106) the results of some interesting physiological experiments, which tend to show that an organic substance of a poisonous character is contained in the air expired by both human beings and animals. The object of the experimentalists was to prove that expired air participates largely in the production of pulmonary tuberculosis. They state that air to which 1 per cent of carbonic acid has been added is by no means so injurious as expired air containing the same amount of that gas, and that the ammonia always present in expired air will not account for the symptoms produced by inhaling the latter. The injection into the veins of animals of a liquid obtained by passing the expired air either of human beings or dogs through water was followed invariably by certain symptoms, including slightly dilated pupil, a marked slowing of respiratory movements, a considerable paralytic weakness, especially of the hinder limbs, and a rapid lowering of the temperature. Although the heart is not much affected at first, after three or four days it acquires a morbid activity. Larger injections of the liquid give rise to excessive contraction of the pupil, increased paralytic weakness, and a choleriform diarrhœa. The authors of the paper believe that it is to this poisonous principle, of which the exact nature is as yet undetermined, that the dangerous character of expired air is due. The liquid used in the above experiments had neither an acid nor an alkaline reaction, so that the principle would appear to be neutral in character.

How Business is Affected.

The *Iron and Steel Trades Journal* (London) notices that great surprise is being expressed in certain quarters with regard to the fact that the raw materials and labor do not rise in price so fast as the finished products. Crude iron is quoted about the price ruling in December, while finished iron and steel are from 10s. to 20s. per ton higher. We have never known, adds the editor, an improvement in trade to produce any other state of matters. In like manner, when a depressed period sets in, the crude products and labor reap a corresponding advantage, as the prices of finished articles always go down rapidly in face of a falling market. The cause is not obscure.

When a revival in trade is felt, there is a wider disposition to trust, and loanable capital that has been "fructifying in the pockets of the people" during the preceding depression comes into use and helps on the expansive movement. Confidence begets confidence. The necessary lubricant to loosen the wheels of the great industrial machine is easily procured in busy times. Thus we find that a much larger percentage of new companies are being successfully floated, and capital comes forth from its hidden corners.

When capital is willing, credit is always good, and there is apt to be much speculation not resting on a solid basis. When credit is good, undue rises in prices are, to a certain extent, delusive, and caution must be exercised in dealing with statistics founded on values. The recent long continued depression was more a depression of prices than a falling off in the volume of trade.

Railway Signals.

One pull of the bell cord signifies "stop."
Two pulls mean "go ahead."
Three pulls mean "back up."
One whistle signifies "down brakes."
Two whistles signify "off brakes."
Three whistles mean "back up."
Continued whistles indicate "danger."
Short rapid whistles, "a cattle alarm."
A sweeping parting of the hands on a level with the eyes means "go ahead."
A slowly sweeping meeting of the hands over the head signifies "back slowly."
A downward motion of the hands, with extended arms, signifies "stop."
A beckoningmotion with one hand indicates "back."
A red flag waved up the track indicates "danger."
A red flag by the roadside means "danger ahead."
A red flag carried on a locomotive signifies "an engine following."
A red flag raised at a station means "stop."
A lantern swung at right angles across the track means "stop."
A lantern raised and lowered vertically is a signal to "start."
A lantern swung in a circle signifies "back the train."

IN the absence of plumbago, those who are annoyed by a creaking hinge on a door may be glad to know that by rubbing the end of a common lead pencil upon the offending part it will immediately be reduced to absolute silence. Blacklead is one of the best lubricators known.

The Pasteur Treatment in Barcelona.

The municipal authorities of Barcelona, as we announced last year, have established a municipal microbiological laboratory, mainly with the view of enabling persons bitten by rabid animals to obtain the advantages of Pasteur's method of treatment. To the post of director of the laboratory Dr. Jaime Ferran, whose name is well known as having proposed and carried out a system of anti-cholera inoculations, was appointed, and he has been assisted by Drs. Pauli, Commenge, and Lluch. A report of the work done from May 10 to December 10, 1887, has just been published in *La Independencia Medica*. Altogether eighty-five persons have been subjected to the treatment. Of these, twenty-five had been bitten by animals that were certainly rabid, fifteen by those which had been pronounced rabid by medical men or veterinary surgeons, and thirty-seven by animals which were believed to be rabid, but whose condition could not be verified by professional men. The remaining eight persons had not been bitten at all, but submitted to the process in order to prove its harmlessness. The duration of the treatment was more than three months in forty-three of the cases, more than forty days in sixty-three, and less than that in twenty-two cases. Not a single case, either of those who had been bitten or of those who had not, proved fatal. The wounds were caused by seventy-two dogs, two cats, and two mules. Two of them were not bites, but dissection wounds with instruments tainted with the virus of rabies. At first Dr. Ferran carried out the inoculations of his rabbits according to Pasteur's method—*i. e.*, by trephining. Recently, however, he has adopted a new, and, as he believes, an improved, plan—viz., the injection of a single drop of the emulsion of the medulla containing the virus into the anterior chamber of the rabbit's eye. This produces exactly the same effects in about the same time as the trephining method.—*Lancet.*

Workshop Management.

The selecting of foremen is one of the most difficult duties that can confront owners of manufacturing establishments. It is generally found that the man who is the most capable artisan, and well up in all matters relating to his trade, is entirely void of the force of character and power to command others which are essential features in a good foreman, while the man who possesses the latter qualifications is often a very inferior worker. We have heard of a manager of a great establishment, says the editor of the *Iron and Steel Trades Journal*, who appointed an artisan to be foreman, owing to having observed that he was always moving hurriedly between the workshop and the store. The appointment elicited the fact that the new foreman, being a poor worker, had been content to "run the messages" for the other workmen, and his alertness while on the trot between the workshop and the stores had led the principal manager to fancy that he was an exceptionally earnest, faithful, and capable servant, and worthy of promotion. It is also well known that a large percentage of workmen spend their evenings doubtfully, and are never fit for their duties till a good part of the working day is spent. It is only in the large establishments this is possible, but the evil prevails wider than most employers and directors fancy is possible. We have inquired very closely into this point, and regret that we must admit that a great deal of unnecessary laxness obtains in our workshops, and cheap foremen are generally without backbone and worthless. Those who superintend should be superior to those under them in every respect, know how every job should be done, and how every man in the works is employing his time.

IN New York the law makes it a misdemeanor for a keeper of a boarding house or restaurant to abuse the confidence of his patrons by substituting butterine or oleomargarine for true butter. It will be in order next for Michigan to protect her industries by prohibiting the use of salt produced by evaporating the waters of an ocean into which thousands of tons of sewage are daily poured. There is nothing like a paternal government.

EDISON'S NEW SYSTEM OF TELEGRAPHY.

We illustrate herewith a system of telegraphy recently introduced by Mr. Thomas A. Edison, and known as the phonoplex system. It is operated by an induced current, and may be used successfully upon lines 100 miles or less in length. It finds its principal use in connection with the ordinary Morse lines. The current used in operating the system has no effect whatever upon the instruments of the Morse system, neither does the current used in the Morse system interfere with the phonoplex apparatus. It may also be used in connection with duplex and quadruplex wires, thus enabling a long stretch of wire to be utilized in connection with intermediate stations.

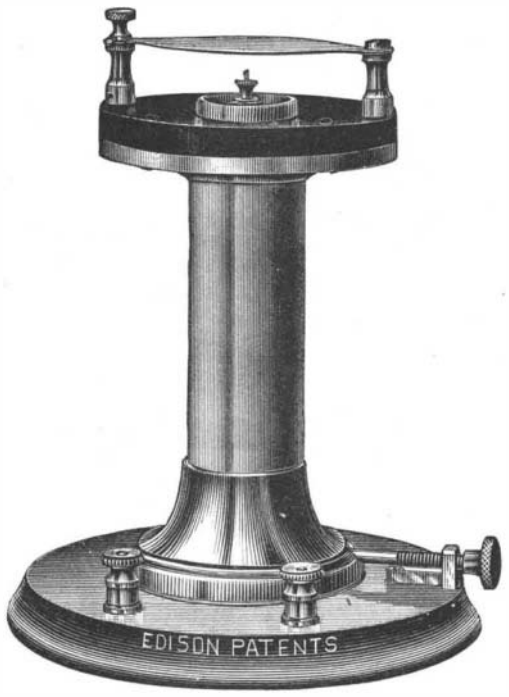


Fig. 1.—THE PHONE.

The equipment of an office consists of a key, a transmitter, magnetic coil, small resistance box, and the phone, two condensers, two cells of gravity battery, and four of electropoion, the whole requiring no more space than an ordinary Morse instrument.

The phone (shown in Fig. 1) consists of a hollow column of brass resting upon a wooden base inclosing magnets. At the lower end of the column is a rack and pinion by which the magnets can be adjusted. At the top of the column, in a suitable cell, is arranged the diaphragm, to the center of which is attached a screw-threaded pin provided with an adjusting nut and binder at the top. A split hardened steel ring, which is apertured transversely, is received upon the pin and rests upon the diaphragm. When a momentary current is sent through the coils of the magnets, the diaphragm is drawn down, throwing the ring violently against the top nuts, producing a sharp, loud click.

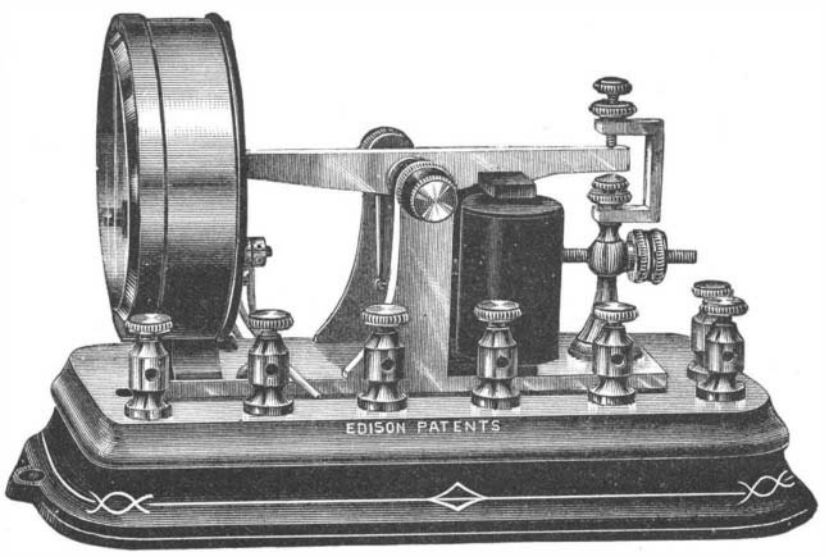


Fig. 2.—THE TRANSMITTER.

The transmitter (shown in Fig. 2) is interposed between the key and the magnetic coil. The key operates the magnet of the transmitter, and the arm of the transmitter is arranged to control the electrical contacts, as shown in Fig. 6.

Fig. 3 represents the small magnetic coil which is used to produce the induced current, by which the phones upon the line are operated.

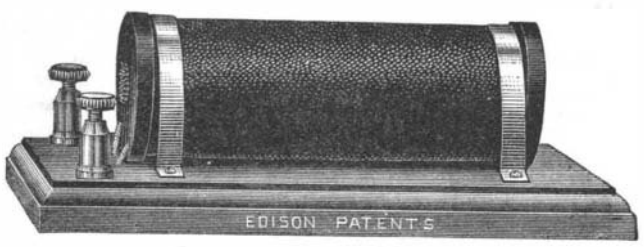


Fig. 3.—THE MAGNETIC COIL.

The key (shown in Fig. 4) is constructed so that when the lever is opened or thrown to the right, it closes the circuit around the magnetic coil through the points of the transmitter, and when closed or thrown to the left it opens this battery, and at the same time short-circuits the magnetic coil. This is necessary, as an open circuit electropoion battery of low resistance is used to transmit the signals, and it is desirable to cut out this battery at all times, excepting when signals are to be sent. By this arrangement the manipulation of the key is exactly the same as that of an ordinary Morse key, although the effects are different.

A small resistance box is placed in the circuit in such a way as to receive the current when the circuit of the coil is broken on the up stroke. The current passing through the spools of the resistance box thus produces an audible distinction between the up and down movements of the key as manifested in the phone, the upward movement being distinguished by a light stroke and the down movement by a heavy stroke.

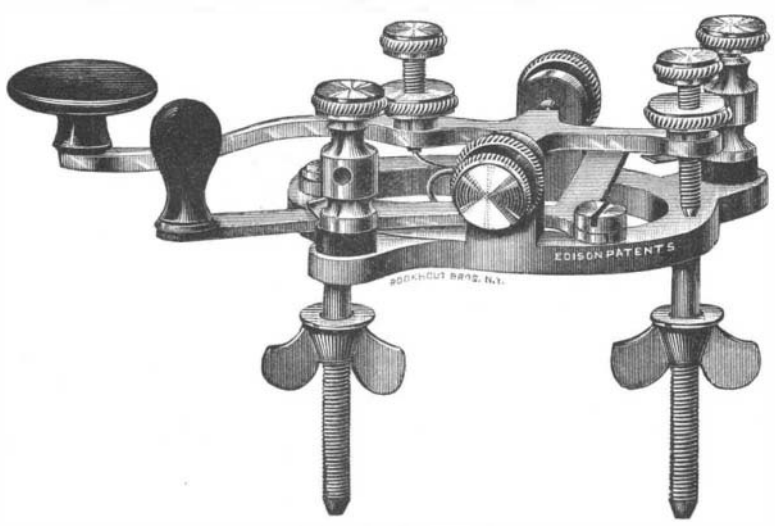


Fig. 4.—THE KEY.

Fig. 5 shows the arrangement at station. ML is the usual Morse line, with Morse relay, A, and ordinary key, B, shunted by condenser, C, to keep the line closed to the induction impulses. At each office where it is desired to operate the phonoplex there are placed in the main line a magnetic coil and a phone. The armature of the transmitter responds to the action of the key, *a*, through the transmitter battery and wires, 1 and 2. These wires, 1 and 2, form a local circuit to excite the coil of the transmitter. The circuit around the magnetic coil, which is used to send the induction impulses to the line, starts at the right hand side of the magnetic coil, thence through coil, battery to post, *b*, on the key, *a*, through which it passes along wire, 3, to the armature of the transmitter. This circuit is completed to the left hand side of the magnetic coil from the transmitter points, C and E, and along wires, 7 and 9 or 8 and 9, depending upon the position of the armature, and whether it is attracted by its magnet or influenced by its spring.

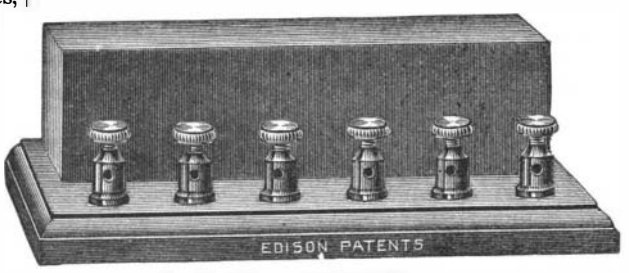


Fig. 5.—THE RESISTANCE BOX.

When the lever of key, *a*, is thrown to the left or closed, the coil battery circuit is left open at point, *b*, and the magnetic coil is short-circuited through wires, 9, 8, spring, *e*, of transmitter, transmitter armature, wire No. 3 and wire No. 6 to main line. The coil battery is left open for the reason that it is of very low resistance and depreciates rapidly when left on closed circuit. The magnetic coil is short-circuited when not in use, so as to keep the resistance of the same out of the main line. When the lever of key is thrown to the right and makes contact with point, *b*, it breaks its contact at point, H, throwing the magnetic coil into the main line circuit and closing the circuit of the coil battery around the magnetic coil through transmitter points. This is done when the operator desires to send a message. With the lever in the above position, when the key is depressed, the local circuit being closed, the armature of the transmitter is attracted toward its magnet, thereby breaking contact at spring, *e*, and sending an impulse from the magnetic coil into the line. When the key is released the armature of the transmitter is also released, and the circuit is broken at point, *c*, thus sending another impulse into the line, but through resistance box, *d*. This forms the up stroke in the phone, and the resistance has the effect of making it lighter than the down stroke, so as to enable the operator to distinguish the difference between the two and avoid getting "back stroke." Wires 4 and 5,