

BURYING TELEPHONE WIRES IN THE SEWERS OF PARIS.

The question of burying the telephone, telegraph, and electric light wires, instead of having them strung on poles as heretofore, is now attracting a good deal of attention in all our large cities. In New York, where the inconvenience of the overhead wires is probably felt most seriously, there is now sitting a commission, authorized by the Legislature, to determine upon some general system for placing the wires underground, and then see that this is done. The work of this commission thus far has been simply preliminary, consisting of the receiving of various plans and devices for effecting the desired end, of which a large number has been

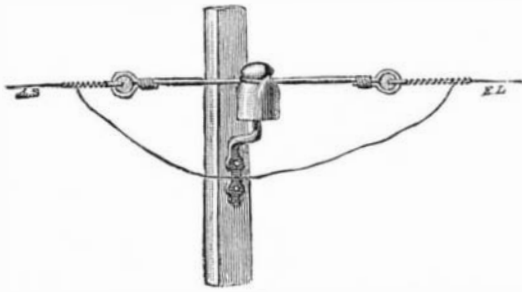


Fig. 1.

submitted. The opposition by the companies, which at first seemed to be mainly on account of the additional expense that would be imposed on them, seems now to be more particularly directed to the alleged impracticability of any of the plans proposed, on which it is the duty of the commission to decide.

How this difficulty is overcome in the French capital

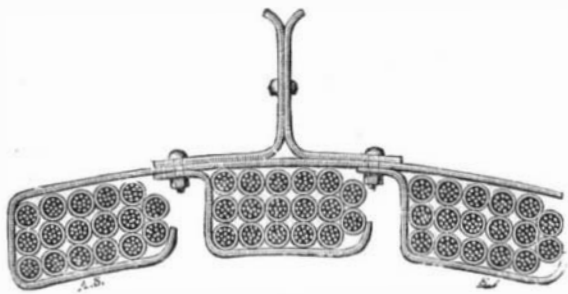


Fig. 2.

will be readily understood from the accompanying illustrations, the admirable sewerage system of Paris affording the ready means. We copy from *La Lumiere Electrique* a description of the manner of fixing the wires, together with some other particulars, from which it appears that the development of electrical improvements there is not altogether without its difficulties. Our contemporary says: "The state has indeed been obliged to grant telephone patents, but by reason of a peculiar construction of the law, a premature communication made to the Academy of Sciences lost the Bell patent. Following Bell, a host of inventors have made improvements of considerable importance, and have organized systems of call, etc., that have rendered the telephone a valuable instrument that man will make more and more use of. What has the state done to aid this new progress? It has not even deigned to preserve a neutrality; it has stretched out its powerful hand, and, when a few men have come to ask permission to organize a telephone service like those of other countries, it has begun by demanding the renunciation of their patents in its favor, and imposing enormous taxes. It has also written in the concessionary contracts that it reserves to itself the right of competition and even of expropriation at any moment, and in exchange for all these rebates it has accorded concessions for five years, leaving to the grantees the care of obtaining from whoever it might be permission to place their wires upon the roofs of houses.

"It required great courage on the part of the companies to face those difficulties of all sorts that could not fail

to arise in a country where property is so divided that it necessitated as many agreements as to location, in putting up the aerial lines, as there were telephone poles. The honor of putting up the first telephone line in Paris is due to Dr. C. Herz. The house Postal-Vinay took the enterprise in charge, and carried it through in a very remarkable manner.

"Fig. 3 represents the roof of a Parisian house upon which two men are fixing a frame with its insulators. The one in the foreground is holding a rope, which he will quickly draw up as soon as he hears the whistle of the foreman. Another man, upon the roof of the opposite house, will do the same thing, and the astonished

hesitation in using Montefiore phosphoric copper or Mouchel bronze wire.

"The recent improvements in telephony, especially as regards calls, would permit of the use of copper wires 0.02 inch in diameter, or even still finer ones. Such wires combine within themselves those conditions of economy and security that are looked for in towns where sewers are rare or infectious. Such is not the case with the city of Paris, which in this respect is perhaps the best endowed of any other in the world, thanks to the labors of that great engineer, the late Mr. Belgrand, and his eminent associates, the Alphands, the Huets, etc.

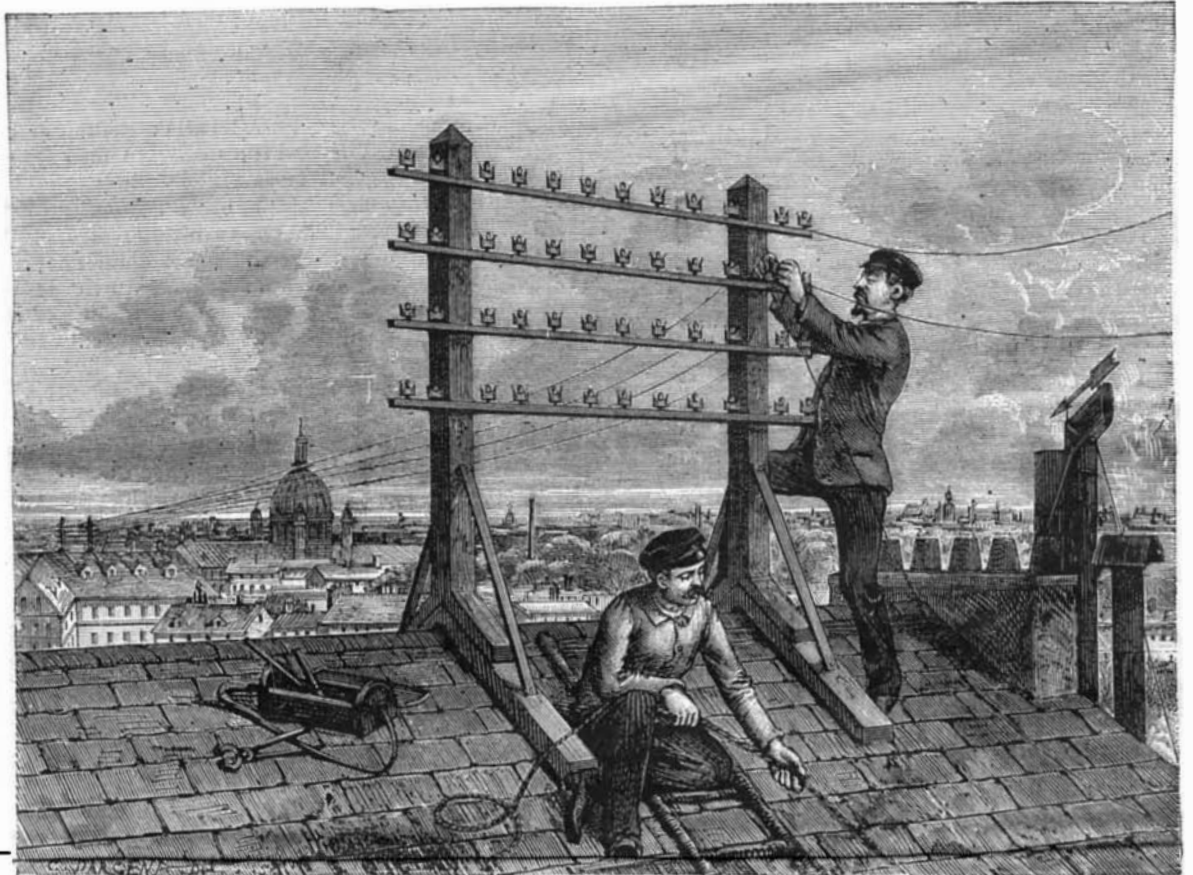


Fig. 3—HOUSE TOP LINES IN PARIS.

passer-by will see a telephone wire rise that a few moments before lay in the middle of the street. The foreman has awaited for a favorable moment before giving the signal. Regardless of the hour, and notwithstanding the passing of pedestrians, coaches, and omnibuses, several hundred miles of telephone wire were stretched over the roofs of Parisian houses in this way.

The wire chosen by preference was of steel, 0.08 inch in diameter, which was then considered as less dangerous to passers-by in case of breakage, and as less disagreeable to the sight, than the ordinary telegraph wire of double the size. To-day, if it were necessary for Paris to return to aerial telephony, there would be no

"The sewers of Paris have become a place of prominence for strangers. In the larger ones, those under the principal thoroughfares, the traveling is done either by car or boat. The others, although of smaller dimensions, are of easy access to workmen who are especially shod for the occasion.

"The increase in the number of subscribers to the telephones rendered the owners of the houses of Paris more exacting as to location, many of them demanding 100f. annually, and some even 200f., for a simple pole fixed alongside a chimney, without counting those who requested to be released from their contract because of the Æolian harp-like noise that the lines made. An

endeavor was made to satisfy the latter by the use of special deadeners. The steel wire, interrupted in the vicinity of the insulator (Fig. 1), was replaced by a rubber covered cord, and an electric junction was made by a lax wire called a ligature. This situation became daily more troublesome, and in 1880, upon the fusion of the first companies into a single one that still bears the name of Societe Generale des Telephones, the city of Paris, authorized by the Common Council, opened its sewer at a certain rental to telephony, as it already had done to telegraphy. It rented for four years a space 12 inches wide by 4 deep on the sewer arch, and this permitted the Society to affix triple hooks (Fig. 2) thereto, that support 51 multiple cables of 14 conductors each. The very slight distance (a few hundredths of an inch scarcely) between any two conductors did not

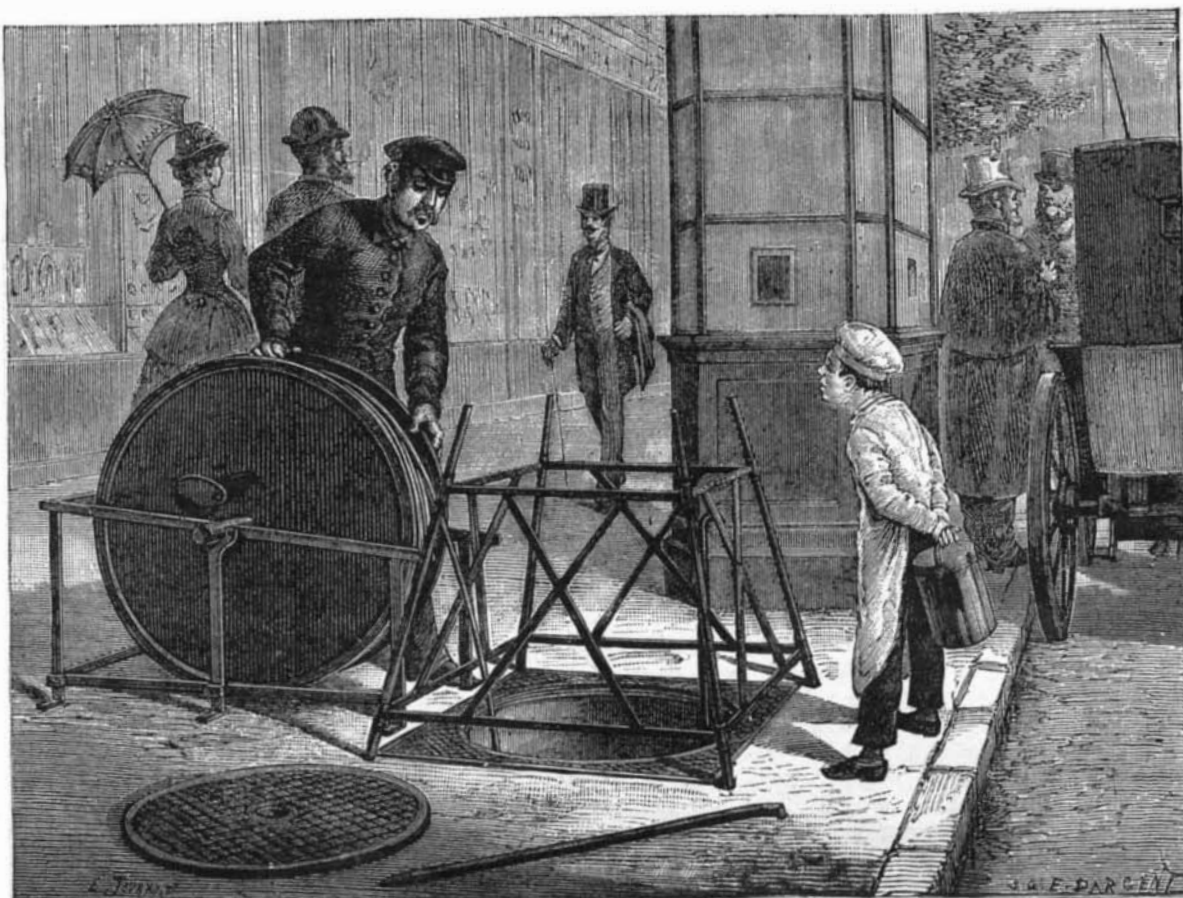


Fig. 4.—LOWERING THE WIRES INTO THE SEWER.

permit of using the ground as a return wire, and the induction was such that a conversation transmitted by one wire was heard in the contiguous one with an intensity equivalent to that of a direct conversation. Calls and telegraph signals also produced very intense noises that were called, by analogy, "frying." Consequently, it became necessary to employ two simple conductors for each line, and, as a further precaution, these were twisted together loosely and covered with cotton of one color. Seven couples of wires whipped about with cotton of different tints, in order to prevent confusion, were covered with tarred tape, and placed in the same leaden tube (analogous to those used for gas), which was again drawn after the introduction of the conductors.

"These multiple, 14-wire cables, which serve to make but 7 lead-covered conductors, have an external diameter of $\frac{3}{4}$ of an inch, and cost from six to twelve cents per running foot, according to the market price of copper, lead, and gutta percha. Their length is about 1,300 feet, and it is only at their extremity that are soldered the small individual lead-covered cables that run to each subscriber. These small cables usually have a diameter of $\frac{1}{8}$ of an inch, and cost from one and one-half to three cents per running foot, according to the price of material and labor.

"The improvements made in telephony would allow of the use of much finer, and consequently much cheaper, wires, and so much less cumbersome ones that the number of subscribers might be quadrupled and easily quintupled without a demand for more space in the sewers, as required by the city engineers.

"All Parisians have seen a telephone cable paid out alongside of a sewer manhole (Fig. 4). The cable is wound around an iron drum whose axle is carried by a flexible frame of forged iron. It is pulled by the lower extremity and is laid along the sewer sidewalk. When the part necessary to rejoin the point of soldering is down, the men finish the unwinding in moving in the opposite direction. In this way, dragging is avoided, and no risk of straining the cable or of tearing the external covering is run.

After this, the cable layers, standing on small ladders or the city water mains, pass the cable over the hooks that have been sealed into the walls in advance. As maybe seen, this operation is exceedingly simple, and presents none of the dangers of aerial work.

Fig. 5 represents the interior of a large sewer during the laying of a cable. One of the large pipes serves to distribute the water of the Seine for sprinkling purposes, and the other, reservoir water for drinking, etc. The small pipe belongs to the pneumatic post, the still smaller one is for the atmospheric distribution of time; and of the groups of cables, one of them belongs to the telegraph system, and the other to the telephonic. This engraving was made from a photograph taken by Nadar through the aid of electric light."

BROMINE.—A correspondent of the *Monthly Mag. of Pharmacy*, writing from Messina, says: "A bottle of bromine left in a closed room all night with the stopper out destroys all infection and insect life. I have cleared places which were infected with vermin many times. It is far more effectual than the vapor of burning sulphur."

Hints on Type Setting.

In composing, the left hand, which holds the stick, should always follow the right, which takes up the letters. If the left hand remains stationary, much time is lost in bringing each letter to it, and traversing a greater space than necessary; the eye should always be fixed on the nick of the letter before the finger is ready to take it up; this will effectually prevent any false motion, as it may be lifted and conveyed to the stick in its proper position. A sentence of the copy should, if possible, be taken at one time, and while putting in the point and space which conclude that sentence, the eye is at full liberty to revert again to the copy for a fresh one. It is to perfection in this particular that those compositors who are so much admired in the business are indebted for their swiftness. The time they thus gain is considerable, without any appearance

Sulphurous Acid in the Air of Towns.

M. Witz has conducted a series of observations upon the presence of sulphurous acid, due to the combustion of coal and gas, in the air of towns, and its effect upon the salubrity of localities. Daily analyses of the atmosphere of the largest French towns go to show that the proportion of ozone in the air is very variable. Generally, a northerly wind is accompanied by a diminution of the quantity of ozone. The exact value of ozone as a constituent of the air of towns is not known; but the fact that it is generally scarce or altogether absent during unhealthy periods is held to testify to its sanitary influence. M. Witz has been led to believe that the absence of ozone is caused by the superabundance of sulphurous acid. This latter is an invariable constituent of the air of towns in which coal is burnt in large quantities. Thus at Rouen, where M. Witz conducted

his experiments, he has observed that the bright orange placards commonly used for advertising, being colored with red lead pigment, always become blanched in time. The peroxide of lead passes into the state of sulphate, and protoxide to that of sulphite.

Long continued observation of these placards, posted in the interior and round the suburbs of the town, has shown M. Witz how to graduate the area of chemical action according to the density of the population and number of furnaces in operation.

Inside dwellings the same effect is much more marked, especially if the colored paper is placed in the way of condensations from humid atmospheres. The presence of sulphurous acid in the air of manufacturing towns becomes very evident in connection with the first white frosts of winter. A great deal of the acid vapor is then condensed with a small quantity of water, and its effect upon exposed objects is sometimes very destructive. Hence M. Witz demands that, out of consideration for the public health, means should be taken for reducing to the lowest possible proportion the sulphurous acid vapor emitted from factory and other chimneys.

The *Journal of Gas Lighting* says: Unfortunately for the reasoning that would connect the diminution of ozone (and consequently the preponderance of unhealthy atmospheric conditions) with the presence of sulphurous acid, it is a fact, requiring to be otherwise accounted for, that ozone disappears and epidemics rage in districts

where not a pound of coal or a cubic foot of gas has ever been burnt.

Powdered Crab as a Medicine.

A Russian paper says: "During the last fifteen years the inhabitants of a malarial locality in Kharkoo Government in Russia have used the *crab powder* with great success against the fevers. The powder is prepared in the following way: Live crabs are poured over with the ordinary whisky until they get asleep, then they are put on a bread pan in a hot oven, thoroughly dried and pulverized, and the powder passed through a fine sieve. One dose, a teaspoonful, is generally sufficient to cure the intermittent fever; in very obstinate cases, a second dose is required. Each dose is invariably preceded by a glass of aloe brandy, as a purgative. The powder is used in that locality in preference to quinine."

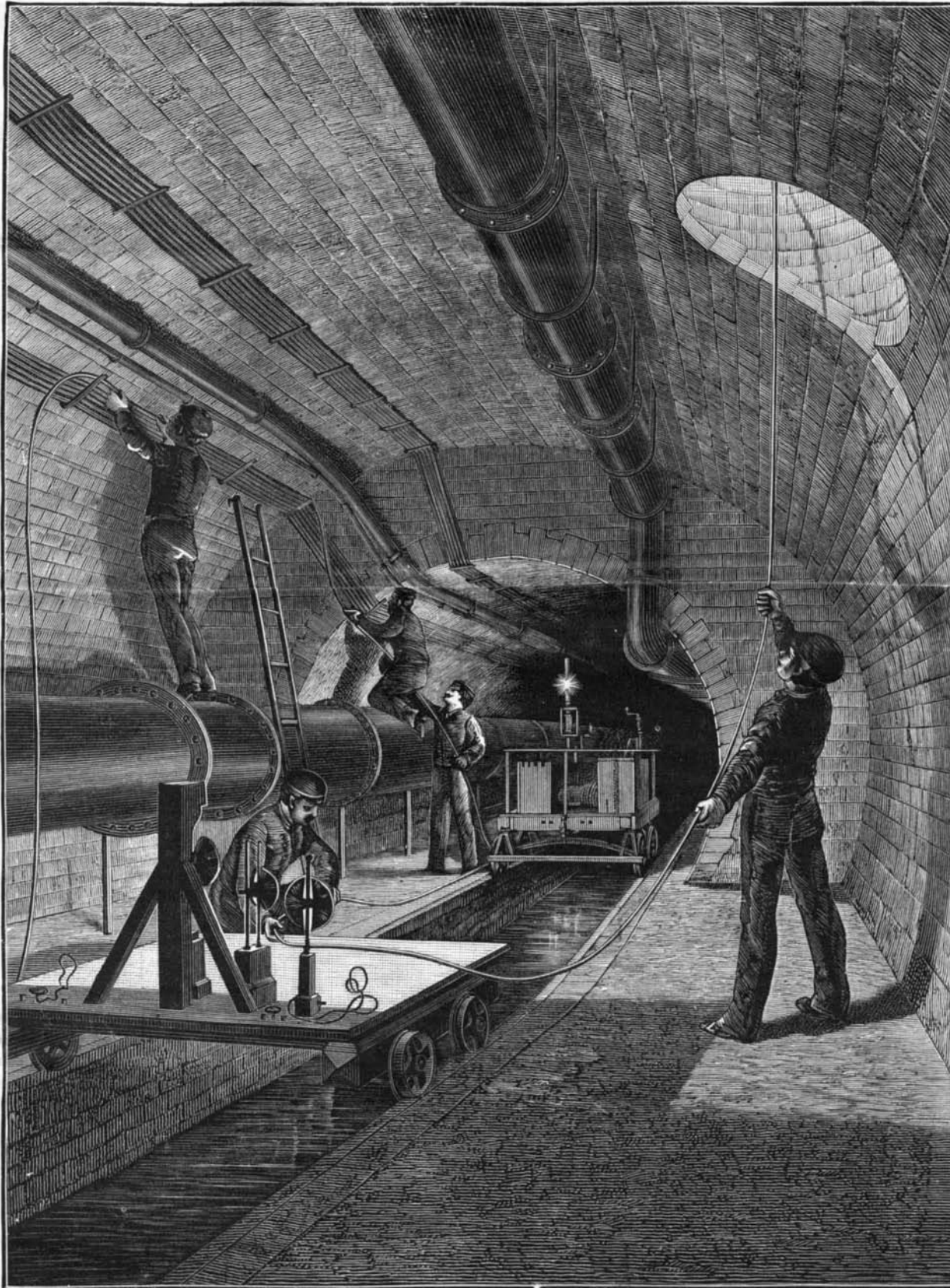


Fig. 5.—LAYING TELEPHONE CABLES IN A PARIS SEWER.

of bustle or fatigue. By thus taking into the memory a sentence at a time, they preserve the connection of their subject, which renders punctuation less difficult.

From habit the compositor becomes so well acquainted with the peculiar feel of each type that he can generally detect a wrong letter without looking at it. Those who are careful in distribution find the advantage of it in composition. The greatest disgrace that can attach to a compositor is that of being considered a foul or slovenly workman—to avoid which should be his earnest endeavor; it would be even better to read every line as he composes it than to lose so much of his time at the stone, independent of the disgrace attached to a man of this description. We would recommend him to cast his eye over the line as he justifies it; this method, properly acquired, will not detain him in his work, but will enable him to be much more accurate.

The Longest Tramway Rope in America.

A tramway rope and fixtures are now being placed at Sewell, W. Va., near Gauley Bridge, from the cliffs on the other side of the river down to the Chesapeake and Ohio Railway. The original design is by Col. F. Warburton, R.E., of the British army, who by this means once transported an army with all its equipments across a New Zealand river.

The owner is G. M. Donaldson, of Richmond, Va., of Donaldson & Sons, Scotch timber merchants. He owns about 10,000,000 feet of oak and a smaller amount of other lumber. It lies on the rolling highlands which stretch back from the top of the New River canon. The mill is three-quarters of a mile back from the cliffs, and connected with the rope bridge by a tramway. Height of cliff, 475 feet above the rails; inclined distance, 1,504 feet and nine inches. This distance is being spanned by a two and three-eighths inch wire rope of best crucible steel. The towers supporting the rope stand a little forward of its ends, making 1,466 feet clear span, and the fall 465 feet. The sag of the rope is 62 feet. The towers are of wood, 28 feet high, and held in position by two eyebars 5x1½ inches. On each tower is a heavy cast iron saddle, transferring the tension of the rope to the anchorages. The ultimate strength of the rope is 190 tons. Maximum working strain under a load of five tons will be 42 tons. The loads will be from 1,000 to 1,200 feet of lumber. Twenty-five trips a day will be made until the lumber on storage is shipped, when the trips will be reduced to fifteen. The lumber is from 18 to 24 feet long, and the difficulty is to transport it without injuring the edges.

This is done by a cage invented by Mr. W. Hildenbrand, the engineer in charge, the bottom of which consists of two movable beams, which, when turned sideways, leave the cage without bottom, so that it can be placed over the timber, and after the bottom beams are turned back again the timber can be easily lifted from the truck. This will be done by a pair of differential pulleys, with which also the height of the cage can be regulated according to the weight to be transported.

The cage is suspended from a carriage 17 feet long, with five cast iron wheels. An endless ¾ inch steel rope over two 36 inch drums serves to pull the load over when gravity fails, and to pull the empty carriage back. This rope has a strength of 14 tons. The engine has two cylinders, and will carry about 65 pounds of steam. It was built specially, because none could be found answering the conditions.

John A. Roebing's Son's Company are putting up the affair for Mr. Donaldson.

Its importance consists not so much in the fact that it is the largest tramway rope in America, which is true, but because, if it is an economic success, similar constructions are almost certain to be used in all parts of this section, and not only for lumber, but for coal, and perhaps iron ore and limestone.—*N. W. Lumberman*

COMBINED PLOW AND SEEDER.

With the aid of the machine shown in the accompanying engraving, hitherto unbroken soil may be plowed and planted at the same time. The forward guide wheel can be held at any desired height to govern the depth of the furrow. The bar supporting the seed hopper and the mechanism for operating the dropping slide is secured at one end by a double hinge joint attached to a yoke on a standard connecting the beam and land-slide. The dropping slide is fitted in the floor of the hopper, and may be connected by a pitman with the drop wheel, which is journaled in bearings on the opposite end of the bar and runs on the land beside the plow. The double hinge joint permits the bar to swing sidewise and also to rock up and down, to allow the drop wheel to always run on the ground no matter how the plow may be shifted about, and leaving it free to rise and fall in passing over roots or clods of earth; hence the drop wheel will move the slide regularly to allow the seed to fall through a hole in the hopper bottom, through a flexible tube and funnel held to the handle by straps, to the ground. The slide is made with two plates (Fig. 2 is a plan, and Fig. 3 a sectional view) fitted to slide in slots made in the upper face of the slide, the slots being cut through at the inner ends to permit the passage of the seed. Both the holes can be made larger or smaller, to deliver a greater or less quantity of seed, by shifting the plates in the slide. A brush cut-off is fixed in the hopper over its discharge hole.

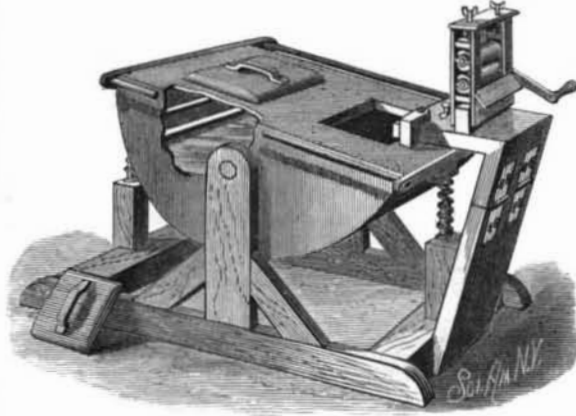
When the drop wheel, which is preferably 36 inches

in diameter, is connected by its rod to the slide, and when one of the seed apertures is closed, but one drop of seed will be made for each revolution, and when both holes are open two drops of seed will be made, allowing the seed to be planted in hills 36 and 18 inches apart respectively. To plant closer the rod is disconnected, the gear wheels shown in the engraving are set to mesh with each other, and a short rod connects a wrist pin on the small gear with the dropping slide; thus the seed will be planted in hills 12 and 6 inches apart, by properly setting the sliding plate, as will be easily understood.

This invention has been patented by Mr. Allen Glenn, of Scranton City, Iowa.

A NEW WASHING MACHINE.

An easily operated clothes washer, and one calculated to do its work with the least possible wear of

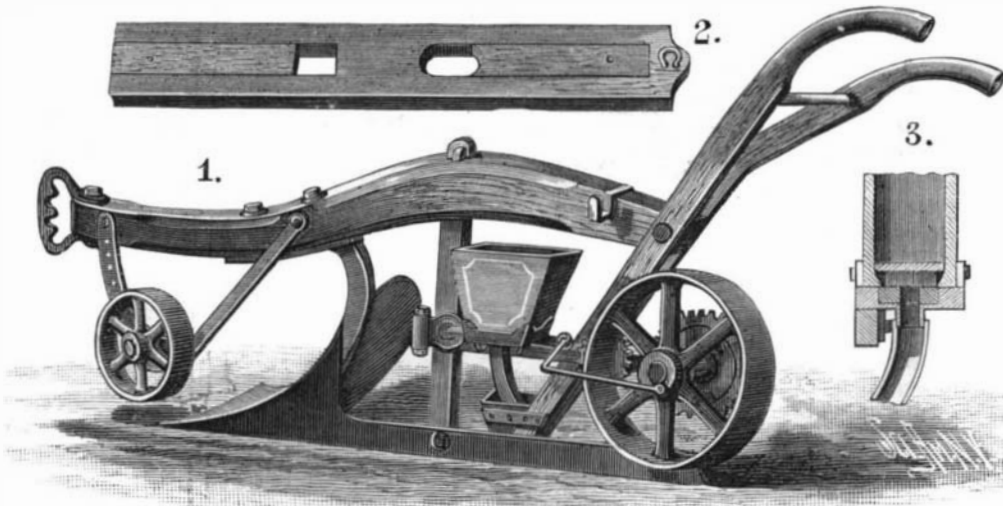
**FALKENTHAL'S WASHING MACHINE.**

the clothes, is shown in the accompanying illustration. The body is made semicircular in form, and pivoted between uprights of the frame, where it is adapted to swing, cross pieces at the top on each end of the body alternately striking springs supported by uprights to aid in continuing the motion. The cover has openings, fitted by smaller covers, and the sides of the body have rounds or small rails along the top edges, by which it may be conveniently rocked upon its pivots. The body has ridges or ribs on its bottom over which the clothing rubs as the machine is operated, the whole bottom being lined with zinc or other suitable material, and a wringer is so attached that it may be easily swung into or out of position for use.

This invention has been patented by Mr. Henry Falkenthal, of Bozeman, Montana Territory.

To Test the Quality of Leather Belts.

For testing the quality of the leather used for belting, Mr. Eitner proposes the following simple method: A small piece is cut out of the belt and placed in vinegar. If the leather has been perfectly tanned, and is therefore of good quality, it will remain immersed in the vinegar, even for several months, without any other change than becoming of a little darker color. If, on the contrary, it is not well impregnated with

**GLENN'S PATENT PLOW AND SEEDER.**

tannin, the fibers will promptly swell, and, after a short time, become converted into a gelatinous mass.—*Revue Industrielle.*

Hemp for Phylloxera.

They recommend, in South Russia, hemp as a means against the phylloxera. It is sufficient to plant the hemp around the vineyard, and place it near the infected vines. The insects are attracted by the strong odor of the hemp, the roots of which prove to be poisonous for them. The following experiment will show the efficiency of this means: Plant in the same barrel an infected vine and a hemp plant. In a few days the vine begins to revive, and if you pull the hemp carefully out, you will find its roots covered with phylloxera.

Hay Fever.

Careful observations fully bear out the germ theory, not only the presence of the germs, but an agitation or disturbance of the germs being a cause of the malady. For instance, upon a not very sultry day, three or four hours in the country have been spent without inconvenience; but on the same day, half an hour in an express train has sufficed to bring on the most aggravated symptoms; in the same way, in town, a week or two has been passed without trouble, but a couple of hours at an open air exhibition, in the same locality, with a moving crowd stirring up dust and pollen, have produced a violent attack.

The only check to hay fever appears to be, first, sleep; second, freedom from pollen; the so-called cures, such as snuff, or other application to the nostrils, being perfectly useless. The above conditions combined effect an almost miraculous cure, as has been proved by sleeping for a short period under the protection of carefully wetted cloths through which the air is, as it were, filtered, or more certain still, a night spent at sea. Experience shows that if the attack is once stopped, a moderate amount of exposure to germs may be risked without setting it up again. The conclusion to be drawn from this is, that it would be worth the while of some enterprising individual to establish a "hay fever cure."

The arrangement would be extremely simple, neither more nor less than a series of sleeping apartments into which nothing but air deprived by straining through wet flannel of all germs, and possibly cooled down to about 55° or 60°, could penetrate. Upon a large scale, such an establishment could be easily worked at a profit, in connection with any of the large Turkish baths or other similar establishments in town.

The beneficial effects of low temperature have been conclusively proved by subjecting a hay fever patient to the action of one of the preserving chambers in a cold store for meat. The remedy, however, was too violent to be generally adopted, but a temperature of 50° would, no doubt, suffice, and could be, of course, borne without inconvenience in the hottest summer.

A Wonderful Peruvian Railroad.

One of the most wonderful pieces of engineering in the world is the railroad stretching from Lima and Callao to the crest of the continent, where the famous mines of the Cerro del Pasco are, the source of the ancient riches of the country, from which tons upon tons of silver have been taken, and which still hold, if the testimony of the mineralogists can be relied upon, the richest deposits on the surface of the world. The railroad was never completed. Mr. Meiggs carried it from Lima to the crest of the Andes at a cost of \$27,000,000 and 7,000 human lives, and gained for himself a reputation for energy and ability surpassing any man that ever came to this continent, but he died with fifty miles of track yet to be laid. No one has been found with the courage to finish the work, until a few weeks ago Michael Grace, of New York, whose brother and partner in that enterprise is the mayor of that city, made

a contract with the government under the terms that he is to be given the road as it stands, with all its equipment, if he will complete it to its original destination. He agrees to complete the remaining fifty miles of railroad and pump out of the mines of Cerro del Pasco the water that has been accumulating in them for half a lazy century, in consideration for which the government gives him that portion of the road already completed, and all the silver he can get out of the mines during the next ninety-nine years, he paying the nominal rental of \$25,000 a year for the use of the property. The sensation of riding up this railroad, together with the rapid ascent

from the sea level to the mountain's crest, produces a sickness called "siroche," often fatal, and usually sending people to bed for several weeks. The symptoms are a terrible pressure upon the temples, nausea, bleeding of the nose and ears, and faintness, but the effects can be avoided by taking precautions and observing rules that experience has suggested, the chief ones being to take a glass of brandy and keep perfectly quiet, as the slightest degree of exercise will floor the strongest man. People who are compelled to make the ascent, if they have not become accustomed to it, usually take two or three days for the journey, stopping off at the stations along the line, and going to bed at once upon reaching the town of Chila, which stands at the summit.—*Philadelphia Times.*