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GRANDMOTHER'S OPINION.

- "Listen to the dots and dashes,
Why, how perfectly absurd!
Surely no man ever hasbes
Such sounds up to make a word.
- "Do you mean to say the clicking
Of that little brass machine—
That small monotone of ticking—
Talks, with miles and miles between?
- "No, I never will believe it:
No one would, with any sense!
Reason, judgment, can't receive it,
'Tis the veriest pretense.
- "Just because I'm old and feeble,
People tell me dreadful lies,
Thinkin' I'll believe such twaddle;
Young folks think they're awful wise!
- "Now, when I was young (and pretty),
Young folks would respect gray hairs.
But in these days—more's the pity—
Old people ain't anywheres!"

FANNY FROND.

Edison's System of Electric Lighting.

The well-known French electrician and author, Count Du Moncel, has written for *La Lumière Electrique* an elaborate and exceedingly clear and able article on the Edison system of electric lighting, a translation of which THE OPERATOR takes pleasure herewith in presenting, in a slightly condensed form, to American electricians.

The Count commences by remarking that several castles in England now employ the electric light for household illumination and that a certain number of houses in the city of New York have subscribed for the light furnished by the Edison Electric Light Company. Since the successful introduction of these lamps, he adds, many systems of the same kind have been brought out by different inventors, and without speaking of such well-known ones as those of Edison, Swan, Maxim, Lane, Fox, Sawyer, we know of about fifteen inventions bearing more or less upon the subject. It, therefore, seems to us an opportune moment to enter into circumstantial details about this method of lighting, which up to this moment has not excited any great interest in Europe, for various reasons, of which the principal one was the relative considerable expenditure of motive force to produce a light of given intensity. It should be borne in mind that the luminous power of an incandescent body increases in a much greater ratio than the calorific intensity; therefore, by the very fact that incandescent lamps permit a greater divi-

the same. Nevertheless, the satisfactory results recently obtained force us to pass these systems of electric lighting in series, and we will begin naturally enough with that of Mr. Edison,

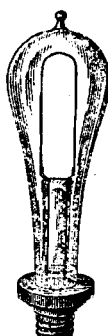


FIG. 1.



FIG. 2.

which has made the most noise in the world, and which has attracted attention to this manner of lighting by electricity.

Referring then to the Edison system, he goes on: The incandescent system was first rep-

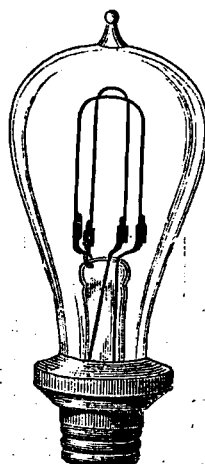


FIG. 3.

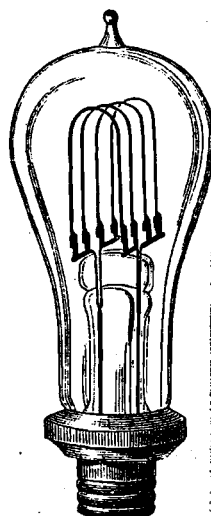


FIG. 4.

represented by lamps made from an incandescent platinum wire, and the interesting experiments

system were not satisfactory, principally because of the disaggregation and partial fusion of the wires, and in spite of the numerous improvements brought to bear on this system by Mr. Edison, who, by one of the most ingenious of processes, has rendered them more infusible and harder, still they had to be absolutely rejected—at least for ordinary lamps. Then it was suggested to employ carbon which, if not allowed to burn, is infusible in the highest heat developed in the lamps, and different arrangements of apparatus were put together at various times by King, Lodyguine, Boulguine, Swan, Sawyer, etc., some avoiding combustion by inclosing the lamps in receptacles where a vacuum had been obtained, others by filling these receptacles with gases unfit for combustion, as nitrogen or oxide of carbon, or simply by leaving the air shut up in the receptacle to be vitiated by an incipient combustion.

All these attempts had but partially succeeded, to say nothing more, when, in 1879, the new incandescent carbon lamp of Mr. Edison was announced, and many savants, and myself in particular, doubted the exactness of the allegations which came to us from America. The carbonized paper horseshoe appeared incapable of resisting mechanical shocks, and of supporting incandescence for any length of time. At this epoch Mr. Swan himself said that up to that time he had not been able to obtain any very satisfactory results by an analogous disposition of the incandescent organ.

Mr. Edison, however, was not abashed, and in spite of the lively opposition made to his lamps, in spite of the bitter polemic of which he was the object, he did not cease to perfect it for practical purposes, and has at last produced lamps, which we have seen at the Paris Electrical Exposition, and which can be admired by all the world for their perfect steadiness.

As at present made, these lamps are sufficiently solid and can last a long time. The originally fragile carbon has become extremely elastic and hard, and of such attenuation that it can be well compared in size to a horse hair. By a cleverly combined system of fastening the platinum conducting wires are not exposed to be cut, and they are so sealed in the glass receiver that their change of volume under the action of heat does not endanger the perfection of the vacuum. By the way the carbons are treated when the vacuum is made in the globe, the bubbles of air inclosed in their pores, and which, in escaping, disaggregate the surface, are evacuated before closing the lamp, and at the same time the filament of carbon acquires a peculiar density and hardness, as was the case with the platinum wires. To obtain this result the carbonized filament must be brought into incandescence while the vacuum is being made. The very nature of the substance of vegetable origin employed in its fabrication has been modified.

Fibres of bamboo carbonized by a certain process are now used instead of the paper originally employed. According to Mr. Rafscheler and Mr. C. A. Moseley, collaborators of

125 ohms, when brought up to an incandescence corresponding to 16 candles; but it can vary according to the luminous power desired of the lamps, for it can be distributed between two lamps whose filaments are correspondingly more or less long. Their extremities, which are enlarged, are pressed in a kind of pincer which terminates the platinum conductors, and which are soldered by an electrolytically deposited copper. Figs. 1, 2, 3 and 4 represent the actual arrangement of these lamps. Their duration, from what I have been assured, is long enough; however, they must wear out. Although most of them may have served for 1,200 hours, the question may be asked whether a lamp capable of deterioration may be considered a practical thing; but if it is considered that this lamp can be furnished for 80 cents, that the adjustment on its support cannot be any simpler than it is, which is evident on inspection, it is easily seen there is no more trouble to replace one than to renew a broken lamp shade.

What constitutes Mr. Edison's system is not alone his lamps, it is the totality of the arrangements referring to them, and which have attained such a degree of simplicity that henceforth nothing remains to be desired in practice. Generating machines, distribution of circuits, installation, indicating and regulating appara-

right angles to them) laid one against the other at the ends of the cylinder, and insulated from each other. Each bar is fastened to its corresponding discs in such a way as to form a single circuit enveloping the cylinder longitudinally, and which is made perfect through the coupled bars two and two with the commutator blocks (made after the Gramme pattern).

screwed against the copper discs corresponding to them. In the new disposition adopted by Mr. Edison, the field magnets lie horizontal instead of being placed in the vertical.

Fig. 7 represents the whole machine as actually worked in the Palais de l'Industrie.

We have described the generating machine before completing the description of the system

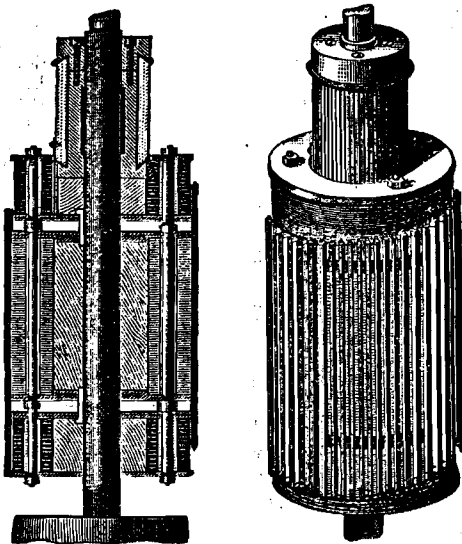


FIG. 5.

FIG. 6.

tus, meters for measuring the amount of current employed, are all combined for immediate application. This application is about being made in a part of the city of New York, where a great number of houses are to be lighted by this system, by means of a subterranean distribution from a central station, from which also motive power will be distributed to the houses.

This central station will be provided with twelve steam engines of 150 horse-power each, actuating dynamo-electric machines, each of which will be capable to supply, it is said, 2,400 lamps of 8 candle power. The current furnished to these lamps comes through a branch taken before each house from the large-sized conductors laid in the streets. These deviations bring the poles of the generator into each house, where the lamp wires can be brought in connection with them, thus rendering each house independent of any other, both for a supply of light and motive power.

When it is considered that in the system of distribution adopted by Mr. Edison, the total resistance of the exterior circuit is extremely reduced, and that with 2,400 lamps it is only 111 ohms, which is a very small resistance, it is evident that a very feeble resistance should be given to the generating machine; so that its first arrangement has been modified. To begin with: The field magnets were arranged on a derivation taken from the commutator, putting it into the induced circuit as in Wheatstone's and Siemens' system. Then the armature was arranged on Siemens' principle, so that the wire consisted of bars of copper. These bars lie close to each other around the cylinder which forms the armature, and they generate the current. Their extremities correspond to discs of copper (at

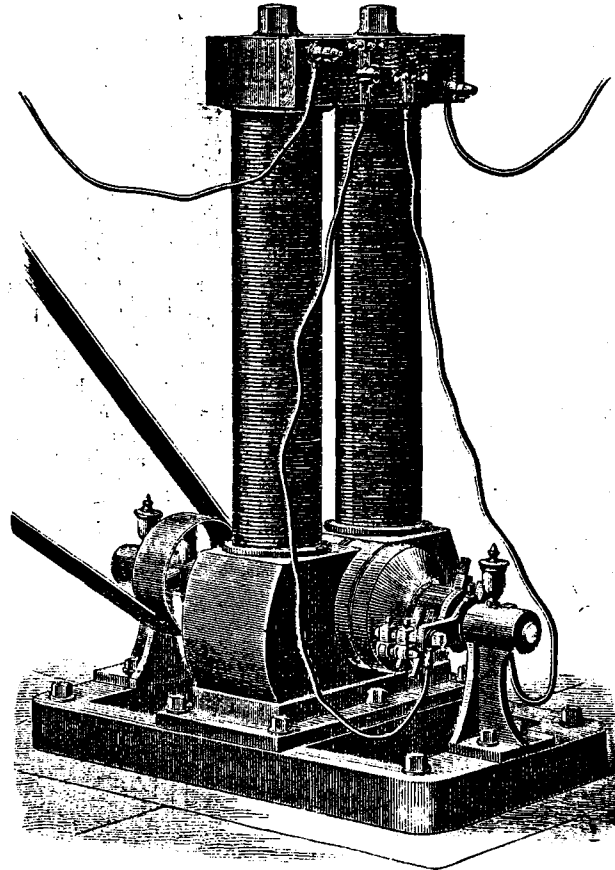


FIG. 7.

Figs. 5 and 6 give an idea of this new arrangement. The centre of the cylinder itself is occupied outside of the rotating axle by a cylinder of wood, which, in its turn, is surrounded by a thick tube made of a series of very thin discs of iron, separated from each other by tissue paper. This arrangement facilitates the rapid changes of polarity in the plates. The tube is terminated at its two extremities by two thick clamping

of distribution of the current, because we ought to speak of the system of control used in making the current uniform when its intensity has been modified by a variation in its distribution; that is to say, following after a variation resulting from the unexpected suppression of a certain number of lamps in a part of the system. The necessities of this system are easily understood, if we consider that this suppression can lead to a

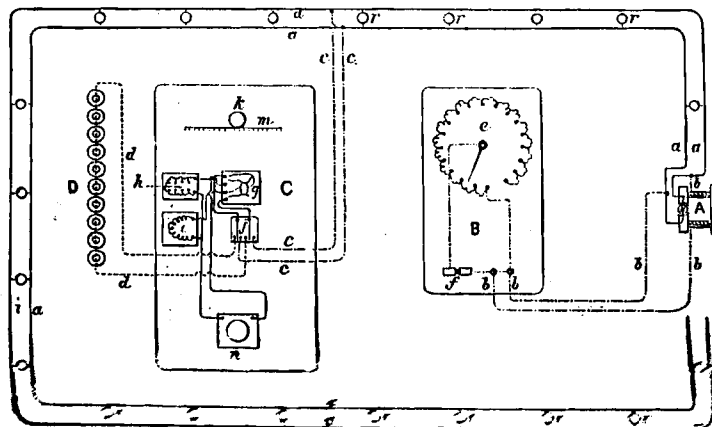


FIG. 8.

discs, which are made to compress the others laterally, and the copper discs of the working coil occupy the two compartments at the extremities of the cylinder, as seen in Fig. 5. Under such conditions as these the resistance of the generator is small, and permits of great subdivision of the current in multiple arc; nor is there any insulation to be burned, and it is even possible, in case of the deterioration of the bars, to renew them easily, for they are simply

greater or less increase in the intensity of the current feeding the remaining lamps.

In France several systems have been devised to obtain an automatic regulation, but in America, it seems, it is preferred to effect this by the intermediation of an appropriate controlling agent.

In this system, whose general arrangement we see in Fig. 8, the current which feeds the lamps furnishes a deviation at the machine co, which

enters an electric dynamometer, after having gone through a resistance of 180,000 ohms. The electro-motive force should be about 110 volts, and a difference of one volt should correspond on the scale of the indicating apparatus to three divisions; consequently, for each observed increase of intensity a resistance capable of compensating for it should be introduced into the circuit. Mr. Edison has established a circular commutator *c* with bobbins of different resistance, which permits of an increase of resistance, not in the lamp circuit, which would lead to a loss of work, but in the circuit of field magnets, which weakens their action on the working coil.

circuit. This is what is called in America a "cut off," and in this way it prevents deterioration. The box is then hermetically closed and covered with an insulating coating. In the figure the branch wires are shown double, but it is evident that they could be single.

We said that all arrangements had been made to make the system a perfectly practical one, and of that we shall soon be able to judge. Let us examine first how the lamp supports and the lamps themselves are disposed. As has been seen, they are formed of glass globes of ovoid form, cemented into the copper sleeves by means of plaster and screwed into cylindrical cavities

I have been assured, the price of this kind of illumination is lower, light for light, than gas. It may be considered that the problem is on the eve of solution, for Edison's system of electric lighting is placed in the same condition as that of gas. He avoids the presence of machines in separate houses, which always are in the way, and which, by their very nature, require care and management not to be obtained from ordinary servants.

As a complement to his system, Mr. Edison has constructed portable chandeliers, represented in Fig. 15, and a current regulator shown in Figs. 16 and 17, which permits of reducing the

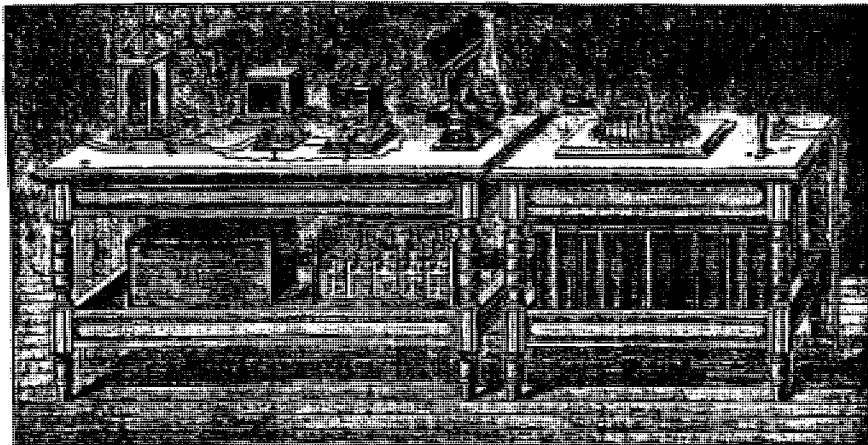


FIG. 9.

From the central station also, the condition of the current affecting the lamps can be controlled by means of a testing photometer, which enables us to see how much the intensity of the current must be diminished or increased to correspond to a given luminous intensity. For this purpose the photometer is mounted on a little railroad, placed in a dark chamber; under and in front of it is placed a scale, arbitrarily divided, so as to indicate immediately the candle power furnished by the current in its normal condition. The left side of Fig. 8 indicates the manner of arrangement of the testing bench, with the explanatory table at the bottom

terminating the supports. These are a kind of arm which can be adapted to brackets or chandeliers, or be arranged around the walls. In the last case, the arms, as is shown in Fig. 11, carry two articulations, A and B, and commutations are made by two plates of the hinges which are insulated, and in whose circular part two springs press, as seen in Figs. 12 and 13. Connections of the conductors with the lamp, as we have indicated above, are made by a lead wire (cut off) which may melt and interrupt the circuit in case a too great quantity of current should endanger the lamp.

In these brackets, as in the three branch chan-

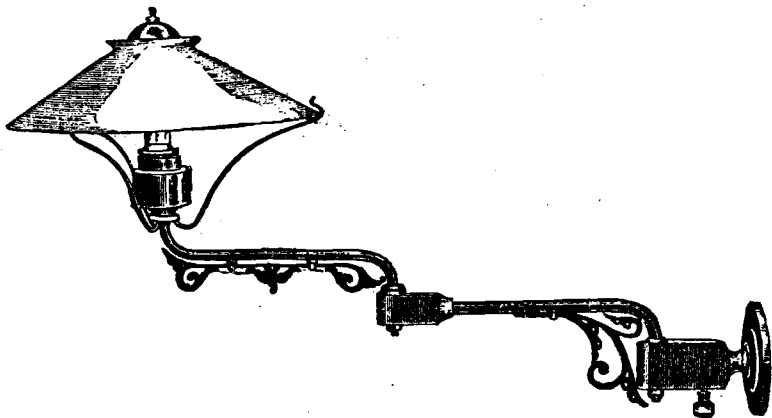


FIG. 11.

of the figure. Fig. 9 shows it in perspective. The manner in which derivations are taken on the principal conductors merits especial mention. The conductors are composed of two rods of copper of hemi-cylindrical form, flat on one side and round on the other, which are enveloped in cylinders of insulating material, contained in small wrought-iron pipes, which are buried under the streets. To take a derivation the cable is laid bare at the spot where the branch circuit is to be established. The two connecting rods (coming from the main conductors) are cut and bent outward and introduced into a clamp where they are soldered to the house wires as shown in Fig. 10; but in order that no harm can be done by two strong currents, one of these communications is made by intercalating a lead wire in the branch circuit, shown at the bottom of the figure, and which, by its fusion, interrupts the

deliers, represented in Fig. 14, keys have been introduced which allow the extinction of the lamps separately or together, without causing any spark of the point of rupture or any danger of fire. The movement of the key *a*, as shown in Fig. 12, breaks the contact by means of a conical stopper which terminates the screw of the key, and which, when separated from the two plates, through which the current passes when the stopper is in contact with them, breaks the circuits at the points and on a surface of sufficient extent to greatly diminish the spark at the point of rupture.

The lighting of the two salons of Mr. Edison at the Exposition was done by 16 small chandeliers like the above, two grand crystal chandeliers and 80 brackets.

The effect was very beautiful, the steadiness being as complete as could be desired, and if, as

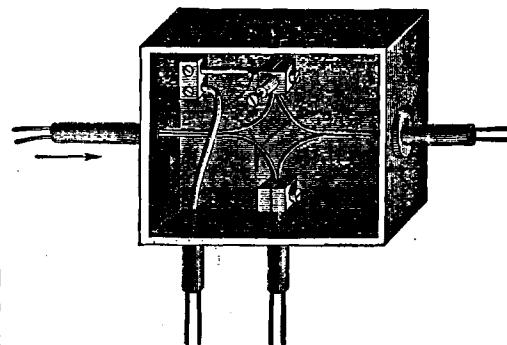


FIG. 10.

light in any desired proportion. It is a carbon rheostat, composed of carbon pencils of different sections, which, as the current passes through one or the other, allows any desired intensity. The apparatus is enveloped in a cylindrical cover, pierced with holes to allow of the escape of heat, and surmounted by a lamp which indicates to the eye the desired degree of luminacy. It is worked by a disc, shown separated in the lower part of Fig. 16, and which can be turned so as to bring a contact spring on any one of the supports of the carbon, whose position is indicated by an index and divisions engraved on the base of the cylinder.

But what is most interesting of all in those accessories of Mr. Edison's system is the meter which determines the amount of electricity con-

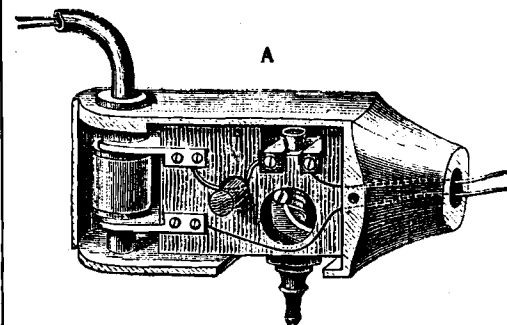


FIG. 12.

sumed by the lamps. There are two kinds. One is automatic like a gas meter, the other requires weighing. They are, however, both founded on the same principle—that is to say, in the estimation of work by the weight of a copper deposit produced by the current used. We will describe these two interesting pieces of apparatus hereafter, and give draw-

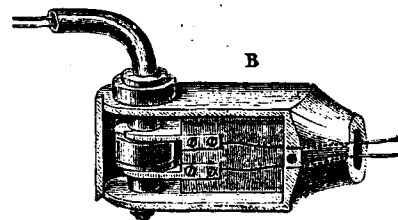


FIG. 13.

ings of them; to-day we must be content with only mentioning the principle involved.

Imagine a balance having at the extremities of the beam two cylindrical-rolled plates of

copper forming two electrodes. Let us admit that these two systems of electrodes, which plunge into two vessels filled with a solution of sulphate of copper and furnished with fixed electrodes, are traversed in an inverse direction by the current employed, and which can cause the balance to operate under a given weight of copper deposited from the solution. It is easily seen that the movement brought about by these conditions can set in motion a current reverser, which can change the conditions of the deposits in such a way that the electrode covered with copper is transformed into a soluble electrode, while the one which was originally in that condition becomes the reducing electrode. From this time on an oscillating motion of the beam of the balance is established, and more or less frequently

Of Mr. Edison's great machine, a cut of which accompanies this article—it will be remembered that the machine was considerably later in reaching Paris than Mr. Edison's other exhibits—we will only say at this time that the steam engine was constructed especially for this application, that it makes no noise, and that the dynamo-electric machine forms one of its integral parts. The field magnets of this latter mentioned, instead of being vertical as in the model represented in Fig. 7, are horizontal, and the dimensions of the machine itself are much larger.

The steam engine which works the machine is of peculiar construction, and the speed of rotation which is communicated to the working coil is 850 turns a minute. This is not a very

to-day is completed, perfectly studied out in all its parts, and that nothing more remains to be done but to introduce it on a great scale.

The following is a brief description of Mr. Edison's steam dynamo, referred to by the Count Du Moncel, and shown in the accompanying engraving:

Peculiar to the Edison system is the idea of connecting an engine of great power directly to the armature shaft of a single dynamo, capable of absorbing the full power of the engine, and of economically converting the same into electrical energy for distribution to the lamps and motors. To obtain the requisite electrical pressure, and avoid the use of magnets and armature of a weight and size which for mechanical and commercial reasons would be excessive, the en-

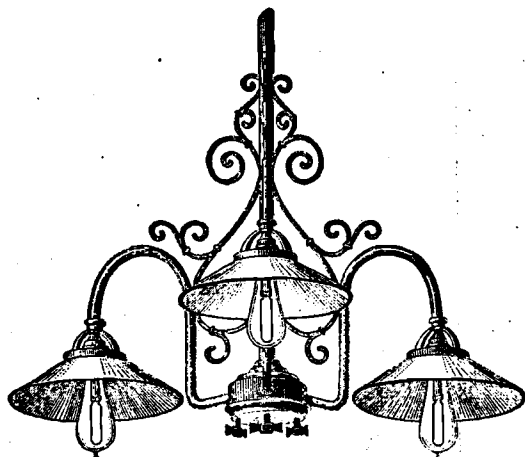


FIG. 14.

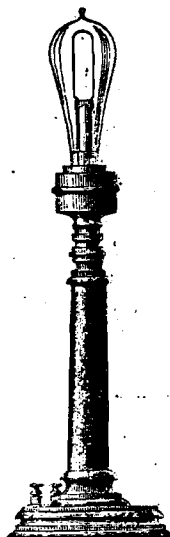


FIG. 15.

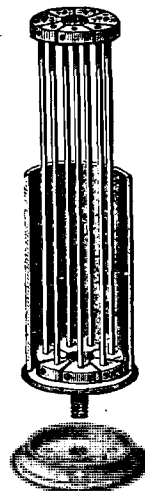


FIG. 16.

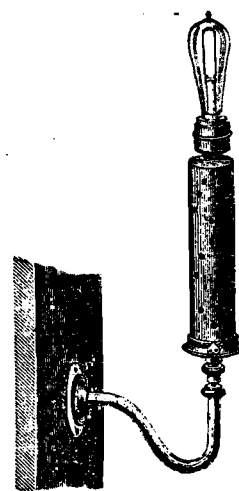


FIG. 17.

repeated, according to the rapidity of the formation of deposit; that is to say, according to the intensity of the current. As the same movement can bring about the passage of a derived current (taken from the total current) across a special electro-magnet, which commands the movement of a counter, it is easily seen (after the determination of the number of Amperes corresponding to the weight of the deposit, which produces the oscillation of the balance) what is the quantity of electricity consumed.

The realization of this idea has necessitated some electro-magnetic arrangements, which we will describe in detail when we get the drawings of the apparatus.

The other system is more simple, consisting of two voltmeters of sulphate of copper, whose electrodes can be easily taken out and weighed, as the work done can be calculated from the weight of copper deposited. One of these voltmeters is open to the subscriber, the other is kept closed by the controller. Resistance bobbins introduced into the circuit, corresponding to these resistances, permit of the employment of greater or less periods of registration.

A small incandescent lamp placed beneath the apparatus, and which can be thrown into circuit by a simple metallic thermometer, prevents any danger of freezing in extremely cold weather.

There is another application of Mr. Edison's light, which was shown at his exposition in a model intended for lighting galleries in mines. In this arrangement, represented in Fig. 18, the lamp is introduced in a glass receptacle filled with water and held in suspension. Communication of the apparatus with the circuit is arranged in such a way that the points of contact are covered by water, which avoids any danger of explosion in mines infested with fire damp.

Quite a number of persons who, without previous examination, and without being of the same opinion two days consecutively, come to us, and disparage electric lighting. It is certain that new inventions have great difficulty in coming to light and in succeeding, above all when they are opposed by rival interests, but when they are really good they triumph in time over all obstacles.

great speed, but the armature is very heavy, weighing, as we are told, over three tons and a half. The magnetic field in which it turns is formed by three powerful electro-magnets, united so as to form but one at their extremities.

In the salon of Mr. Edison were shown a collection of photographs, among them some of the

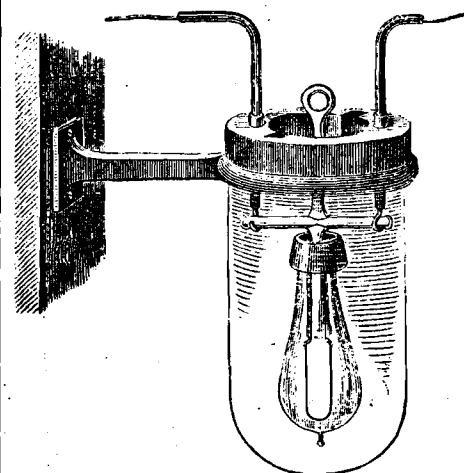


FIG. 18.

manufactories where the enormous amount of material required in these installations is constructed. As we have been assured, one of these turns out 2,000 lamps a day, giving occupation to 150 persons. In accompanying drawings and collections can be seen methods of glass-blowing, the carbonizing of the filaments intended for incandescence, the vacuum pumps and the mounting and packing of the lamps. The pumps referred to are set in motion by dynamo-electric machines.

From all this, we see that Mr. Edison's system

is so constructed as to maintain a speed of 350 revolutions. A boiler pressure of 120 lbs., made absolutely safe by the use of approved sectional boilers, the high speed, and variable cut-off valve and manner of constructing the engine makes this method of generating electricity absolutely safe and economical, and the uniformity obtained in regulation of speed insures a corresponding steadiness in the current and therefore in the lights which it supplies.

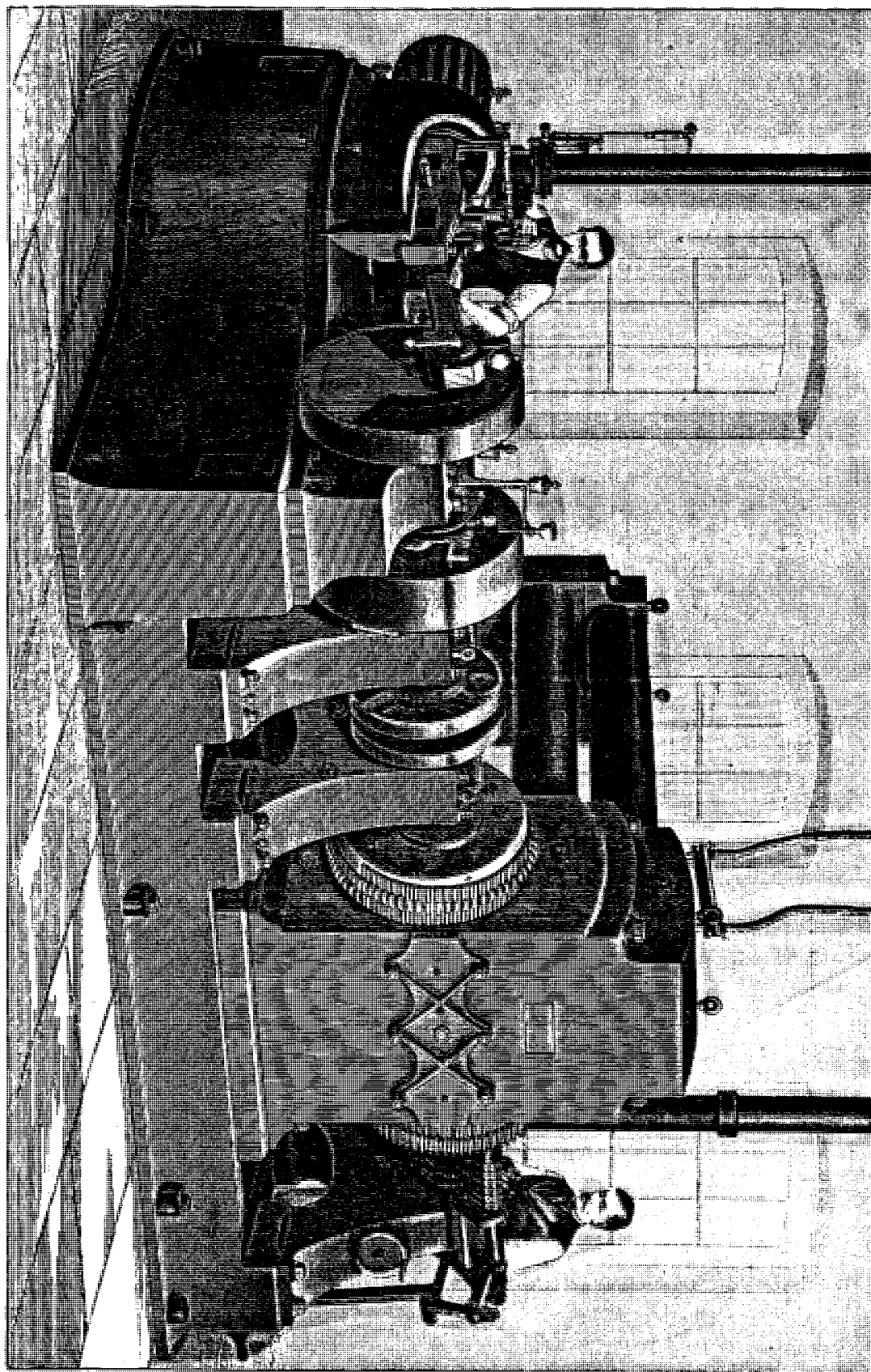
The following approximate summary of weights and dimensions of various parts in the latest "steam dynamo" constructed will give an idea of its total size and power.

Cast-iron sole plate, in one piece, upon which dynamo and engine are placed, and pillow blocks, 9,600 lbs.; magnets, complete, 24,500 lbs.; armature, complete, and shaft, 8,500 lbs.; engine, 10,000 lbs. Total weight, 44,600 lbs.

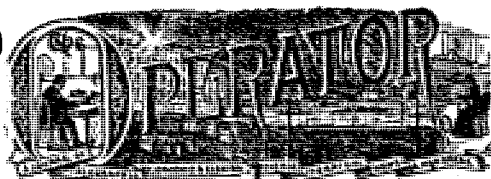
The total weight of copper on armature and magnets is 3,600 lbs.

Principal dimensions: Sole plate, $12\frac{1}{2} \times 8\frac{1}{2}$ ft.; length of magnets, 8 ft.; length of armature (commutator makes additional length of 9 in.), 5 ft.; diameter of armature, 28 in.; engine cylinder, 11 in. \times 16 in.; capacity, 2,400 gas jets.

The electric light mast recently placed in the public square at Cleveland, O., is 260 feet in height, and composed of sections of boiler iron about five feet in length each. The apex is 8 inches in diameter, the base three feet. The entire column weighs in the neighborhood of twelve tons. The foundation on which it rests weighs fifty tons. There are to be four lights at the point, having combined from 20,000 to 40,000 candle power, the exact power not having been definitely decided upon. It is intended to illuminate an area of one-half mile. The erection of a mast at the corner of Water and Superior streets, 250 feet in height, will at once be commenced, and as soon as completed lights will be placed on the three masts, and the gas in the down-town portion of the city will look consumptive. The cost of the mast in the square was \$3,800.



EDISON'S STEAM DYNAMO AT THE PARIS ELECTRICAL EXHIBITION.



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OUR CONSOLIDATION.

The call in the last issue of *THE OPERATOR* for a national convention of telegraphers has excited much interest, both in telegraphic circles and in the daily newspapers, many of which have kindly copied the salient features in the call. It has also evoked much comment, for and against, in our own ranks, and if it had no other result than this—a thorough scrutiny of our professional condition, which has certainly deteriorated—it would not have been issued in vain.

The difficulty attendant upon the convening of such a deliberative body, and the subsequent formation of a national organization, is that it is liable to be combined of so much good and so much evil that the more fair-minded of our professional brethren might become perplexed in an honest endeavor to determine whether to approve their final action or not. The idea is based upon a sound principle, and should inspire confidence in all quarters, were it not for the fear of such a powerful organization falling under the control of impracticable or selfish and designing men. Now, if anyone thinks that the formation of such an organization will ultimately release him from hard work, or any of the restraint necessary to the discipline of the service, he had better disabuse his mind at once with regard to its objects. That is exactly the class of men we are endeavoring to weed out, and we have no doubt that the executive officers of all the companies, who, if they were not eminently sensible men would not occupy their present exalted positions, will cordially aid us in the good work.

In thus striving to maintain the high standard of our profession, we are not looking specially to pecuniary gains or any radical revision of salaries, but to the barring out of cheap and vulgar additions, and the education and elevation of those now working beside us. We are, as a body, building up a distinctive character—by our mode of life, by the models we set before us, by the ideas we receive from our surroundings, and by the books or papers we read; and the higher these objects can be raised the greater will be our elevation. For instance, now that we are divided and sub-divided, one person is mingling with intelligent and refined society, and is becoming more worthy of his calling; another prefers inferior company and a less circumspect mode of life, and is consequently becoming unworthy of his calling. Now, the

ears, of consolidation—is one of the prime factors in forming our characters, especially in the young; and there can be no better way of elevating the profession at large than by consolidating into one brotherhood, with each component part working for the collective interests. Thus, by closer intercommunication outside of the office, we may better free ourselves from the danger of interlopers; and, by mutual exchanges of sentiment, by pure reading, and an earnest desire to attain one single object—the elevation of the profession—we may learn, each from the other, the folly of carelessly flinging away our earnings and the value of patient industry, conscientious and unremitting labor, careful deliberation when our interests are at stake, watchful economy and unceasing diligence, that we may thus grow in closer affinity to each other.

Of course, such an organization needs the most rigid supervision, and the most reverent respect for vested rights and constituted authority, as well as the open, flashing eye, the quick ear, the well-curbed tongue and the guarded pen.

There may, possibly, be deep water ahead, through which we must all, sooner or later, wade; and, if the surmise be a correct one, we might as well put on our life-preservers in time. Such precautions may seem a little out of place when we are all sailing nicely before the wind, and cheerily “toils the merry crew,” but it will be when calamity threatens, as it has done since the official consolidation, when our rights are being swept away and our means of existence threatened, that such an organization—conceived in fairness and worked only in justice—could put forth all its energies to protect the weak from spoliation, and the strong from that of which they might, upon maturer judgment, be ashamed.

We are pleased to notice the hearty manner in which the Western Union operators of Philadelphia have honored their worthy manager, Mr. William G. Jones. We are unalterably opposed to the general principle of indiscriminate gift-taking on the part of those still in office, since it opens the way to so many vicious practices, where unworthy men are concerned; but, in this case, as we know from our own knowledge, there was something so unselfish on the one side and so totally unexpected on the other, and such unanimous enthusiasm in the suddenly-devised project, that we can find no room for complaint. On the contrary, we have rather to indorse and rejoice at the pleasurable incident; for it is, at least, one guarantee of that absolutely necessary good feeling between employer and employé which alone can cement the entire service in one great unyielding and unanimous body. Mr. Jones has spent many years at the key, and, whether as operator or as chief, he has infused a higher sentiment into the minds of those about him. Since the death of the late Calvin Sellers, we have heard of no telegraphic official who has drawn from his subordinates more personal loyalty and affection than William G. Jones. His quiet dignity; his ingenuous and open spirit, gentle manliness and irrepressible sense of humor have made him both a staunch friend and a delightful companion, and no one can say that he has ever been connected with him in any way and not been charmed by his peculiarly tranquil nature and unobtrusive

—will grow with the flight of time; for, though but a young man in years, he has already lived with us “that best portion of a good man's life—his little, nameless, unremembered acts of kindness and of love.”

TO MANY people the little telegraph messenger is a “white wing'd messenger of peace,” and to every one his call is ever a welcome one. Even to the most hardened, the little fellow tramping through sleet and snow is an object of commiseration, and his first false step in life is much to be regretted. Such was the case of poor little Aaron Platt, twelve years old, who had so many messages to deliver, and was so tired running from pillar to post, that he lay down on a door-step and, boylike, fell asleep, with his messages for a pillow. Being unable to deliver the remainder of the dispatches when he awoke, he, with all the lack of judgment to be expected of his tender years, tore them up and went home. The little rascal was, of course, discovered, and should have received a sound whaling with the most available shingle or maternal slipper; but it was a hard-hearted “justice” that committed him for one month, and the alleged “manager” who prosecuted him—we commend him to those of the officers of the American Rapid Company who are fathers—must be as cold-blooded as a fish. Just think of it—twelve years old! Rain, hail, snow; fourteen miles of slush already waded through; four miles yet to tramp; weary limbs; midnight; a mere child—somebody's baby-boy—yielding to a childish impulse, a temptation if you like; and a month's imprisonment in the juvenile asylum! If this be law—and law, you know, is “the perfection of reason”—then gentle Charity is dead, and Brother Jay Gould was correct when he unblushingly avowed himself one of the “early birds.”

THE Mutual Union Telegraph Company has not yet turned over to any benevolent society that \$250 which its officers claimed was paid to certain amateur detectives and telegraphic Benedict Arnolds in its service by specified Western Union officers as a bribe to lie and steal. Under these circumstances, the money cannot, by any manner of means, rightfully belong to anyone in the Mutual Union service, and, since the Western Union people disdain to claim it, it may as well be deposited to the credit of telegraphers in general. Even as a matter of live competition, which the Mutual Union makes a boast of, since the Western Union has made a special purchase of a muscular Cotswold ram to butt Mr. Erastus Wiman all the way down Broadway to the Battery for his loose dealing in this matter, the Mutual Union cannot do less than turn over the money to the Telegraphers' Mutual Benefit Association or the Brotherhood. The officers of that company are too just and upright to permit any Judas to profit by another man's weakness, and if some smart young man in the Mutual Union service has quietly pocketed the \$250 in dispute, we trust that that company will promptly cause him to disgorge. Since we have been furnished with the number and series of each bill, we shall not forget that \$250.

INDEPENDENTLY of our college-professor swindlers, the telegraph appears to be becoming very popular with professional beats and forgers in general. The latest return is from Havana, Cuba, where two clever swindlers, one operating

\$500,000, which constituted the grand prize in the last "Spanish National Lottery." Their scheme was ingenious. The Havana papers on Dec. 24 published a dispatch from Madrid, announcing that, at the drawing of the lottery, ticket No. 4,745 had drawn the prize, and on the same day a gentleman in Havana presented himself at the banking house of J. M. Barges & Co., with the ticket in question, and after some delay received an order on Paris for a million francs. A member of the firm then insured the ticket, and sent it under national seal to the lottery company at Madrid. In the meantime a telegram from the lottery company shows that ticket 4,745 drew a blank, and that the cable dispatch previously published was a forgery.

An investigation should show how many of the operators were concerned in this scheme.

THE reduction in tariff recently made by the Western Union—whether for the purpose of freezing out the Mutual Union or not, we cannot say—is in marked contrast with the "reductions" proposed by Mr. Fawcett, the Postmaster General, in England. In a territory scarcely larger than the State of New York, with a shilling (25c.) uniform rate, it is proposed to reduce the rate to a halfpenny (one cent) per word, with a minimum rate of twelve cents. This scheme seems very fair until we hear that at that rate the names and addresses of sender and receiver are to be counted as part of the message. By the time all the words in the name and address from and to are counted at the rate of a cent a word, in addition to the body of the message, the British public will not have much to boast of in this "reduction" of rates. The United States, with their vast extent of territory, equaling that from London to Persia in extent, and their maximum rate of \$1.50 for ten words, still lead the world in cheapness as well as in excellent service.

To those who reflect that it is scarcely more than seventy years since whale oil and tallow candles gave way to coal-gas as a means of illumination, the rapid strides made by the electric light during the past two years, and that, too, in the face of a violent opposition, will not be surprising. It will be remembered that there was no electric light at the Centennial Exhibition in 1876, while to-day it is extensively used all over the world, and its popularity is steadily growing. Much of this grand success is due to the inventive faculties and indomitable enterprise of Mr. Thomas A. Edison. His light is both beautiful and brilliant, and its success must be peculiarly gratifying to him after years of partial failure and unfriendly criticism. These reflections will lend additional interest to the translation of the Count Du Moncel's excellent article on Edison's System of Electrical Lighting, which we publish on another page.

THE kind of independence which THE OPERATOR is endeavoring to instill into all telegraphers does not extend so far as to indorse the action of discharged employes in shooting their late managers in the face. This summary method of righting his grievances was adopted on the 7th inst. by Henry Roeth, a sixteen-year-old messenger of the American District Company, at their Tenth and F streets office, Washington, D. C. Mr. John J. Bauer, night manager at that office, discharged Roeth for disorderly conduct, whereupon the vicious youth shot Mr. Bauer twice in the face. He was promptly arrested

and should be severely dealt with. There are many alleged managers in our service who might possibly be similarly dealt with to advantage, but as the process might lead to complications, it is as well not to decimate the ranks in this way.

IN justice to the Pennsylvania Railroad Company—which, by the way, has had two serious "accidents" since our last issue—it should be stated that that company no longer offers the pitiable sum of \$29 a month to its "operators." We have been at some pains to sift this subject, and, as may be seen in another column, salaries which were recently \$37 and \$29 a month, respectively, for different grades, are now \$41 and \$36 a month, respectively. Even these rates are far below what should be paid to competent and intelligent operators, and while this corporation employs men whose telegraphic services can command no more than \$36 or \$41 per month, we cannot reasonably look for any diminution in the ever-increasing "wreckord" of fatal accidents on its road-way.

THE Rio de Janeiro (Brazil) *Jornal do Comercio*, of Dec. 6, announces that Mr. Jay Gould, of New York, will shortly lay a cable through the Bermudas to St. Thomas, thence in unequal curves to Paramaribo, in Dutch Guiana, and from that point to the city of Fortaleza, the capital of the province of Ceará, in Brazil. The cable has been ordered, and the Brazilians are waiting anxiously for the completion of the line. Communication with Brazil and the South American republics is now carried on by way of England, and the cost is about \$3 a word to Rio de Janeiro.

THE cable steamer Faraday is again afloat, after all her mishaps. She passed Gravesend, England, on the 10th inst., and proceeded to sea, having on board the last portion of the new Jay Gould cable. Only a few years ago it was deemed foolishness to attempt such an undertaking except in the finest summer weather, yet such have been the improvements both in cables and appliances that no one seems to regard the fact that this latest attempt is being made in the middle of winter. We wish the Faraday much success.

THE new tariff of the Western Union may be set down as a reduction in rates. The rate for night messages is slightly increased, while there are some marked reductions in the day service. Heretofore the maximum charge on any single message to any part of the United States has been \$2 for ten words; it is now \$1.50. The man who begrudges \$1.50 for a ten-word message from New York to British Columbia, New Mexico or California, would not be satisfied with the same rate to Palestine, and should use the mails exclusively.

ONE of our readers at Williamsport, Penna., writes us at length concerning a telegraph college in his town, and its fraudulent methods of securing students—we had better say of securing the cash of students. They are, of course, only a repetition of the despicable tactics of the average "college," but we have filed away, for future reference, the letter of our esteemed correspondent, who, we hope, will spare no effort to expose the swindlers in his immediate neighborhood.

A YOUNG Chinaman, Chin Chin Chan, who was

studying American customs at Hopkins Grammar School, in New Haven, Conn., utilized his leisure time by practicing telegraphy, and became a tolerably fair operator. He was ordered home, along with a number of other students, last May; and, having become probably too much Americanized, has just been beheaded in his native country. Thus the telegraphic "student question" is summarily disposed of in China.

THERE is to be a telegraphic convention in Buenos Ayres during the exhibition in that city, next month, and the indications are that the Emperor of Brazil will attend, in order to promote a better understanding of the telegraph business in the republics. The land lines of Brazil end at Ceará, where Mr. Gould's cable is to land, and the desire is to have the land lines under a perfect system for better communication with the United States.

THE "bears" have been after Western Union during the past week; basing their action, it is said, upon a bill introduced into the legislature of this State to compel the company to charge a uniform rate of twenty-five cents for each message. Of course, such an unjust measure could never be made to work, and if that is all that scares the holders they might as well hold on to their stock.

IN reply to a Grand Rapids correspondent, we would say that many operators send (and receive) 40 messages an hour for ten hours every day, and keep it up the year round, averaging 400 per day. This would not be considered extraordinary work, and, while such a man would be called a very good operator, he could not be thought an exceptional one.

WE are pleased to see that the Mutual Union has at last gained access to the city of Chicago; and that, after all the wrangling, the City Council of that place has granted permission to the Mutual Union to erect poles in the city until such times as it shall have completed an underground system.

ELECTRICITY has been employed in guarding the remains of the late Napoleon III. In view of the rumors of ghouls at work upon the tomb, the mausoleum at Chiselhurst has been connected with the priest's house by an electric burglar alarm wire.

THE Western Union is rather late in abolishing the absurd practice of sending the check after a message instead of before it, but it is better late than never. It has been done by all line companies for the past four or five years.

THAT "one man in Charleston" has been heard from long enough to circulate the remark that Mr. D. H. Bates is the Oscar Wilde of the telegraph. Well, if one is soup-erintendent the other is stew-too.

WE hear with much pleasure that Professor George F. Barker, of the University of Pennsylvania, formerly of Yale, has been appointed consulting electrician of the Western Union.

THE officers of the Mutual Union say that the presidency of that company has not yet been offered to anybody.

THE LOCOMOTIVE OF 1881-1891.

1881.

Axles groaning, pistons hissing,
Tearing, wearing, bolts all missing;
Rushing hideous through night air,
Always wanting some repair;
Boisterous, blustering, screaming, sooty,
That's the way he does his duty.

1891.

Silent, voiceless, quickly speeding,
Coal or water never needing,
As he rushes thro' the dark,
Showing but a single spark;
Like glow-worm or fire-fly,
Or star twinkling in the sky,
Soundless all his work will be,
Moved by electricity!

—*Railway World.*

More Work for the Telephone Inspector.

In a prior issue we found an irate subscriber to a telephone exchange growling out a complaint, that though he called he received no response; and we followed the inspector through the work of testing for and ascertaining the trouble.

It is proverbial among electrical inspectors that when trouble once commences at any particular place it is invariably well followed up by others. In the words of Sir Boyle Roche, "the greatest of all possible misfortunes is inevitably followed by one which is much greater." So we may, without stretching the bounds of probability, imagine the same much-afflicted subscriber returning, precisely a week from the date of his former complaint, with the contemptuous remark, "That thing worked all right for two days, but it is out of order again."

Courteous manager blandly inquires: "What is the trouble now, sir?"

Irate subscriber: "Oh, I can call you first-rate and I can hear you talk, but I can't make you hear me. Guess you had better take the instrument out, if it isn't going to work any better than that."

Here the manager has a chance to show what he is made of. If he is a judge of "human nature," as Deaf Stapleton used to say, he will let the subscriber talk until he has about talked his indignation away, and then he will simply respond that he will have it attended to at once, or words to that effect. If he is not a judge of human nature, he will try to persuade the irascible gentleman, against the evidence of his senses, that the instrument is all right, and that it was only the said irascible gentleman's inefficient manipulation that was at fault.

But, as a matter of fact, in a case like this, the chances are ten to one that the office operator detected the trouble before the subscriber did, and that by the time the complaint is made, the inspector is already on the ground and examining the instruments.

It will be remembered that the complaint was that, although the subscriber could hear from the central office, he could not make the office hear him.

It is obvious, therefore, first, that the receiving part of the subscriber's apparatus is all right; and, secondly, that the transmitting part is all wrong.

The zealous and thoughtless inspector now invariably jumps to the conclusion that the Blake transmitter needs adjusting, and forthwith opens it, catches hold of the carbon button with his fingers, snaps it vigorously up and down a dozen times or so upon the platinum electrode; then, warning to his work, he pulls out his screw-driver and gives the adjusting screw four turns ahead, and three and three-quarters turns backward, just as if the transmitter was a safe, and four one way and three and three-quarters another was the combination thereof; next he gives the carbon half a dozen more ferocious snaps, closes the door, and after bawling: "How do you get me now?" into the mouthpiece in stentorian tones, reports the affair O. K., and returns to wait for another victim.

Thus proceedeth the zealous and thoughtless! Is that the way all inspectors do?

Not so; yet the picture is not overdrawn, for I have seen the foregoing proceeding fully carried out many times, and am still totally at a loss to imagine the ghost of a reason for the carbon snapping part of it; a feature which with this class of inspector is never omitted.

The zealous, thoughtful and efficient inspector does not take it for granted that the transmitter needs adjustment; and if he discovers, after due investigation, that such is the case, he goes about it in an intelligent manner.

Many of our most promising inspectors, however, are young and inexperienced, and with a hint or two will do well; and, again, the old rule comes in, "Be sure you're right, then go ahead."

Several causes might result in the trouble which caused the complaint, and it might as well be admitted here that its most probable location in this case is, indeed, somewhere in the transmitter. The same symptoms were on one occasion, however, found by myself to originate from a cause completely external to the transmitter.

In the instance I refer to, the trouble was caused by the bad workmanship of the construction fiend, who, seized with a fit of economy, either of double-pointed tacks or elbow-grease, had brought the two line wires leading into the secondary coil of the transmitter together, and then tacked them so tightly down under one staple as to virtually short-circuit the secondary circuit of the induction coil, so that no currents generated in it could pass to the line.

It, therefore, pays to stop and think, before altering a single adjustment, how many conditions might cause such a difficulty as we have under consideration; after which it is time enough to decide what is the condition in the particular case.

Let us remember that a Blake transmitter is a compound instrument. It has comprised in its little black walnut box two distinct circuits—a complete local circuit, passing in from one pole of the transmitter battery to the variable resistance contact, thence to the primary or first circuit of the induction coil, and then out and back to the other pole of the battery; and a portion or loop of the line circuit, which merely comes in, passes through the secondary, outer or fine wire coil, and then goes out again. The current steadily flowing through the primary coils is made alternately stronger and weaker, as the contact between the carbon and the platinum, under the influence of the diaphragm when operated by the sound waves of the voice, becomes firmer or sligher; and at every variation in the strength of the current, a current is set up in the surrounding secondary coil. If there is no electrical current in the primary coil; there can be no currents started in the line coil; therefore, it is evident that a defective battery may cause the trouble.

Following out the same line of thought, we may further reflect that, since a defective battery may cause the trouble, anything which may cause the current generated by a good battery to be interrupted, will also cause the trouble; therefore, a broken wire in the primary or battery circuit will be sufficient to account for the result.

Again, it may be readily seen that if there is any connection between the two battery wires before they enter the transmitter, thus forming a short circuit, cutting off the primary coil and contact points, the effect is the same; the transmitter is still dormant.

Our previously mentioned friend, the staple or double-pointed tack, used judiciously, might, for example, accomplish this effect quite as easily with the primary wires, as we have seen that it did with the secondary wires.

Moreover, the transmitter may be so loosely adjusted that the carbon and platinum contacts do not touch; or the local circuit-closer in the magneto bell may be out of order.

We may, then, sum up as follows: If the receiving telephone works properly, while the transmitter does not:

First—The trouble may either be in the local or primary circuit, or it may be in the line or secondary circuit of the transmitter.

Secondly—If the former, it may either be in the battery itself, in the transmitter, or in that part of the primary circuit which, to be auto-

matically opened or closed, runs through the call bell.

Thirdly—If the latter, its nature can only be that of a cross between the in and out wires; since the telephone, which is in the same circuit as the secondary coil, works; which, of course, it could not do if the wire was broken.

Now, therefore, having seen that so many conditions would all produce the same result, how shall we go to work to find out which condition we have to contend with?

Test the apparatus as soon as you reach it. See if the fact is as stated. Finding that it is; that you can hear the central office operator, but that he cannot hear you, talk to him through the receiver and tell him to wait till you call again.

Ascertain now whether your battery is all right; first, by ocular examination, then by tasting. You may at once see that the wires are eaten away or otherwise severed, or you may see that it is dry. In one case, repair the wire; in the other, wash out the glass and fill up with new solution. Test again by talking, and you will probably find everything all right. Suppose, however, that the battery looks all right; you then unscrew the battery wires, so that you have one direct wire leading from the zinc and one from the carbon, and taste the ends; if, on putting the end of both wires in your mouth, you taste the current fairly strong, you must look elsewhere; the battery is all right. If, on the contrary, you taste nothing, or almost nothing, the battery is most likely the seat of the defect. Clean the zinc; see that the sal-ammoniac solution is strong enough; see that the gas holes in the top of the porous cup are clear, and run them through with a small screw-driver; see also that the connections of the leading-out wires are well made and that there is no white lead round the cap of the carbon. Your battery will, most likely, now work up. If it does not, change the porous cup.

But suppose the battery had proved, both by examination and taste, to be all right, your business is now to find out if the defect is in the magneto bell or in the transmitter proper.

Open the transmitter and see whether anything wrong can be seen; this, by the way, may be done first, as it takes little time and sometimes saves work. You may possibly find the electrodes or contact points apart. If so, carefully adjust them, according to the instructions given in the special article on the Blake transmitter, and again test.

If everything looks right, unscrew the wires from the primary circuit binding screws of the transmitter and, with the telephone off the hook, again taste; it is to be observed that the battery circuit is now longer than when you tasted it before, as it passes through the automatic circuit-closer. If you get the taste again you must look further, the fault is not in the circuit-closer. If you do not get the taste, you have localized the fault, inside the bell box. It can, in that case, only be a bad spring contact or a broken wire, and upon opening the box may be easily found and repaired.

We will suppose, now, that the taste was present and that we must now look into the transmitter for it.

There, if the electrodes are close, as we have already by ocular examination seen they were, the trouble must be a broken wire, an oxidized screw connection, or a defective hinge connection; the adjustment seldom has anything to do with this trouble.

If everything in the primary circuit is in good order, closely examine the secondary wire, both in the transmitter, out of the transmitter and in the bell box, for a cross between the two wires. Any such trouble will generally be found in the local circuit, and the secondary need only be examined when everything else fails to show the fault.

An inspector with a good sense of taste might simply open the primary circuit, first taking the telephone from its support, and taste the two open ends, to ascertain quickly whether the fault was in the primary or secondary circuit.

But as the primary object of this article is the instruction of the junior inspectors, it has been thought well to describe the testing operations at a step by step rate of travel. As a concluding aphorism I would add: Try to find the fault with your eyes, before testing in any other way, or before touching the apparatus at all.

T. D. L.

A Well-Earned Testimonial.

One of the most pleasant incidents of the new year yet recorded was the presentation made by the Western Union operators of Philadelphia to their popular manager, Mr. William G. Jones—a presentation made to him, not as manager of the office, but as a personal friend to each and every employé therein. The proposition thus to give expression to friendly feelings toward Mr. Jones which, as two-thirds of the profession at large know, have characterized the intercourse between Mr. Jones and his subordinates for many years, was made in an entirely impromptu manner; yet, so spontaneous and hearty was the response that within twenty-four hours after the subject had been mentioned over \$300 had been subscribed, and a superb gold watch and chain, with seal attached, were in the hands of the engraver.

The presentation, which was an overwhelming surprise to Mr. Jones, was made in the main office, Tenth and Chestnut streets, on Monday, Jan. 2. On that morning a goodly number of the employés of the company gathered in the main office. There were present all the managers of the branch offices, and all the other members of the operating and clerical forces that could be temporarily spared from their duties.

Mr. John E. Zeublin, the Superintendent of the sixth district, and several personal friends of Mr. Jones were also present by invitation. About eleven o'clock Mr. Jones was sent for, and shortly afterward, all unconscious of anything more than routine business, he entered the room. Eager friends gathered around him, extending the compliments of the season; and, before he could recover from his blank astonishment at the unusual demonstration, Mr. James L. Mingle, one of the oldest "old-timers" in the office, stepped forward and, stating that he had been delegated by his associates for the pleasing duty, presented Manager Jones with the elegant testimonial to which reference has already been made. Mr. Mingle's speech, though brief, was appropriate, and happily gave his astounded principal time to catch his breath, while the manly sentiments so delicately expressed served to increase the enthusiasm. Mr. Mingle said:

Mr. Jones: This may not be the first time you have been surprised. Time brings many surprises, but none so grateful as those which show that our friends not only think of us, but watch for us. The heart is good, but the hand in its warm grasp and movement shows the feeling, the power, the energy of the heart. So, to-day, we, who are associated with you, exhibit our feelings, our affection for you. In this watch you will see embodied the motive power that tells the passage of time—its minutes, its hours, its days and its years—and it is pleasant for us, many of whom have been your associates for so long a period, to testify that in your position you have always treated us honestly, fairly and kindly, and justly deserve our respect and esteem. You will, therefore, accept this watch and chain as a New Year's memento, a slight tribute of the esteem and the attachment had for yourself by those with whom you are so intimately connected. Accept it as a token of our hearty good will, and with our sincere wishes for your future prosperity and happiness. In conclusion, Mr. Jones, permit me to say, in justice to myself and those associated with me, that we have no ulterior object in view. The sentiments uttered but faintly express our feelings toward you, and the gift is presented cheerfully, willingly, and to you as a personal friend, and not as manager of the company. I say this so that you may not feel embarrassed, or in the least degree hampered in your action toward us as manager, on account of this occurrence.

Mr. Jones, in receiving the watch, said:

"Sir: I need not say that this is a complete surprise to me, nor how embarrassed I am in expressing my feelings. I am much gratified, not only on account of the handsome gift, but for the kind manner in which you, sir, have presented it. I shall always remember with pleasure the kind expressions of esteem and friendship with which this beautiful present came to me, and more so as it comes from personal friends and not as a gift from employés to an employer. Again, sir, I tender to you, and through you, to all concerned in this presentation, my heartfelt thanks."

The affair had been managed with such secrecy that Supt. Zeublin, who had been invited to the office, was totally unaware of the project until a few minutes before the presentation.

The gift is worthy of the givers. The works are of the "Elgin" make, and the cases of gold,

extra weight—massive, indeed—and of the latest pattern. On the outside of the front case is Mr. Jones' monogram; on the reverse, the figures "1882," and the cap is suitably inscribed inside—the sentiment expressed in the inscription being doubtless even more appreciated by the worthy recipient than the testimonial itself. The chain is of a heavy, but neat, pattern, with a handsome seal attached.

The entire proceeding was a very gratifying one, and reflects much credit upon all concerned.

Beggary Salaries of the Pennsylvania R. R. Company's Operators.

The remarks of THE OPERATOR on the subject of the starvation wages paid by the Pennsylvania Railroad Company, in connection with its continual slaughter of human beings, of which we are keeping a complete record, has called forth many letters from those familiar with the subject, and from which we make the following selections:

"Annex, P. R. R.," writes: "In 1876, and during the heavy business consequent upon the Centennial Exhibition at Philadelphia, the operators on the 'signal towers' on the Pennsylvania Railroad, Philadelphia Division, received as 'salary' \$41 and \$32 respectively. Early in 1877 this pittance was reduced to \$37 and \$29. It so remained until late in 1880, when it was made \$41 and \$30; and there it now remains. Some few—but very few—offices now pay \$45. Beginning with the Yard Dispatcher's office at Hestonville, and thence to Harrisburg, there are more than sixty signal-tower operators. Fully two-thirds of these work for \$30 per month, and none get \$50, except, perhaps, Lancaster and Columbia, though even these offices did not at a very recent date.

"Dispatchers, operators and others working in Superintendent Prevost's office in Philadelphia receive \$54. They, and they only, work but eight hours. On the P. W. & B. Division some of the men are supposed to work but eight hours, but I was informed by one of them that they more frequently worked sixteen hours, and that they were allowed no extra pay for it. There may be operators on the road who receive \$70, but they are in switch-towers, where they have to do the same amount of work for which other companies pay an operator from \$50 to \$70, with a switchman, at same salary, to help them. On the Philadelphia Division, not satisfied with these 'wages,' the division operator imposes a fine on his men for the slightest misdemeanor. This fine is supposed to swell a fund to be paid to sick operators; but I have never been able to find an operator who received the benefit of it. While sick I myself was compelled to lose three months at one time on account of ill-health, but did not hear from the fund, except that I was notified to remit \$1 in payment of a fine imposed about one week before I took sick, for 'slacking' the Atlantic Express. This is a very poor showing for 'the greatest road in the country,' when the Philadelphia & Reading road, which is in the hands of receivers, pays not less than \$40, and there are no 'signals' to pull; and, consequently, only a fraction of the responsibility on the operators."

"Phono," an employé of the Pennsylvania Railroad, writes: "The truth is that salaries on the main line average between \$36 and \$40 per month, and an office that pays as much as \$50 is exceptional. In the signal-tower offices the pay is mostly \$36 a month, with ten hours as a day's work. There is an office on our division in which the 'operator' reports in the morning at six o'clock, and is on duty until seven or eight P. M., according to the time made by trains. He is then graciously allowed to sleep until midnight, when a night train awakens him, and he is on duty until 4 A. M., and sometimes can hardly get time to get his breakfast. He has often been up day and night. For this service he gets the princely salary of \$31 a month.

"On the small branch roads, the operator is generally freight and ticket agent, and has no regular amount of labor for each day; often working day and night, and no extra pay is allowed, as they are paid by the month and must work whenever called upon. I have worked four days and four nights consecutively without any more sleep than I could steal be-

tween duties, but never received any remuneration for this extra service."

"Western Independence," writing from one of the Western connections of the Pennsylvania Railroad, says: "This company's Western branches have from time to time reduced their operator's salaries so that a night man formerly drawing \$45 per month now receives but \$36 or \$38 for the same service. About a year and a half ago the same company (Pan Handle), with considerable ado, claimed to have restored their men's wages to the old standard. The facts in the case are that an increase of \$2 per month was allowed where there had been a total cut of \$9. When these reductions were made in 1877 and prior thereto it was claimed by said corporation that they could not afford to pay better wages. We will ask where did the \$15,000,000 and over, cash, come from to pay for the P. W. & B. Railroad, recently purchased by the Pennsylvania Railroad, mainly out of the pockets of their employés? The truth of the matter is that when these cuts were made times were hard, and this company having the advantage made the most of it and thereby reaped a rich harvest."

Aerial and Subterranean Wire Ways.

For want of space we have been unable heretofore to refer to the excellent paper read before the New York Electrical Society, Dec. 7, by Mr. H. W. Pope, Chairman of the Committee on Subterranean Lines of the National Telephone Association.

The paper treats of the present method of line construction, the action of various municipal bodies in the direction of legislation to enforce subterranean construction, as well as the electrical and other difficulties to be encountered.

Considerable space was devoted to the question of insulation and the experiences in Europe for the past 20 or 30 years in the use of gutta-percha. Mr. Pope does not advocate gutta-percha, especially for cross-country lines. In water, he says, it is apparently indestructible, but when exposed to air or alterations of climate, etc., it oxidizes and can be easily crumbled into the consistency of dust. Kerite insulation, however, he adds, seems to retain its insulating and durable qualities under the most trying circumstances. He goes on to argue from the experiences in Europe with insulation for underground lines that little faith can be placed in the hundreds of compounds brought forward as a cheap solution of underground complications. Many, it is admitted, will last from three to five years, but their probable failure in this length of time is sufficient to condemn them, especially in systems where the replacing of conductors is an expensive and unnecessary matter.

The description of systems contains nothing sufficiently new to justify a lengthened notice. Mr. Pope stated "that the tendency of the telephone organizations throughout the country had been to improve in the direction of aerial lines, by the introduction of various kinds of aerial cables. By the use of Kerite cables reasonable permanency is assured, and should at any time a change of plan or the construction of a subterranean system become necessary or preferable, they can be utilized. When it is taken into consideration that an aerial cable of the diameter of seven-eighths of an inch can be made to contain eighty or more conductors—the capacity of a more than ordinary pole line—the advantages of aerial construction become apparent."

It is claimed that, with a proper permanent aerial wire way, the introduction of expensive subterranean lines would to a great extent be obviated and that the Scott system might be used to good advantage as a means of distributing wires in combination with an underground system. To one thoroughly familiar with the ramifications of wires in this or any other large city, says Mr. Pope, it certainly seems absolutely necessary that the system to be adopted should combine both aerial and subterranean lines. After what has been accomplished in the way of housetop rights, nothing in that direction seems impossible.

In conclusion Mr. Pope comments on ger of unwise and impolitic legislati-

municipal, and thinks some united action should be taken which will protect aerial lines under restricted conditions, and not render it possible for underground systems to become a monopoly in fact, if not in name. An attempt to prohibit the construction of aerial lines should, he thought, be viewed with disfavor and strenuously opposed.

The paper, though long, was listened to with marked attention, and certainly covered all the points of a much-agitated subject.

Notes and Queries on Electricity and Electromagnetism and Their Applications.

BY T. D. LOCKWOOD.

Practical as far as possible;
Theoretical as far as necessary.

Q. 175.—Describe briefly other switches in use?

A. Many small switches or circuit changers are used for "cut outs," ground switches, battery switches and kindred purposes. They are usually either plug or button switches.

The plug switch is simply two or more brass plates with holes drilled between them, so that by the insertion of a metal plug any two or more plates, with the circuits attached to them, can be connected together.

The button switch consists of a lever pivoted at one end to a screw, to which the main circuit wire is attached, and of any required number of buttons, or contact points, each connected to a screw and branch wire below the base-board, and to any of which the lever may be swung, thus connecting the circuit to the branch required.

Several such levers may be all connected together by an insulated cross-bar, and worked by the same movement; these are called compound switches. Special forms of switch are also used in connection with telephones; these are popularly known by the names of "secrecy" and "automatic" switches.

The first one was devised on the baseless theory that every man would be on the lookout to listen to the conversation of others, and is designed to obviate such occurrences. It consists in devices whereby a telephoner, by turning a lever or a hook, opens or breaks the line in the direction in which he is not about to converse, and at the same time connects a temporary ground, completing the circuit through his telephone in the direction in which he does intend to converse.

The automatic switch is one in which the removal of the telephone changes the circuit from the alarm to the telephone, and is in general use.

Q. 176. What is meant when we speak of a "loop?"

A. A loop is the technical name applied to a wire which branches out from the main circuit to some other point (such, for instance, as a branch office), and returns to the main line again at or near the same point at which it left it. Loops may be either permanently connected to the main line—as when a town is situated a mile or two one side of the main line, and the line wire is led from the main line to the town and back again to the main line on the same poles—or they may be so arranged as to be included in the circuit of any desired line. This is usually the case when the loop starts from an office. It is then led from the switch-board and can easily be switched into any circuit.

Q. 177. What is a lightning arrester?

A. It is an apparatus designed to protect telegraph offices and their instruments and inmates from injury by atmospheric electricity, which, when it charges the line wires, follows them into the offices during lightning storms. If unprotected, the fine wire coils would often be burned and the operators might also be injured, fatally or otherwise. The principle on which nearly all lightning arresters are made is that lightning, being the discharge of electricity of very high tension, or electro-

motive force, will take a short route, even of high resistance, in preference to a longer one of much better conductivity, its chief object being, apparently, to get to the ground by the quickest possible way, no matter how difficult that way may be. It will, therefore, leap over an intervening air space, or force its way through a resistance that acts perfectly well as an insulator to the voltaic current, which is of much lower tension.

Acting on this principle, lightning arresters are frequently made by connecting each wire, as it enters the office, to a screw with a sharp point, and adjusting the sharp pointed screws connected with all the wires as close as possible to, without allowing them to touch, a metal plate, which must be connected to the ground wire. As there is such a short distance between the points and the plate, the lightning, when it enters, jumps over the space and escapes to the ground. Another arrester, much used in country offices, is made by placing two brass plates, connected to the lines, upon a larger brass plate connected to the ground, and separating them only by a very thin sheet of non-conducting material—paper is the most frequently used.

Now, when lightning strikes the wires and enters the offices, it forces its way through the insulating material to the ground plate below, thus escaping.

Q. 178. What is a cut out, and what kind is preferable for a way station?

A. A cut out is a switch or circuit-changing device used in telegraph offices for the purpose of disconnecting the instruments from the line, leaving, at the same time, the line perfect and continuous, so that messages can be sent and received by the offices on either side of the station whose instruments are cut out.

They are of two general classes. First, those in which the instruments are merely short-circuited; that is, a shorter path is given for the current than the route through the relay, by connecting the incoming and outgoing lines by a button or plug. Secondly, those in which the instruments are totally disconnected from the line; that is, when cut out no metallic connection is left between the line and instruments.

The latter is by far the most preferable, as it removes the instruments from all possibility of danger from atmospheric electricity. Where the Western Union pin-switch is used, the instruments may be cut out at night, or, when leaving the office, by merely arranging the pin or pins, so as to connect the two upright bars together, so that the loop to the instruments connected to the cross strips or discs are short-circuited.

This is a type of the first class mentioned. It may, however, be converted to a cut out of the second class by simply placing both of the pins connecting the instrument loop to the upright on the same disc, thus making a short circuit in and out of the office, and, at the same time, opening the wire leading to the instrument.

The most popular and universally employed cut out for way offices where there are but one or two wires is the plug and spring-jack cut out. The plug is a double wedge made of two pieces of brass, separated by a thin layer of insulating material. Each of these pieces is attached by a flexible conductor to one of the instrument wires so that the two together form actually a loop that can at will be inserted into a spring-jack, which is always in the line circuit.

Pen-Pictures of Jay Gould.

"Hermit," writing to the *Troy Times*, says: "Gould leads a hard life. He labors with close application, and is driven by the pressure of his engagements until he may be considered a mere bondman. He has no leisure, no society, no reading, no recreation; but is simply under the whip and spur of necessity. To this has been added the consciousness of impending danger. He has a body guard of detectives to protect him when walking the streets, but he spends most of his time in his office, being as secluded as possible. This sense of danger is certainly very natural. The fact that Major Selover pitched him down stairs into the barber shop shows that personal violence may be repeated."

The veteran, Joe Howard, writing to the *Philadelphia Times*, says: "Jay Gould, a little, insignificant, restless-eyed, full-bearded, queer-headed chap, said to be worth \$300,000,000 on

paper, fond of nobody, dyspeptic and a wrecker. Not ten feet from him stood Ned Stokes, who was sentenced to be hanged for killing Jay Gould's partner. I don't see how Gould can expect to go on depreciating other people's property, ruining homes, despoiling fortunes and generally bedeviling the substance of his fellows, and not get into a scrape sooner or later. He has been whipped, slapped in the face, and thrown into an area, but he never resented the one or the other."

The melancholy crank, J. Howard Welles, does not seem to be singular in his estimate of Brother Jay.

Phosphor-Bronze Wire for Telephones and Telegraphy.

The recent extraordinary development of telephonic communication has given a new interest to the study of the transmission of feeble electric currents over long distances, and improvements in the forms of conductors, both as regards their cost and their physical qualities, are unquestionably necessary. At the Paris Electrical Exhibition, M. Lazare Weiller, of Angoulême, France, exhibited a new form of conductor appearing to possess some remarkable advantages, the conductor consisting of phosphor-bronze wires. As soon as telegraphic systems grew to even moderate dimensions, the employment of copper conductors was abandoned, and iron and steel wires were employed in their place. Another phase of the development appears likely to take place for telephonic systems, in the substitution of phosphor-bronze for steel or iron in the conducting wires. Phosphor-bronze, which has been already used with perfect success for overhead telephone conductors, readily adapts itself to being drawn into wire, and retains in that condition a very high resistance, equal to as much as 76 tons per square inch. At the Paris Exhibition a group of 15 threads of phosphor-bronze wire, each 14-100ths mm. in diameter, supported a block of stone weighing 99 pounds by means of a stirrup weighing 5.5 pounds.

By using phosphor-bronze wire, spans of from 1,300 to 1,600 feet are practicable, as has been abundantly proved in France, and a much less number of supports are necessary than are required for galvanized wire. This alone is a great advantage, as the fixing to supports is not only a matter of considerable expense in first cost and maintenance, but also gives rise to serious inconvenience, as in a majority of cases these supports have to be fixed to private dwellings. The cost of the phosphor-bronze wire is about the same as that of the steel, and as the expense of placing it is much less, a considerable economy is obtained. The increased strength of these wires presents another distinct advantage of special importance for overhead wires in towns, as the chances of accident are largely reduced. Another point of no little importance lies in the fact that the development of overhead lines proceeds so rapidly that the wires begin in many places to form a network, disagreeably conspicuous when wires of large diameter are employed. On the other hand, the fine threads of phosphor-bronze are scarcely visible at a few yards' distance. Finally the fine wires offer less surface to the wind they cannot be loaded with snow or become so heavily coated with ice; the metal is inoxidizable, and when old wires have to be taken down their value is relatively higher than that of iron or steel. For all these reasons the exhibit of M. Lazare Weiller has attracted considerable attention, and there is little doubt that phosphor-bronze conductors will be called upon to play very important part in telegraph and telephonic communication.—*Iron Age*.

A Model Press Circuit.

The leased wire of the New York Associated Press, from this city to Washington, which I frequently attracted wide attention in telegraphic circles, was quadruplexed on Dec. 1, and is now in splendid quadruple working condition. With the tremendous high-pressure for which the wire of the Associated Press has always been remarkable is borne in mind, with the additional fact that copies are taken at Philadelphia and B

more, thus necessitating quadruple repeaters (two full sets of quads) at each of these places, the quadruplexing of this remarkable wire becomes an event in the history of American telegraphy, and a lasting tribute to the enterprise of the Associated Press and the skill of the electricians of the Western Union Telegraph Company.

An association which spends \$200,000 a year for cable dispatches and nearly half a million dollars a year for news collected in its New York office alone (we are indebted to Hon. Erastus Brooks, in an article in the *Mail and Express*, for the figures) will not stick at trifles, and therefore no one need be surprised at the vast amount of work done by its men. Since leasing its own wires and controlling its own operators within its own offices for news from Washington to New York, not counting the words dropped at its offices in Baltimore and Philadelphia, nor the words from the wires of the Telegraph Company, it received in news in

1877—5,480,713 words.

1878—5,804,486 words.

1879—7,414,078 words.

1880—7,210,167 words.

Last year (with November and December estimated) 7,750,000. With the increased facilities afforded by the quadruplex, and the excellent discipline maintained by Mr. Hueston, we should not be surprised to see these figures increased to 12,000,000—a daily average of 34,000 words.

The circuit extends from the general office of the Associated Press in this city to the Capitol at Washington, with the Associated Press offices at Philadelphia, Baltimore and Washington as intermediate offices. This makes three separate circuits—New York to Philadelphia, Philadelphia to Baltimore, and Baltimore to Washington, which are then interlocked by quadruplex repeaters at Philadelphia and Baltimore; but, such is the perfection of the original arrangements and the skill of the operating force, each "side" may be said to work like a single wire, and the work continues uninterruptedly from nine o'clock in the morning until two o'clock the next morning.

In this city, owing to the great number of manifold copies to be taken, two men copy on each "side," and the copy is sent out direct to the papers as received, and without editing, the work being perfect. This is something which has never been successfully attempted before, and is another of the many improvements, of which "the quad" is, so far, the crowning triumph, introduced since Mr. Hueston became the Director-in-Chief of this vast concern.

The operating force requires no comment, and can best speak for itself. It is as follows:

New York—Messrs. W. T. Loper, G. H. Sickles, Walter L. Prentice, W. S. Daniels, J. S. Thompson, Thomas R. Taltavall and L. B. McCarthy.

Philadelphia—Messrs. Wilfred N. Gove, Joseph T. Wilde, H. W. Orr, C. L. Laverty and Edwin C. Boileau.

Baltimore—Messrs. Thomas J. Bishop, Charles F. Habbistoun, Asa Davis, A. M. Frankenburg and J. Doyle.

Washington—Messrs. William J. Landy, William Dyer, Chas. Mixer, — Stevenson, Willis J. ("Bif") Cook and Charles H. Cottrell.

Besides these splendid operators there are a number of telegraphers also in each office, performing duties connected with the press, the General Agent himself, Mr. Hueston, being still an expert operator. Indeed, it is scarcely necessary to note that fact, since no one not a thorough telegrapher, could have dealt so intelligently and successfully with these new arrangements. In addition to other capable subordinates, who can be relied upon as "reliefs" on the wire, the Agents at Philadelphia and Washington—Mr. William H. C. Hargrave and W. P. Phillips, respectively—are expert operators who have left their mark on the profession in times past.

In the *personnel* of the wire we should not forget Mr. Joseph E. Fenn, the electrician, who had charge of setting up this remarkable quad. The difficulties in this case were unusual, and Mr. Fenn not only overcame them in his usual clever manner, but also produced two inventions in doing so to overcome similar difficulties. The latter cannot be mentioned in detail, as they are now being patented, but for the benefit of electricians they may be mentioned generally as interesting facts. The first is a peculiar arrange-

ment of the local circuits, in which, by the addition of but one extra instrument, i. e., a Morse key, the offices at Philadelphia, Baltimore and Washington (main office) can send either north or south as they choose, or in both directions simultaneously. The second innovation introduced by Mr. Fenn is this: All quadruplex circuits of 100 miles length, or under that distance, are very difficult to work, on account of the induced current discharged from the relays in circuit, which grows worse as the circuit is made shorter. By a peculiar and very ingenious arrangement of magnetic coils, Mr. Fenn entirely neutralizes this discharge, and the circuit—especially the fifty-mile line from Baltimore to Washington, which would not quad. at all otherwise—is made perfect.

We are pleased to note these evidences of true progress given by the Associated Press, especially since the ideas, as well as the practical part of it, are principally the work of operators. The Associated Press, in all its perplexing ramifications, has long been an object of admiration and wonder, and more so since Mr. Hueston has brought to it his wide experience, stern discipline and untiring energy. Indeed, we cannot do better than to conclude with the words of that able writer and leader of the press, Hon. Erastus Brooks: The Associated Press daily brings the news of the world to a focus. Differences made by the rising and setting of the sun are the only points of difference in the diffusion of knowledge. New York is as near as London for the reception of the daily record, and the American West, in the courses of light and motion, is further off than Europe and the more distant East. Literally in signs and symbols the press talks at the same moment with the East and West Indies, with Oregon and the British Provinces, with the Old World and the New, and daily brings to every class the important transactions of the world. It is this sort of knowledge, as Burke once said, that has "undetermined superstition," and, in the words of the greatest dramatist, spread "the wings of knowledge whereby we fly to Heaven."

The Telegraphers' Convention.

To the Editor of The Operator:

SIR: Will you allow me to speak to your readers upon the question of organization, or rather the question of reorganization? Many of them either belong or have belonged to telegraphers' organizations, some of which have gone out of existence, others are in a lingering condition, and none of them are in a condition to accomplish that for which they were organized, and why? There are a number of answers to that question, among them the indifference of the members, petty jealousy, and sometimes the dishonesty of the officers of these societies. But a still more effectual barrier to success lay in the fact that these Unions were and are composed but of one branch of the profession—commercial operators, who have never recognized the right of other operators to organize or strive to elevate themselves. They never dreamt that they were each dependent on the other. Now, if the members of the various brotherhoods that exist to-day feel that their association alone will be sufficient to accomplish all that is necessary, they will learn their mistake; and, like the unfortunate "T. P. L." of 1869-70, find out that they have bitten off more than they can chew.

"In union there is strength." Like the strands of the cable, separated each one can be broken easily, but when twisted together and solidified, no power can burst them apart. It is to such an association that I would call the attention of all telegraphers; an association that will expect of its members prompt attention to all the little details necessary for the successful operation of the Union; an organization whose members will stand by each other through thick and thin, through good report and evil report, and do their part of the great work necessary to successful organization. But if we expect to form a perfect Union, we must get together, and when we do get together, we must expect to sacrifice all pet schemes to the good of the whole. I would suggest that the various organizations send delegates to the convention that has been called to meet in Pittsburgh on the first Monday in March. Let them bring the constitutions, by-laws, rituals and work of each

society with them; look carefully over each, pick out the best and burn the rest, and by this means form an organization that will command the respect and indorsement of all members of our profession.

In conclusion, allow me to advocate the claims of Pittsburgh as the place of meeting. It is true that a more central location might have been chosen but certainly none more fitting than the Smoky City, the stronghold and home of all the powerful Trades Unions that exist in the United States—a city that alone has more than a hundred lodges of working men. To be more specific, Pittsburgh has sixty-eight Assemblies of the "Knights of Labor," representing nearly as many different trades, all banded together for their mutual protection; forty lodges of the Amalgamated Association of Iron and Steel Workers, and others too numerous to mention, all in a flourishing condition. What better place could be chosen for a convention of operators, a place that seems to inspire all classes of workingmen to united action. Besides, to choose another place would cause vexatious delay. We all know that this is the most favorable opportunity we have had to come together without fear of official displeasure, and that a more favorable one is not likely to occur in the future.

ORGANIZATION.

PITTSBURGH, Pa.

To the Editor of The Operator:

SIR: The call published in your issue of Jan. 1 for a telegraphers' convention meets with general approval among the operators here. It is doubtful, however, whether this office will be represented. The fact of the matter is, we have no organization like our sister cities, and should any one conclude to attend, he would do so on his own responsibility. Some months ago a gentleman from Kansas City arrived here with his pockets loaded with documents authorizing him to organize a branch of "The Brotherhood." He worked here some time, and when off duty talked considerably on the subject, but didn't seem inclined to start the thing. He finally departed for parts unknown, without having accomplished the work intrusted to him. On account of the numerous changes continually occurring here it would be difficult to place such an organization on a respectable footing. There is no doubt but the convention will do much towards improving the condition of the operators throughout the country, and we would request them to remember their brethren in the Far West in a special manner.

PIONEER.

DENVER, Colo., Jan. 7.

To the Editor of The Operator:

SIR: Permit me to say that I consider the idea of a telegraphers' convention an excellent one, and likely to be followed by good results. Indeed, I think it the only way we can ever accomplish anything toward bettering our condition, financially or otherwise. The many societies now in existence in the different cities, while not amounting to much or doing any great good as they at present are, would, if all combined in one good, strong association (no milk-and-water affair), form what the operators have been wishing for during the past ten years—a good, solid organization.

Regarding the date, I consider it good, as work is slack now and will be until April or May, and the delegates will have no trouble getting off. As for the place of meeting, no better could have been selected. It is a great railroad centre and easy of access from all the cities. The "boys" there are proverbial for hospitality, and, I can assure you, will do everything in their power that will conduce to the comfort and enjoyment of the delegates while in that city.

NEW YORK, Jan. 10, 1882.

A Question for Dispatchers and Railroad Telegraphers.

To the Editor of The Operator:

SIR: Being desirous of having a few time-card points settled, which seem to be taken in as many different ways as a road has dispatchers, I take this method of bringing the question before my brother operators, and invite their or any one else's opinion through the same channel. I will first give the rule relating to the question in dispute:

RULE.—A red flag by day or a red light by night,

borne on an engine, shows that a train is following which has *precisely the same rights* as the engine bearing the signal. An extra train following a regular train, and properly signaled, must always be considered as a part of and to have all the rights of the leading train, and no more.

The question is, in case an engine is running the time of a passenger train and carrying a signal, which train is the regular and which is the extra? I have heard it decided both ways by men who were called good dispatchers.

I claim that the engine bearing the signal is the regular train in every case and that the order of no train dispatcher can change it in any way, so long as the above rule remains on his time-card to explain the meaning of a signal carried on an engine.

I believe a railroad company (to be perfectly safe) should have the same system of orders on every division. I find, however, that they are worded differently on nearly every division of this (the C. & N. W.) road.

The above being among the points, or rules, decided differently on different divisions, I should be glad to hear from the boys on the subject. Don't be afraid of hurting my feelings, for I am no dispatcher and have no time-card record or reputation. J. F. M.

BALATON, Minn., January, 1892.

Echoes From the Wires.

To the Editor of The Operator:

SIR: I trust the interesting telegrams below will have a tendency to strengthen the backbone of telegraphers and thereby stiffen prices. The Western Union management have "beared" the salary market long enough, and it is now high time the operators started a "bull" movement.

To Sup't.—I have been looking for an operator for six weeks. Impossible to find one at the present salary. Please do something.

MANAGER BLANK.

To Manager Blank.—At what salary can you get a competent operator to fill Smith vacancy immediately? SUP'T.—

To Sup't.—There is not a competent operator in this part of the State that I can get at any price, except Mr. Long, who lives here, but says he cannot work for less than \$75 per month.

To Gen. Sup't.—Assistant operator at Kickville, salary \$50, has resigned and left. Manager Blank reports he is unable to fill the vacancy at same salary, but can get a competent man at \$75 per month. Manager Blank is now alone, and it is necessary to provide an assistant operator promptly. Shall he employ the man at \$75? SUP'T.—

To Sup't.—You better employ the new man temporarily at salary named and submit the case by mail for approval, stating why the assistant resigned and what efforts were made to fill his place at old rate. GEN. SUP'T.

Mr. Long was engaged at \$75. UNCLE TOM.
NEW YORK, Jan. 12.

TELEPHONE DEPARTMENT.

The electric light people suggest that the telephone companies use lightning arresters in order to avoid the danger incurred by telephone and electric light wires coming into contact.

Harry Drawbaugh, of Harrisburg, Pa., 15 years of age, and the eldest son of Mr. Daniel Drawbaugh, of People's Telephone Co. fame, fell from a horse he was riding a few weeks ago and died Dec. 28.

The longest wire through which a conversation can be carried on through the Metropolitan Telephone Company is that running from New Brunswick, N. J., to Yonkers or Coney Island, a distance of about fifty miles.

The Leadville (Col.) Telephone Company now operates about 240 miles of wire within a radius of five miles from the central office, and has 800 telephones in use. The officers of the company are the Hon. H. A. Tabor, president, and Allen M. Clay, general manager. Mr. Clay, by the way, was presented by the employees of the company with a handsome New Year's present, in the shape of a solid gold shield badge, with a telephone carved in the centre.

The business of the company has steadily increased since it was established. Experiments were made some time ago in talking to Denver,

a distance of over a hundred miles, but, after an exhaustive trial, it was found that the difficulties presented by the great altitude of the intervening range would prevent the continued and successful operation of a line of that character for commercial purposes, so the project was abandoned.

Messrs. Delano, Richards & Haines, of 55 Broadway, New York, who advertise telephone stocks for sale in another part of this issue, have opened up a new field. We understand that they propose to make a specialty of dealing in all kind of electrical stocks, bringing new inventions before capitalists, organizing stock companies and generally promoting enterprises. They are gentlemen well-known in this line of business, having organized some of the principal district telegraph and telephone companies and having long experience and a large acquaintance throughout the country.

A number of ladies and gentlemen at the Bristol Hotel, London, recently heard by telephone the performance of "La Mascotte" at the Comedy Theatre. The *Daily News* says: "It was a comedy itself to walk into a quiet room at the Bristol Hotel and see the ladies and gentlemen all leaning over tables, elbows down and hands up, holding a black tube-like receiver to each ear. When one joined the ludicrous circle he soon, however, became as absorbed as his neighbors, and did his opera-hearing in right earnest. In the dialogue Mr. Lionel Brough's voice was heard as if he were talking in the room beyond with the door open. The crashing of the chair which breaks under him on the stage was distinctly made out, as well as the roar of laughter which followed the catastrophe, and the subsequent speech in which he is 'down on his luck.' Again the peculiar sound made by him when he discovers he has 'swallowed a caterpillar' was reproduced with comical effect through the telephone, and the laughter in the auditorium had its sympathetic echoes in the Bristol Hotel."

DASHES HERE AND THERE.

Western Union stock is quoted at 78 $\frac{1}{4}$. Last issue it was 79 $\frac{1}{4}$.

A new fire alarm system has been established at Troy, N. Y.

The Canadian Government telegraph line, near Edmonton, N. W. T., has been destroyed by Indians.

If you want to become a telegraph operator send 25 cents to C. E. Jones & Bro., Cincinnati, O., for best-illustrated instruction book.—Advt.

The report of the Board of Trustees of "The New York Electric Light Association," a corporation formed only a year ago, promises a dividend from actual earnings within the next three months.

Mr. Edison suggests a number of submarine lights for lighting up New York harbor at night. As the light will burn as well under water as above it, the plan does not seem to be a very wild one.

The Tribunal of Commerce in Paris has given judgment for the Compagnie du Telegraphe de Paris & New York in an action brought by two shareholders against it for the annulment of the resolution passed in a general meeting in January, approving the treaties contracted with the English cable companies.

The electric light on Chestnut street, Philadelphia, has been materially improved by the removal of the old ground-glass globes surrounding and partly obscuring them. New globes of thinner glass have been substituted with only the lower part of the glass ground, while the upper part is perfectly transparent.

The managers of the Mutual Union Telegraph Company have decided to open a new telegraph office at Sandy Hook, for marine news, as soon as the necessary arrangements can be made. When this is accomplished, reports of the arrivals of incoming steamers off the Hook will be promptly bulletined at the principal offices of the Mutual Union Company in this city.

Van Nostrand's Engineering Magazine now gives a great deal of attention to electricity and its developments. The January number, which is the first number of the twenty-sixth volume, contains a valuable article on the relative

efficiency of the various lamps used in incandescent electric lighting. Published by D. Van Nostrand, 28 Murray street, New York, at \$5 per annum.

The Atlanta, Ga., force consists of J. M. Stevens, day chief in charge; P. Holcomb, chief; R. O. Camp, R. H. Oloston, P. E. Murray, E. E. Williams, A. H. Crist, E. P. Tebeau, R. H. Holmes and R. Rowe. Mr. Herrick is the popular manager. The Atlanta office is a particularly pleasant one to work in, and for that reason there are very few changes among the force there.

The T. M. B. A. issues its assessment for two deaths. That of Charles Henry Patch, who died at Des Moines, Iowa, of consumption, Nov. 22, 1891, will be paid from the surplus. On that for John W. Sanford, who died at Mobile, Ala., of gastric ulcer, Dec. 4, 1891, one dollar is due from members holding certificates up to and including No. 4,036. Insurance expires Jan. 30, 1892, and membership March 1, 1892.

One of the telegraph operators in the Police Central Office in Brooklyn has a performing mouse which lives behind the desk. It comes out from its hiding-place every night, and entertains the operator in the dreary watch after midnight. A wire is stretched over the desk and a piece of cheese is attached to it. The mouse climbs up the rod of a bill file that rests against the wire, and then walks the wire. When it reaches the cheese, it balances itself gracefully upon its hind legs and begins to nibble bits of the cheese, which it removes with its paws. It has never yet missed its footing or fallen off the wire.

The contract for erecting interlocking switch apparatus at Chatham square and at 155th street and Eighth avenue, on the elevated railroad, this city, has been awarded to the Union Switch & Signal Company, of Pittsburgh, Pa. This company, it will be remembered, represents the consolidation of the several corporations owning patents for electric railroad switches, etc., which were merged some months ago. The company, now thoroughly organized, is prepared, as will be seen from the advertisement in another part of this paper, to furnish signal and interlocking switch apparatus for railroads in any part of the country.

The best prepared foods for dyspepsia and nervous prostration are the concentrated and semi-digested extracts from the great life-staples—beef and wheat. They are not intended to take the place of your ordinary diet, but to be taken in small quantities after the regular meals, furnishing additional nerve and brain-building properties not found in sufficient quantity in the food usually eaten. They also assist the function of digestion and assimilation—a one-dollar package supplying the nerve and brain-sustaining elements to an adult for two weeks. Write for free pamphlets. Address The Blanchard Mfg. Co., Food Department, 27 Union Square, N. Y. City.—Advt.

Messrs. Partrick & Carter have just issued a handsome 60-page illustrated catalogue and price list of telegraphic and electrical instruments and supplies. In it they give cuts, descriptions and prices of the various standard telegraph instruments and apparatus, learners' instruments, batteries, line and office wire, insulators, line builders' tools, as well as electric apparatus for blasting, electro-medical apparatus, induction coils, electric bells, annunciators, burglar alarms, submarine cables, fire-alarm telegraph instruments, and everything else connected in any way with the telegraph, telephone or electrical business. The catalogue, which is exceedingly handsome and complete and has evidently been prepared with great care, has been issued for free distribution, and will be sent to any address, postage prepaid, on application.

Messrs. L. G. Tillotson & Co., made a splendid display at the Atlanta Cotton Exposition, just closed. Their exhibition of goods presented an almost endless variety of telegraph and electrical apparatus as well as railway machinery, and was considered as complete, interesting and handsome an exhibit as there was in the Main Building of the Exposition. Messrs. Tillotson & Co. received First Awards on Telegraph Instruments and Apparatus, Electric Annunciators and Call Bells, Gong Bells and Electric Apparatus for Therapeutic purposes, in the electrical line, and several similar

awards on Railway supplies. We congratulate this enterprising firm upon their never-failing energy, and wish them continued success.

The Santa Barbara (Cal.) Press says that a patent has been issued to a resident of Santa Barbara for a method of telegraphing from a moving railroad car. The invention enables each freight or passenger train to have its own telegraph office. Two wires are required instead of one, and these are suspended directly over the track and above the moving train. They are parallel and about eighteen inches apart. One wire is connected with a battery at the station from which the train starts, and the other with a battery at the terminal station. They are so suspended that by a somewhat ingenious arrangement light-running wheels can run along them from one end of the road to the other. The wheels are insulated from each other, but are connected with wires that pass down the roof of the car to the operating instrument, and through it complete to the circuit. As the car moves, the wheels are drawn along on the wires just above it, and a constant current of electricity is maintained between the initial and terminal stations through the moving car. We do not see much prospect of the invention becoming a success.

Be it remembered that, although we may eat heartily at every meal, and of the most nutritious food, if the stomach fails to digest it, and thus prepare the elements to enter the blood, no real benefit is derived. These desirable elements must reach the blood before any increased strength or vitality is experienced. Now, what are we possessors of debilitated stomachs to do for relief? The first step toward this end is to aid the stomach in its work by selecting food that is easily digested and contains in a large proportion the vital, nutritive and healing elements. The irritation of stomach once healed, we have a supply of gastric juice of the proper quality to digest our food and get the necessary elements into the blood. This done, increased strength and vitality are sure to follow. The Blanchard Food Tonic for the nerves and their special line of food for dyspeptics possess all the above desirable qualities, and always give perfect satisfaction. One trial of them will convince the most incredulous of their value. Write for free pamphlet. Address the Blanchard Manufacturing Company, 27 Union Square, New York City.—*Adv.*

The Trinidad, Col., Times of Dec. 27 tells a good story of a young telegraph operator who had just come from the East and accepted a situation at a small station called Morley, near that city. On the second night he was there, a number of old-time telegraphers and railroad men gathered in a room adjoining the telegraph office, and, in language loud enough to be heard by the new operator, began to recount the number of murders that they had each committed, and the exact locality in that vicinity where their many victims were buried, winding up with the wonder that the new operator had not been killed on the evening before, for some imaginary incivility to one of their number. As they began to enlarge upon the seriousness of the offense, the evening train came into the depot. A noise was heard in the telegraph office, and the persons in the adjoining room went to the door just in time to see the operator and a valise disappear. The operator at Trinidad was told to board the train at that point and see if the night operator from Morley was there, and ascertain the reason for his sudden departure. It was found that he had paid full fare to Kansas City, and no inducement could get him to leave the train. He replied that he could do better East; besides, he thought it was much healthier.

The daily papers are handing around an original, even if scarcely true, story. During the last two years, they say, Miss Louise Eib and Miss Laura Jordan, telegraph operators, have worked together in the Western Union office at St. Joseph, Mo. Persons about the office who could not read the tickings of Miss Eib's instrument were puzzled frequently to see Miss Jordan put her hands to her ears. The very inquisitive, noticing that during the quick motions she shoved bits of cotton into the auricular channels, sometimes would ask if anything was wrong, but Miss Jordan would avoid the question. Not until two weeks ago, indeed, was light thrown upon the mysterious movements of the young woman and

the smiling habits of her associate. Then it was revealed that Miss Eib is to be married shortly, that the young man in the case is John Martin, a Kansas City operator, and that the young couple have been making love by wire since 1879. In that year they agreed upon a cipher alphabet, by the use of which many tender sentiments were passed to and fro. Miss Jordan soon caught up the key, however, and that she might not be in the way, kindly stopped her ears. The men in the office often wondered at Miss Eib's thoughtful silence and the happy smiles that completely mastered her as she sat at her operating desk, and now that they know the secret they insist that she shall be married by wire, but, being a sensible girl, she prefers the hand to hand custom.

NEW YORK CITY ITEMS.

Echoes From 195.

Mr. Monroe Labaugh has been appointed Western Traffic Chief, vice Asa Davis resigned.

Chief Tommy Allen says he acquired that sailor gait by reading Dana's "Two Years Before the Mast."

A subscription among the operators at 195 to give the little message girls a New Year's present was suppressed by the assistant manager.

During the races at Saratoga the Western Union had a special race wire, and messages were rushed with extraordinary rapidity. In fact many old-timers remarked that they had never heard such speed before. Messrs. Tierney, Bradt and Mitchell alternated at the New York end.

The eminent theologian, Henry Ward Beecher, with each recurring autumnal season is afflicted with a malady commonly denominated "hay fever." He then betakes himself to the White Mountains until the summer solstice is over. Mr. Howlett, the member from Indiana, is similarly affected, and after a lengthy sojourn in Winnipeg he returns to the all-night forces.

An operator at 195, who had 30 cents taken out of his salary for lost time last month, writes: "I made a memorandum for one day only of the arrival of men from whose salaries nothing is deducted. It was a wet morning, when wires and business were disarranged. The manager arrived at 10:30, the assistant manager at 9:05, and the Eastern chief at 11:15 A. M."

A careful and reliable correspondent says that some of the averages now being kept at 195 are shamefully "doctored." He adds that he recently sent four messages in one batch, which were delayed 40, 45, 72 and 120 minutes, respectively, yet these messages left the office apparently under less than five minutes' headway, the time having been changed by one of the chief operators.

Some very beautiful Christmas and New Year's presents were received by the ladies and gentlemen in the operating room, the gifts being more numerous and costly than on any former year. One that attracted much attention was a large illustrated volume entitled "Struggles and Triumphs of Forty Years' Recollections," and containing the autograph inscription, "To my friend, Geo. K. Walcott, Esq., with the best wishes of P. T. Barnum."

The assistant general circuit manager has gone "o'er moor and fen, o'er crag and torrent," to Lynchburg town to remove the disabilities under which they are laboring.

Charles Edward Frederick Bennett, aged 16, is the youngest operator in the office. He works No. 20 South, the Allentown wire. Young Bennett was born in Nashville, Tenn., but his parents removed to Montreal when he was only two years old, and hence he has a slight brogue—not too much, but just enough to give him piquancy. Nevertheless he claims to be a loyal American. It is rather a singular coincidence that the oldest operator in the office, Col. W. B. Clum, should previously have worked this wire. He is 52, and is at present on the sick list. The Colonel was formerly manager at Halifax and in Boston and for several years chief operator with the A. & P. in this city, but he has suffered on account of the many consolidations, as have many others engaged in this precarious business.

The main reliance, and where the great bulk of the business is done between New York, Phila-

delphia and Washington, and between New York and Boston, is on the printing telegraphs. Messrs. Calvert, Miller and Knittle are on the Boston circuit, which is worked quadruplex. The Philadelphia and Washington circuits are also quadruplexed. Messrs. Edwards, Fullon and Noyes are on the latter. The receiving is generally done by Morse operators, the art being readily acquired by a little instruction. While about 300 messages is considered a good day's work on the Morse system, a printing operator can readily send 700 or more.

Behold me while you can—
An old-time telegraph man.
I work Albany quad;
I'm the girl's body guard—
A good looking Torrance man.

A small and bright young man.
A work-extra-night young man.
I am on Sy,
And considered quite fly—
A Martin Du young man.

I am the good-natured man.
I let the boys off when I can,
And dock them their time
In a way that's sublime—
The T. B. chief operator man.

I'm a would-be chief young man,
A not-come-to-grief young man.
Toledo I work single;
With the chiefs I do mingle—
A transferred A. U. young man

Imagine me if you can—
An 8 to 5:30 young man,
Who works with Detroit
And is very adroit—
A Japanese young man.

SCENE—COAT-ROOM W. U. BUILDING.—Fly Operator to Timekeeper—"Is there no Slope boys working here? No 'Frisco stuff, eh?"

Timekeeper—"Oh yes, we have plenty of good ones from the coast. The late arrivals are Luke McGlew and Harry Idlefoot."

F. O. (contemptuously)—"Never heard of 'em. Must be hams, or else stuffing you about being there."

Old San Fran. Operator (overhearing above and more anxious to gain information about his old pals than to be sociable) accosts F. O. with "Stranger, whar d'ye say you worked on the Slope?"

F. O.—"Bet your life. Just pulled in from Omaha and Ogden. That Utah scenery and climate is just—"

Old S. F. O.—"Yes, but whar on the Slope?"

F. O.—"Oh, the Slope; well, I subbed in Kansas City and Denver a while. They were paying \$95 to first—"

Old S. F. O. (excitedly)—"Hang the salaries! Did you ever work in California?"

F. O.—"No, but I once worked a wire to California, and it was the fastest—"
(But real Californian had sloped down elevator.)

Other City Items.

Gibri House, for Gilsey House, and C. W. Esjpiere for C. W. & J. Pierce, by one of the branch office men.

The night men at 185 Broadway presented Night Manager W. C. Pearce of that office with a handsome gold chain at New Year's.

The New York Telegraph Company, with a capital of \$1,000,000, was incorporated at Albany, Jan. 12. The line is to run from New York to Yonkers, with stations within 30 miles of the line.

Mr. Ed. Murphy, for a number of years manager of the Western Union office at Eighth avenue and Fourteenth street, has resigned to accept a more lucrative position with a prominent broker firm in Broad street.

Seventy-five nice, fat turkeys, averaging 11½ pounds each, were distributed by the Mutual District Telegraph Company among its messengers on New Year's, to reward special, meritorious services during the busy holiday season. On the two days preceding Christmas the messengers of the Mutual District Company delivered over 17,000 Christmas packages, and, of all that number, only one has not been accounted for.

The Gold and Stock Life Insurance Association's annual meeting was held on Monday, Jan. 9, in Room 48, W. U. Building. The reports of the secretary and treasurer were read, showing a considerable increase in the reserve fund. An

important amendment to the constitution was passed, after which the election for officers for the year 1882 took place. After a somewhat exciting contest, the following officers were elected: President, Chas. S. H. Small; Vice-President, J. E. Hamilton; Treasurer, Carl Winkel; Secretary, Daniel E. Pike. Additional members of Executive Committee: Michael Breslin, Waldo H. Collins, Robert Carter, M. W. Doran and Maurice Brick.

Aaron Platt, twelve years old, a messenger of the American Rapid Telegraph Company, pleaded guilty in the Special Sessions on the 9th inst., of destroying nine messages that had been entrusted to him on the 1st inst. The counsel for the lad said that his client had a large number of messages to deliver on that holiday, and when all but nine of these had been taken to their destinations the boy sat down on a stoop to rest. He fell asleep, and when he woke up it was late at night. Unable then to deliver the messages, he tore them up and went home. He afterward confessed. The confession availed him nothing, and a thick-headed judge sent the child to the Juvenile Asylum for one month.

It does not always pay to be too utterly too-too enthusiastic over your employer's business. A call for an American District Telegraph messenger was sent from the White Elephant restaurant, Broadway, near Thirtieth street, shortly after 10 o'clock on Saturday morning, the 7th inst. A couple of minutes afterward two boys attached to the office at Broadway and Thirtieth street rushed into the place at breakneck speed. Each was trying his best to outrun the other. They reached the cashier's desk almost simultaneously. They were directed to the restaurant, where a gentleman was waiting to give his instructions. Like a flash they turned to the right and dashed toward the restaurant, the door of which is about midway of a walk overlooking the bowling alley, and at the end of the walk is a French plate mirror, about twelve feet high and eight wide, extending from the floor to the ceiling and the width of the walk. In the exciting race to get the message the boys failed to notice the restaurant door, and dashed pell mell into the mirror, shattering the lower portion of it, and cracking it through the middle from floor to ceiling. No. 617, J. Nolan, aged 16, struck the glass first with his knees, and No. 92, F. Collins, aged 14, ran against his comrade. Neither boy was much hurt. The mirror cost about \$800. The combined assets of the two boys are about eleven cents.

PERSONAL.

E. H. Smith has been appointed train dispatcher of the Yellowstone Division, with headquarters at Glendive, Mont.

Mr. J. L. Hall of the Williamsport, Pa., A. U. office, has been appointed manager of the Wilmington, Del., W. U. office.

E. C. Greene, late manager of the A. & P. Tel. Co., Lafayette, Ind., now holds a similar position with the W. U. Tel. Co., at Bismarck, Dak.

Messrs. Chas. F. Bartlette, Ed. Altemus and J. I. Linehan, late of the W. U., have accepted positions with the Mutual Union at St. Louis.

E. P. Delano, formerly of the W. U. Telegraph Co., Chicago, has accepted a position as manager for the same company at Miles City, Mont.

Mr. Ed. G. Young, operator superintendent's office, Williamsport, Pa., was married on Christmas Day to Miss Mary P. Ayl, of Sunbury, Pa.

William Fitzgerald, train dispatcher G. R. & I. R. R., Grand Rapids, Mich., was presented with a Christmas present in the shape of a fine boy.

Miss Lizzie A. Williams has been appointed manager of the main office recently opened by the Great North Western Telegraph Company at Farnham, Que.

N. D. Root, formerly of the Michigan Central Railway, has recently been appointed chief dispatcher of three divisions, Northern Pacific Railway, at Brainerd, Minn.

Mr. Jed. G. Blake has resigned the management of the Glens Falls, N. Y., W. U. office, to take charge of the Burlington, Vt., office of the Mutual Union Telegraph Company.

Missouri Division, Northern Pacific Railway. He was formerly train dispatcher of the Michigan Central Railway, at Jackson, Mich.

The Mutual Union and Eastern Telegraph Company opened for business at Portland, Me., Jan. 2, with Mr. A. C. Preble, formerly manager of the A. U. Company, same city, in charge.

John L. Fuller has resigned his position as manager Nor. Pac. Railway office, Bismarck, Dak., to accept a situation as cashier freight department same place. His successor is W. L. McCracken.

Mr. George S. McCord, manager G. N. W. T. Co., Bathurst, N. S., died suddenly Jan. 4, at Sackville, while consulting a physician there in reference to his health, which had been poor for some time back.

Miss M. A. Pillsbury, for twelve years Manager Western Union office at Belfast, Me., has resigned, and entered the service of the American Rapid in Boston. She is succeeded at Belfast by Mr. P. J. Feeny, of Portland.

Mr. D. C. Batchelor, formerly train dispatcher of the Pittsburgh & Lake Erie Railroad, has been appointed assistant master of transportation on the same road. Mr. L. Stewart succeeds Mr. Batchelor as train dispatcher.

Mr. Charles Russell's many friends in Grand Rapids are glad to have him back again from his long trip "all over." He is filling the vacancy in the train dispatcher's office made by the transfer of Mr. McMasters to Cadillac, Mich.

Daniel Francis, formerly chief operator of the Western Union office in Chicago, died in that city on Sunday morning, the 1st inst., from small-pox. He was taken sick in the operating room on the previous Wednesday morning.

Mr. Frank L. Thirkield, manager of the Baltimore (Md.) Mutual Union office, was the recipient, Dec. 31, of a beautiful gold-headed cane and a fine silk umbrella from the employees of the company. Mr. Lee Andrews made the presentation speech.

A complimentary supper was given to Assistant Supt. Armstrong, of Denver, on his retirement from the business, Jan. 1. Chas. M. Reed, of Denver, has gone to Los Angeles. J. J. Baker, formerly manager of the A. U. at Leadville, Col., has been placed in charge of the U. P. office at the Union Depot, Denver.

Mr. J. E. Johnson, formerly operator and extra agent on the Great Western Railway of Canada, now holding the position of ticket agent on the Northern Pacific Railway, Bismarck, Dak., has gone East to wed Miss Lizzie McConnell, who is working for the Montreal Telegraph Company in Toronto.

Mr. J. F. Hingerty, operator Union R. R., Baltimore, Md., died in that city Dec. 26, of consumption. His genial manner and kind heart endeared him to all who knew him, and he was the life of the Union R. R. The floral tributes were many and handsome, including a pillow and large cross of roses from his associates.

Mr. G. A. Snyder, General Manager's office G. T. Ry., Montreal, Canada, has kindly consented to act as agent for THE OPERATOR and also for the books we publish. Operators at any point on the Grand Trunk Railway can send their orders and remittances to Mr. Snyder, which will have prompt attention at the same rates as if sent direct to this office.

On Saturday, the 7th inst., Mr. John P. Baur, Night Manager of the American District Telegraph Company, was shot twice in the face and seriously injured at the office of the company, corner of Tenth and F. streets, Northwest, Washington, by Henry Roeth, aged about 16 years, a messenger in the employ of the company, whom he had previously discharged for disorderly conduct. Roeth was immediately arrested.

Mr. Mike Connelly has been appointed day chief at Houston, Tex. Mr. Patton, who has just returned from his bridal tour, can be found at his old post. Mr. Gibbs, from Hot Springs, works the Galveston quad. Mr. Eugene A. Randall has resigned and gone to St. Louis. Night Chief Henry Stansbery is as popular as ever with the "owls." Messrs. John D. West, A. S. Cross and J. H. Mill have been added to the night force.

Union office at Cincinnati, died at his residence in that city, of typhoid pneumonia, on the 5th inst., after one week's illness. He was on duty all day on Wednesday, Dec. 28, and was taken ill that night. He was about 40 years of age. He was an elder in the Walnut Hills Presbyterian Church, and had a high standing as a private citizen and as a man of strict business integrity. He leaves a wife and three children.

The operator at Annapolis, Md., found business so lively when the legislature convened there Jan. 2, that he asked for an additional assistant or an increase of pay. Both being refused, he resigned. The young man who was left in charge was completely overwhelmed with newspaper and other messages, and found the job too much for him. Had it not been for the kindness of Mr. J. Frank Morrison, of Baltimore, in coming to his assistance, business would have been seriously delayed.

A correspondent complains that the alleged members of the Brotherhood of Telegraphers of St. Louis don't attend the meetings in sufficient numbers to form a quorum. He adds that many of the operators employed on the various railroads running into that city are anxious to become members of the Brotherhood, but cannot on account of the lack of a quorum present. Some of the members of the order in Chicago would do well to run down to St. Louis and stir up the operators there a little.

Mr. H. A. Washburn, operator to Supt. Furber of the B. & M. R. R., Boston, while returning home, at Reading, Pa., on the evening of Jan. 4, was assaulted and sustained severe injuries about the head, being dragged some distance by a rope around his neck. Robbery is supposed to have been the motive, as his object in visiting the company's office was to receive money due him. His assailants, however, failed to get any plunder, as the money which he drew was not on his person at the time of the assault. Washburn, who at last accounts was unconscious and very low, has but one arm, and has always been considered a temperate and reliable man of good habits.

ROCHESTER & PITTSBURGH R. R. ITEMS.—Mr. H. S. Henderson is day dispatcher and superintendent of telegraph, and Mr. F. R. Swain, assisted by Mr. F. S. Herrick, is night dispatcher. Mr. C. D. Harvey, formerly operator at Machias, has resigned his position to accept a more lucrative one as train dispatcher on the B. N. Y. & P. R. R., Buffalo. Mr. Kennedy, of Lockport, succeeds Mr. Harvey and works nights. Mr. F. W. Thomas is the day man. Mr. G. H. Westinghouse, agent and operator at Gainesville, has resigned and accepted a position with the N. Y., L. E. & W. R. R. at Salamanca. Mr. W. G. Conschaffer, of Caledonia, N. Y., is his successor. Mr. McHugh, of Pavilion Centre, has also resigned. He is succeeded by Mr. Tarbell, formerly of the Franklinville, N. Y., A. U. office.

WASHINGTON NOTES.—Arrivals: Scheibley, from New York; Burke, from Pittsburgh; Crawford, from Mutual Union. Departures: Fred. Mareau, with Baltimore Times; Johnny Vowles, gone to Chattanooga. Other departures (gone but not forgotten): Whepley, Braulik, Painter, Concannon and Ives (all government men), peremptorily relieved on Saturday. Orders from New York. Keep it dark! Let it go no further! Another lucid (?) explanation is now needed from J. M. Field. Burke and Crawford fill two of the vacancies caused by the withdrawal of the government men. Washington branch of "Telegraphers' Union" has accepted "the call" and will send delegates to Pittsburgh. Hint from the J. M. Field letter: "If you and your charitable (?) Brotherhood do not like our working in the W. U. office, you can get right out; there are plenty of telegraph offices east of the Mississippi that you can fill." Query: Are the government operators referred to now looking for these positions east of the "Father of Waters?" Let the band play!

A Portland, Me., correspondent calls attention to a case of bravery and real practical heroism, that reflects credit alike upon the principal actor in it and upon the profession of which he is a member. The correspondent says: "Mr. Samuel A. Roberts, operator at the B. & M. Transfer, was on the B. & M. train that was wrecked on Monday, Jan. 2. Although injured very badly, by the

engine (which passed over the bridges all right), and went to Kennebunk, three miles this side of the wreck. There he sat for half an hour telegraphing the news to the officials and asking for help for those injured. He sat in his chair before the clicking instrument, and sent distinctly and with great care until he fell down in a fainting fit and was carried to the house of Mr. G. C. Farnham. Doctors attended him, and at 7 P. M. he was sent to the hospital in this city, where he remained two days, and was then taken to his home in Lawrence, Mass. Mr. Roberts is a first-class operator. Such noble acts should be remembered and rewarded."

MOUNTAIN DIVISION U. P. RAILWAY.—At Cheyenne we find O. F. Annett, chief operator; Andy J. Borie, chief train dispatcher, assisted by Messrs. O. Finnegan and Ed. J. Duffey, working eight-hour tricks. Geo. A. Guertin is dispatcher's operator. At Hillsdale we find C. W. Cowdin, agent (always out of luck). Pine Bluffs, W. W. Beck, days, with Geo. Atkinson (late of C. B. & Q.), as night owl. At Sidney, W. Smith, days; W. M. Woods (old wide-awake), nights. Lodge Pole, F. C. Rodgers, agent. At Denver Junction, new air-line division, Uncle Geo. Wilson, acting dispatcher, days, with Heath, night owl. At Alkali, we find the great walker, Tim. O'Leary. At North Platte, the east end of the division, Mr. Robinson, days; Mr. Renick as owl. West from Cheyenne, at Colorado Junction, J. Blakely, days; Geo. B. Howard (Tenderfoot, from the N. Y. C.), nights. At Otto, C. Lawton. At Granite Cañon, W. P. Dinsley, days; F. Smith, owl. At Sherman, P. J. McIntosh, days; Judge Gibbons (Chief of Police and President Hook and Ladder company), as night man. At Laramie, the west end of division, we have Johnny Clark, Hays and a new addition, Mr. Stewart. **BOOMERANGE.**

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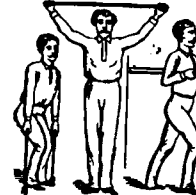
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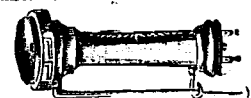
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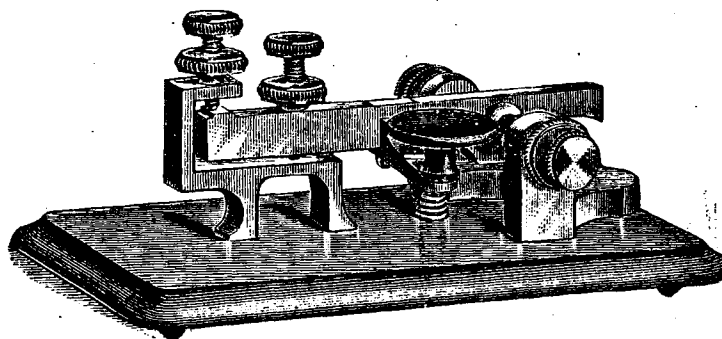
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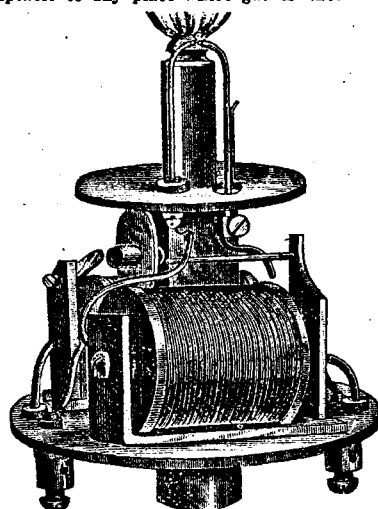
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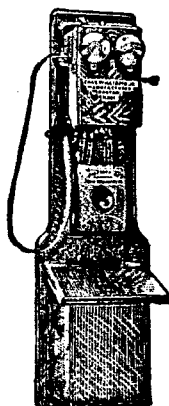
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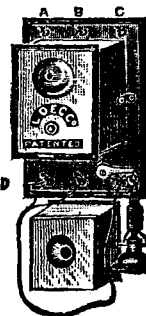


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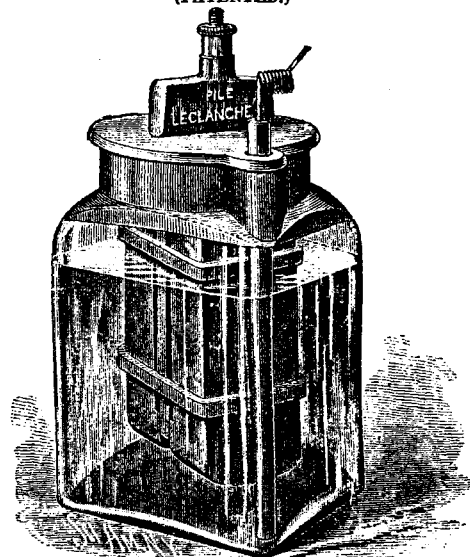
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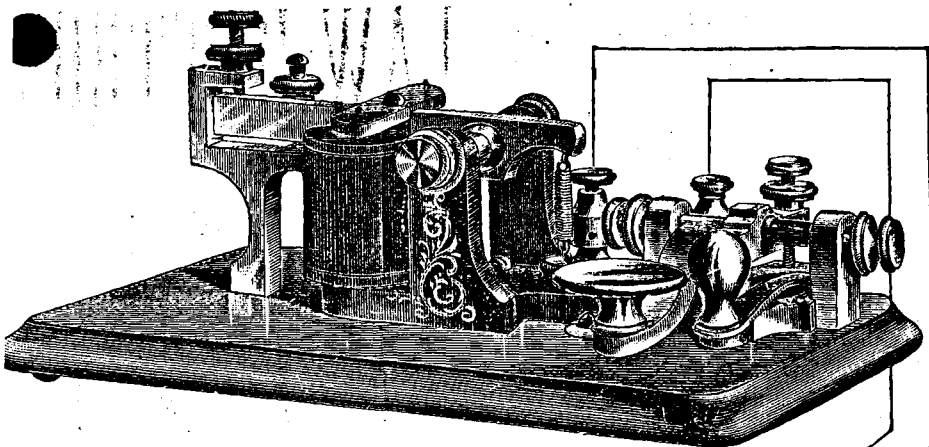
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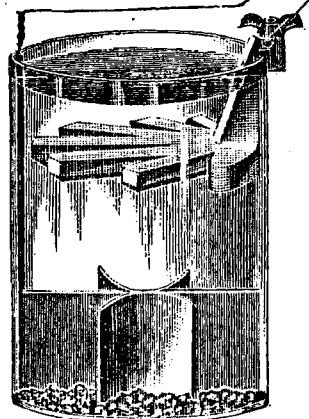
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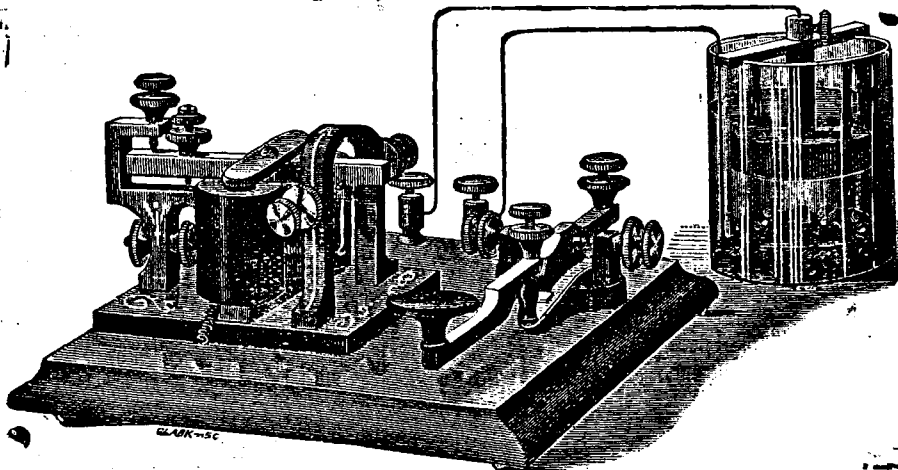
CUT-OUT AND GROUND SWITCH COMBINED.

Guaranteed the best and cheapest in the world. Price by mail, \$1.25.

Premium Learners' Apparatus.

ONLY \$5.00.

Not the Cheapest, but Guaranteed the Best!



The PREMIUM LEARNERS' APPARATUS and OUTFIT comprises the famous "NEW GIANT SOUNDER, PERFECTED," and the "NEW CURVED KEY," placed upon a splendidly polished base, with a cell of Callaud Battery, Chemicals, Office Wire, and an excellent Book of Instruction, for \$5.00, when the money accompanies the order.

These instruments are the exact size and form of those upon which we received the highest award at the late Centennial Exhibition over all competitors. Everything reliable, and so guaranteed, or money refunded. Our Book of Instruction contains full and explicit information as to setting up the Battery, running of wires, etc.

Price, Complete Outfit.....	Money in advance, \$5 00
" Instrument without Battery.....	" " 4 20
" " wound with finer wires for lines of one to fifteen miles..	" " 5 00
" Cell of Battery, Complete.....	" " 80
" Instrument without Battery, by Mail.....	" " 4 75
" Premium Sounder, Separate Base.....	" " 2 50
" Key.....	" " 1 75

All orders will receive our prompt and careful attention. To prevent delay in shipment, full shipping instructions with town, county, and State, should be given. Remittances should be made by P. O. money order, registered letter draft or express, which will insure safe delivery. No goods sent C. O. D.

Send stamp for catalogues, price-lists, etc., for Telegraph Instruments and Supplies, Electric Bells, Electro Platers Supplies and every description of Electrical Apparatus Manufactured.

SEND FOR OUR PRICES BEFORE PURCHASING ELSEWHERE.

PARTRICK & CARTER, 114 South Second St., Philadelphia, Pa.

THE LAW BATTERY.



The first open Circuit Battery in the world and the cheapest.

Combines all the advantages of the best of the others, without any of their disadvantages.

Thousands sold monthly. Send for circular.

Manufactured and sold by the LAW TELEGRAPH CO., 140 Fulton street, New York.

A Call for a Telegraphers' Convention.

To Telegraphers of the United States and Canada:

GREETING: The undersigned, two of the Committee appointed at a meeting of the Commercial and Railroad Operators of this city, were authorized to issue this call for a Convention of Telegraphers to be held in the city of Pittsburgh, on the first Monday in March, 1882, for the purpose of forming an International Telegrapher's Organization, having for its object the amalgamation of all existing Telegraphers' organizations into one grand Brotherhood; the securing to ourselves of a proper share of the wealth that we create, and more of the leisure that rightfully belongs to us, so that we may have more time for social enjoyment and intellectual improvement; to secure for both sexes equal pay for equal work; and to avert the evils arising from the promiscuous teaching of our profession, and such other objects as may be agreed upon.

In order to secure a representative body, we have thought it best that each city, town and division of railroad should be represented by one delegate, and one additional delegate for every fifty operators employed therein. By this method it is hoped that the fraternity will be satisfactorily represented.

In conclusion, we earnestly appeal to the fraternity to give this matter their very careful consideration; and to represent themselves in the Convention by men authorized to take definite and decided action.

The telegraph operators of Pittsburgh will make every effort to provide for the entertainment and comfort of the delegates during their stay in the city.

We desire to hear by letter from telegraphers generally on this subject. All communications will be treated, if so desired, as confidential.

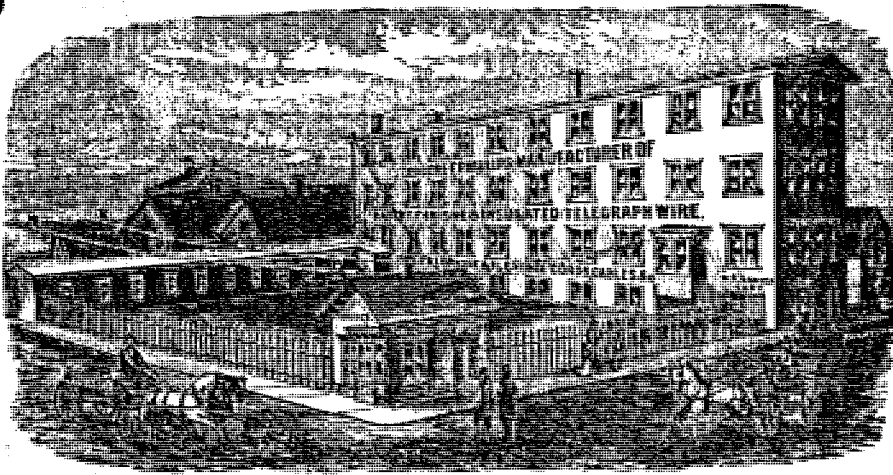
By order of the Committee,

JNO. CAMPBELL, Chairman.

THOMAS H. HUGHES, Secretary.

Pittsburgh, Pa., Dec. 19, 1881.

Address, Lock Box No. 839, Pittsburgh, Pa.

EUGENE F. PHILLIPS,**PROVIDENCE, R. I.**

MANUFACTURER OF PATENT FINISHED

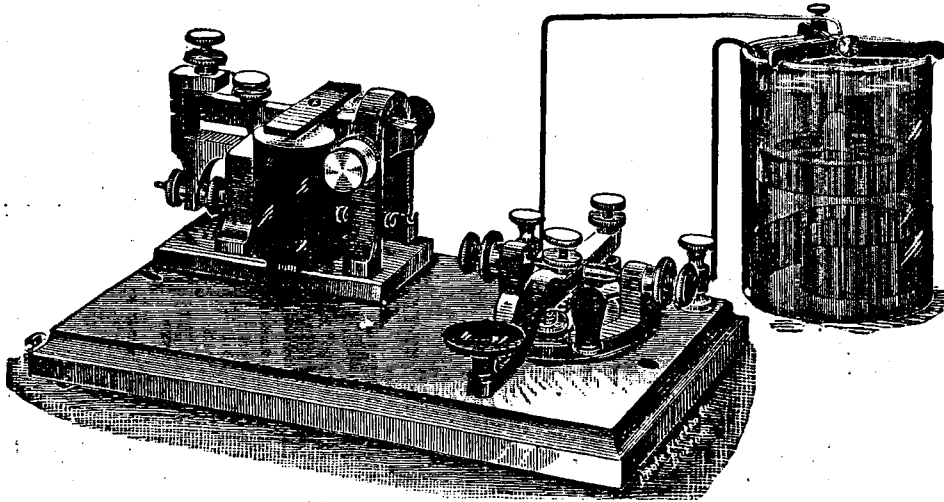
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TELEPHONE AND ELECTRIC CORDAGE.

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W. H. SAWYER, Electrician and Superintendent.

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PRICE FOR THE COMPLETE "GEM" LEARNERS' OUTFIT, \$4.20.

Consisting of the above large-sized Sounder and Key, a good Cell of Callaud Battery, one roll of Office Wire, Book of Instructions, Chemicals, etc. The only low-priced Learners Instrument made that has nicely finished BRASS Sounder and Key lever, with perfect adjustments for both.

Price for Complete Outfit.....	\$4.20	Price for Instrument alone, by mail, post-paid.....	\$4.00
Instrument alone.....	8.40	Instrument alone, for lines 1 to 15 miles.....	4.00
the whole outfit (except Glass Jar) with Key		Price for Instrument alone, for lines 1 to 15 miles, by	
and Sounder separate, by mail, post-paid.....	4.80	mail, post-paid.....	4.50

SEND FOR CIRCULAR.

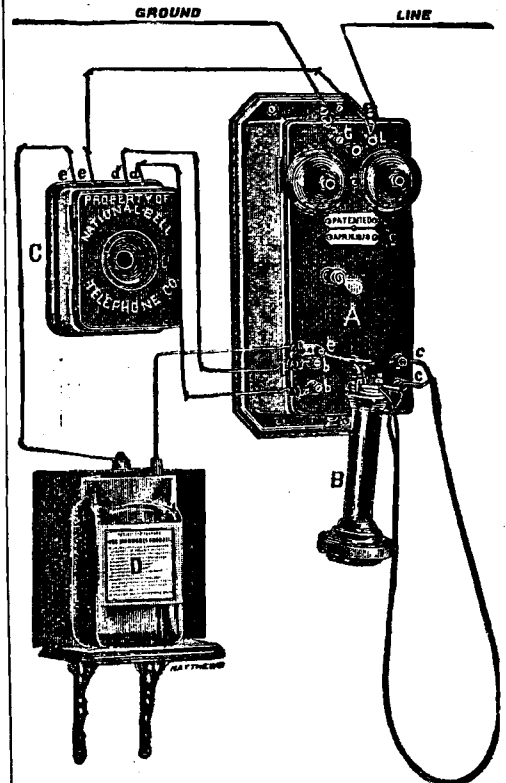
JEROME REDDING & CO.,

Manufacturers of Telegraph and Electrical Supplies,

No. 30 Hanover Street, Boston, Mass.

The American Bell Telephone Company.

W. H. FORBES, President. W. R. DRIVER, Treasurer.
THEO. N. VAIL, General Manager.



This Company, owning the Original Patents of Alexander Graham Bell for the Electric Speaking Telephone, and other patents covering improvements upon the same, and controlling, except for certain limited territory, under an arrangement with the Western Union Telegraph Company, the Gold and Stock Telegraph Company, the American Speaking Telephone Company, and the Harmonic Telegraph Company, the patents owned by those companies, is now prepared to furnish, upon application, either directly or through any of its agents, Telephones of different styles, and applicable to a variety of uses.

This company desires to arrange with persons of responsibility for establishing

District or Exchange Systems,

In all unoccupied territory, similar to those now in operation in all the principal cities in this country.

Responsible and energetic persons are required to act as licensees for the purpose of establishing

PRIVATE LINE AND CLUB LINE

systems, for business or social uses. Also to introduce the telephone for

SPEAKING TUBE

purposes, for which instruments will be leased for a term of years at a nominal rental.

This Company will arrange for telephone lines between cities and towns where Exchange systems already exist, in order to afford facilities for personal communication between subscribers or customers of such systems.

We respectfully invite attention to this matter, and any further information relating thereto can be obtained from the Company.

NO. 95 MILK STREET, BOSTON, MASS.

All persons using Telephones, not licensed by this Company, are hereby respectfully notified that they are liable to prosecution, and for damages for infringement, and will be prosecuted accordingly to the full extent of the law.

WESTERN ELECTRIC MANUFACTURING CO.

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Telegraph and Telephone Apparatus and Supplies.

THE BEST OF EVERYTHING AT BOTTOM PRICES.

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ORIGINAL AND ONLY MANUFACTURERS IN THE U. S. OF
**GUTTA PERCHA INSULATED
ELECTRICAL WIRES AND CABLES**

OF EVERY DESCRIPTION, FOR
**Telegraphic, Telephonic and Electrical Lighting.
Gutta Percha Insulated**

SUBMARINE CABLES.—50 Regular Sizes—One to ten conductors.

SUBTERRANEAN CABLES.—Any number of wires, hempen-armored covered.

AERIAL CABLES.—Any number of conductors; any desired insulation; lead or hempen covered.

LEAD-COVERED CABLE.—Any desired insulation; any length covered continuously without a break.

ANTI-INDUCTION TELEPHONE (Lead-Covered) CABLES.—As used by the Metropolitan Telephone & Telegraph Co.

TORPEDO CABLES.—One to four conductors. Recommended and in use by the United States, European and South American Governments.

MARKS' COMPOUND INSULATED WIRES.—For office, outdoor, underground and battery use.

G. P. OFFICE WIRES.—For all electrical purposes; cotton or tape covered and saturated if desired.

FUSE, LEADING AND CONNECTING WIRES.—For submarine and subterranean blasting.

ALWAYS HAVE ON HAND:

Wires of Every Variety of Insulation,

Burglar Alarm and Annunciator Wires,

TELEGRAPH, TELEPHONE AND ELECTRIC LIGHTING WIRES, CORDAGE AND CABLES
OF EVERY DESCRIPTION.

COPPER MAGNET WIRES, { Perfect Insulation,
Highest Conductivity,

GERMAN SILVER RESISTANCE WIRE,
TELEPHONE FLEXIBLE CORDS, MEDICAL CORDS,
FLEXIBLE ELEVATOR CABLES, { Any number of
Conductors.

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PURE GUTTA PERCHA GOODS.

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NEW YORK CITY

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THE GAMEWELL Fire-Alarm Telegraph Company.

PROPRIETORS OF
THE "OLD AND ONLY RELIABLE"

AMERICAN FIRE-ALARM TELEGRAPH,

which has been in successful operation for more than a quarter of a century, and has been thoroughly tested and approved by

Over 110 of the Leading Cities in the United States and Canadas.

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OTIS T. PETEE, New York, Treasurer.
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B. S. CLARK, New York, Counsel.

The GAMEWELL FIRE-ALARM TELEGRAPH COMPANY continues to contract with cities and towns for the construction of this

Invaluable Adjunct of Every Well-Regulated Fire Department.

THIS IS THE ONLY

PERFECT, COMPLETE AND RELIABLE SYSTEM of Fire-Alarm Telegraph in the World.

WHAT IS SAID OF THE GAMEWELL SYSTEM.

From a very large number of testimonials on file we select the following, as sufficiently evidencing the high estimation in which the American fire-alarm telegraph is held by those who have fully tested its practical working:

BOSTON.

I take great pleasure in adding my own testimony to the great value and success of the telegraph fire alarm; and I feel confident in saying that wherever once tried it will thereafter be deemed indispensable.

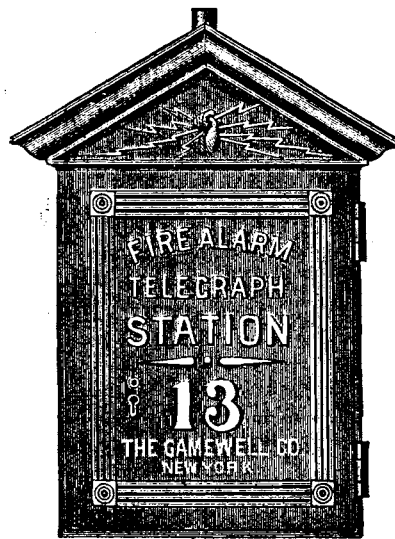
ALEX. H. RICE, Mayor of Boston [1856].

ST. LOUIS.

The superintendent of the fire-telegraph of St. Louis, in his report for 1860, says:

"A comparison of the two years' working of the department, prior to the establishment of the electric alarm, with the two subsequent ones, shows the following results: From April, 1856, to April, 1858, there were 508 alarms, of which 175, or nearly one-third, were false.

"The losses by fire during the same period show greatly in favor of the last two years. From 1856 to 1858 the amount of losses was \$1,803,315 against \$710,404 from 1858 to 1860, showing a diminution of \$1,092,911, or a sum equal to \$548,955 annually; and, on the principal that prevention is better than cure, we claim for the fire-alarm telegraph a large share of the credit in saving that amount."



TWENTY-ONE YEARS LATER.

The same official in his report for 1881 says:
"In 1858, when the Electric Telegraph, as applied for fire alarm purposes, was in its infancy, the nucleus of the present system was introduced into this city. It was accepted by the authorities with considerable misgiving as to its practical utility, and it was looked upon generally as an experimental adventure, involving quite a sum of money. As time passed by, however, it gradually began asserting itself; skepticism as to its practical value faded little by little, until finally, guided by scientific research and mechanical improvements, it stands before the world to-day as being one of the most valuable achievements of man."

ALBANY.

In this city we would much prefer to have four steamers with the telegraph than eight steamers without it; and the same will hold good in any city. JAS. H. McQUADE, Chief Albany Fire Department.

The fire-alarm telegraph is in complete order, and has worked most satisfactorily during the year. In fact, it has never failed since its construction. It is a most valuable auxiliary to a fire department; for, in truth, without it, it would be unable to maintain the high degree of efficiency shown in our organization. Always reliable, the citizen feels assured that within a few minutes after the discovery of a fire the means will be at hand to extinguish it.—Report of Albany Fire Commissioners, 1874.

MONTREAL.

As the simplest illustration of its great value, we have the fires and loss for a fair average year, before and since its introduction.

Before, 85 fires.....	\$140,088 loss.
Since, 99 fires.....	35,428 loss.

A. BERTRAM, C. E. F. D. [1866].

The cost of construction will, of course, depend upon the amount of apparatus required and the extent of territory to be covered. But we have placed the prices of fire-alarm telegraph within the means of all towns, either large or small, willing to expend from \$500 upward to tell their Fire Department on the occurrence of a fire instantly and exactly where it is.

Full and detailed information given on application, personally, or by letter, to the Headquarters of the Company.

Or to MOSES G. CRANE & Co., 267 Washington Street, Boston, Mass., Agents for New England States.

POST & CO., Cincinnati, O., Agents for Central Division.

E. B. CHANDLER, 118 La Salle Street, Chicago, Ill., Agent for Western Division.

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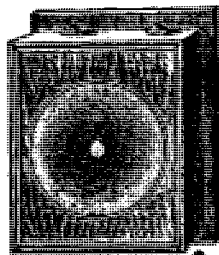
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Also AUTOMATIC TELEPHONES for short lines. Price \$5 per set. Wire 3 cents per rod. Beware of imitations and infringements. Illustrated Circulars, FREE. [Mention THE OPERATOR.]

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**COMPLETE SETS OF
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Wire Stranding Machines.

Complete sets of Machinery for Purifying India Rubber and Gutta Percha, and Insulating Wire.

Lapping Machines for Covering Wire with Silk, Cotton, Flax, Hemp, Tape, etc.

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Manchester, - - England.

BROWNLEE & CO.,

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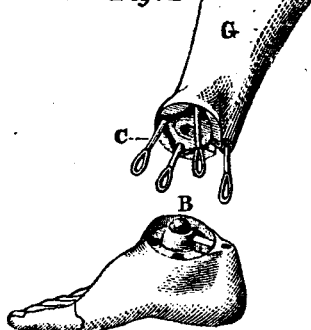
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Light Poles for Telephone Lines and Long Poles for City Use Constantly on Hand.
OFFICE: FOOT OF SHELBY ST., DETROIT, MICH.

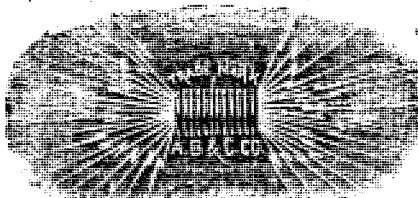
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Mention this journal in writing to us.

Fig. 2



The celebrated Bly ARTIFICIAL LIMBS, with or without universal ankle motion. Remodeled, improved and warranted for five years. Prices reduced. Send for free pamphlet. GEO. R. FULLER, successor to Dr. D. Bly, Rochester, N. Y.

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MANUFACTURED BY THE

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For Magnets, Telegraphs, Telephones, etc., Insulated on the Bare Wire with H. Spiltdorf's Patented Liquid Insulation, covered with cotton or silk.

All sizes of BARE AND COVERED WIRE in stock. The Conductivity of every bundle tested and warranted.

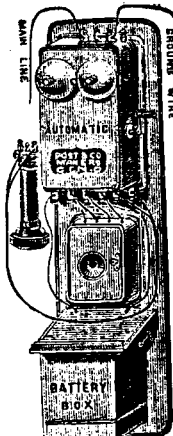
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Galvanized Line Wire, all numbers; Insulated Wire, all numbers; Insulators and Brackets, all sizes; Batteries, all kinds and sizes, at lowest prices.

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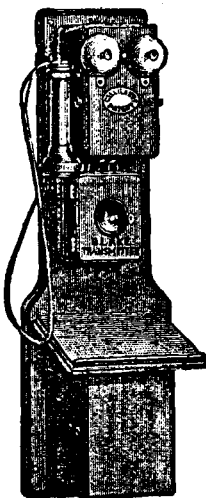
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SECRECY SWITCH,
COMBINATION
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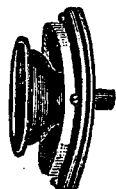
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MADE WHOLLY OF METAL, NICKEL PLATED. WILL STAND ANY CLIMATE. SELF ADJUSTING. THE ONLY MECHANICAL TELEPHONE WHICH FULLY "FILLS THE BILL."

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