facts; and Mr. Crossley's testimony will be abundantly substantiated by all who have had much to do with patent rights. Mr. Crossley refers to the weekly list of patents issued for evidence that a large part of them are assigned wholly or partly to manufacturing companies. In other words, the practical worth of the patents has been demonstrated, and Mr. Crossley has found, upon inquiry, that in nearly all cases the assignors obtain a good price for their inventions. He adds:

"Whenever I have had an opportunity to inquire of inventors as to the success they have had with their patents, the general testimony has been that the inventors have made something satisfactory out of their patents. A number of years ago, Secretary of the Interior Thompson caused an inquiry to be made in this same matter, and it was reported that the value of patents issued would average about $10,000 each."

When it is borne in mind that to a large extent patents are taken out to cover and protect devices and processes which are, so to speak, stepping stones to final inventions which alone are to be practically applied, this high average value is very significant. Then there must be taken into account the large number of inventions which the makers do not develop, not because of inherent worthlessness, but because the inventor's attention is turned to something else. In all such cases the patents pay indirectly in securing the registration and accurate description of the inventions, by which means they become a permanent part of the common stock of practical knowledge.

THE CONCORD SCHOOL OF PHILOSOPHY.

The *Christian at Work*, alluding to the closing of the recent session of the Concord School of Philosophy, rather sneeringly suggests that no new problems were solved nor any new impulse given likely to lift the moral world out of its orbit. The editor further says that he believes it was Mr. Joseph Cook who pronounced Mr. A. Bronson Alcott "the modern Plato." Perhaps he meant the Concord Plato. Every New England village is supposed to have a Plato, and, for all we know, a Socrates as well. But hemlock is not drunk now as freely as it was, and the modern Socrates is not as anxious as his ancient prototype was to be rid of the prison house of his body. It must be a very happy thought to a New England philosopher to imagine himself going down to his grave a nineteenth century Plato. Still, we fear the Phædo will be read when the Concordia is forgotten; and if a modern Plato usurps the olden one in public regard, it will be when English is a dead language, when the theories of its pronunciation are as many as the stones of Trinity spire, and when that New Zealand itinerant shall wander among the ruins of the New York Post Office and puzzle over the lost order of American architecture, or, mayhap, some antiquarian shall puzzle over a translation of a poem of Emerson's, and search in vain for the key to the unsolvable enigma.

TIN IN MAINE.

Among the mining interests just now showing signs of early and profitable development in Maine, not the least in importance is that connected with tin. The country has no lack of mines of gold, silver, copper, and lead; and if any failure should occur in those now opening in Maine, it is not likely that many besides their particular owners would be conscious of the deficiency. Nor is it likely that any great or radical effect would be wrought upon the general industries of the country, should the yield of these metals in Maine prove as generous as the most enthusiastic miners there anticipate.

With tin the case is different. For that metal we are obliged to go abroad, chiefly to England, and so long as England controls the market for tin, there is little hope of our wresting from her the larger traffic in tin plate. The development of tin mining at home to a degree sufficient to secure the practical independence of our vast industries employing tin and tinned iron would be worth much more to the country, indirectly if not directly, than any mine of gold or silver. Accordingly it may be safely said that the announcement of the discovery of extremely promising deposits of tin ore in Maine is likely to awaken a heartier interest throughout the country than any other mining reports from that land of mining booms. If any of Maine's mineral products fail, it is sincerely to be hoped that the failure will not be in tin.

Indications of tin were discovered in Maine some ten years ago; but then it was the popular belief that Maine was not nor ever could be a mining State. Recent explorations in the town of Winslow, on the Kennebec, a few miles above the State capital, have discovered half a dozen metallic veins of rich tin ore, in a rock formation precisely like those in which tin is found in Cornwall, Germany, and New South Wales.

As described by Professor C. H. Hitchcock, the rock which incloses the tin ores of Winslow is a mica schist or killas, associated with somewhat calcareous layers, and adjacent to a hard quartzite band, called an *elvan* by miners. Thirty feet width of vertical sheets of killas show twelve granite veins from half of one inch to three inches width, crossed, occasionally, by stragglers. These veins are full of crystals of tin ore (cassiterite) with the associated minerals fluorspar, margarite, mispickel, beryl, lepidolite, etc. The mineral, geological, and physical feature of the Winslow mine are, Professor Hitchcock adds, "identical with those common to the stanniferous districts of Europe," and "the ore seems to be sufficiently abundant to remunerate quite extensive outlays for mining operations."

Professor Forrest Shepherd describes the mineralized belt at Winslow as from thirty to forty or more feet in width. In a shallow pit where it has been uncovered five or more veins appear within a space of eight feet, a promise unequaled in any Cornwall or Saxony mine. And what is particularly encouraging, the Winslow deposits are, at the surface, equal in quality, Professor Shepherd says, to the best in Cornwall, and in a series of veins most favorably situated, while in Cornwall and elsewhere the veins are rarely remunerative except at great depths.

A company has been formed to develop the Winslow mine and to extend the exploration for tin in other parts of the State. The prospect of success is, to say the least, very encouraging. Should the yield prove abundant a particularly favorable opportunity would seem to offer for the manufacture of tin plate in that State, owing to the abundance of suitable iron ore and the proximity of forests for supplying the charcoal required to smelt it.

THE AMERICAN SCIENCE ASSOCIATION.

The twenty-ninth meeting of the American Association for the Advancement of Science began in Boston, August 25. The meeting was called to order by the retiring President, Prof. Geo. F. Barker, of Philadelphia, who immediately resigned the chair to the President-elect, the Hon. Lewis H. Morgan, of Rochester. President Rogers, of the Massachusetts Institute of Technology, delivered an introductory address, which was followed by addresses of welcome by Mayor Prince and Governor Long.

The secretary reported the deaths for the past year as follows: George W. Abbe, New York; E. B. Andrews, Lancaster, Ohio; Homer C. Blake, New York; F. A. Cairns, New York; Caleb Cooke, Salem, Mass.; Benjamin F. Mudge, Manhattan, Kan.; Thomas Nicholson, New Orleans; Louis Francis de Pourtales, Cambridge, Mass.

A committee was appointed to draft resolutions on the death of Gen. Albert J. Myer, and another to send by cable the cordial greetings of the Association to the British Association at Swansea, on the occasion of its fiftieth meeting.

The general session was then adjourned, and the various sections and sub-sections organized. In the afternoon, Section A was addressed by Prof. Asaph Hall, of Washington, who reviewed the recent advances in the science of astronomy, and the services rendered by men who, like Fraunhofer, have aided the work by optical and mechanical skill.

In the sub-section of chemistry, Prof. John M. Ordway reviewed the recent achievements of practical chemistry, and discussed its methods. The sub-section of anthropology was addressed by Major J. W. Powell, on the social organization and government of the Wyandotte Indians. In the evening the retiring President, Prof. Barker, delivered the customary address, his subject being, "Some Modern Aspects of the Life Question." He took the ground that every action of the living body is, sooner or later, to be recognized as purely chemical or physical, the life that science has to deal with having no existence apart from matter.

The second day's meetings were held in Harvard College, Cambridge. The appointed eulogy on the late Prof. Henry was delivered by Prof. Alfred M. Thayer, who dwelt especially on Prof. Henry's work as a discoverer in science. The practical side of that work was touched in connection with the experiments which proved so beneficial to the light-house and fog-signal service. One discovery—that lard oil, when subjected to a heat of 280° Fahr., is superior to sperm oil in fluidity and illuminating power—saves the Government $100,000 a year.

Prof. Alexander Agassiz, Vice-President of Section B, followed with an address on "Paleontological and Embryological Development," choosing his illustrations from a limited group of marine animals—*zaurchins*—having less than 300 living species, and more than 2,000 known fossil species.

The rest of the day was spent in the museums, laboratories, libraries, the observatory, and other buildings of Harvard College.

The reading of the 218 papers comprised in the programme was to begin on the third day, Friday, and continues until the final adjournment on Wednesday, Sept. 1. Nearly 600 members were registered the first day, and fully 500 new members have been elected during the two days completed at this writing.

MINING DEBRIS IN CALIFORNIA.

The California Mining Debris Commission, with Capt. J. B. Eads as consulting engineer, have lately gone over the Yuba River country to consider the plans proposed for the disposal of mining debris. If correctly reported, Capt. Eads favors the construction of brush dams rather than those of stone, as originally recommended by the commission. In his opinion, a series of brush dams across the river would entirely arrest the flow of sand and clay; and as fast as the brush is buried other layers might be added from time to time, gradually raising the height of the dam until the catchment basin is full.

A dam of this sort is proposed about eight miles above Marysville, where there is tolerably high ground on opposite sides of the valley. The plan contemplates the building of a brush dam nearly two miles long and seven or eight feet high to begin with. This dam would catch and hold a large quantity of debris, and become buried and strengthened by the deposit. From time to time additions would be placed upon top of the new foundation thus formed Proceeding up the river, the banks become higher, forming a broad and deep area between them for storage of matter to be checked by the dams. From this lower dam to the foot of the dumps from the mines there is an area of seven square miles to be filled by the debris, and were it filled to the depth of forty feet at the upper end it would not interfere with mining operations. Two miles higher is Point Du Guerre, a rocky point about sixty feet high, and extending into the canon or valley some distance. From this point to a higher one across the river it is proposed to extend the second dam, the length of which will be nearly a mile. Beginning with brush loaded with rock, and adding new material as it may be needed, a dam forty feet in height can safely and cheaply be built up. An abundance of willows can be cut for the dams along the river side, and Capt. Eads has great confidence in their efficiency for the work required. Below the dams, where the river banks are defective, brush wing dams will easily keep the current in place; and, with the stoppage of dams above, the concentrated water will quickly cut out a single deep channel.

Albert J. Myer.

Brigadier-General Albert J. Myer, Chief Signal Officer, Unites States Army, familiarly known as "Old Probabilities," died at Buffalo, N. Y., August 24.

General Myer was born in Newburg, N. Y., Sept. 20, 1828. He was graduated at Geneva College in 1847, and in 1851 received the degree of doctor of medicine from the University of Buffalo. In 1854 he was appointed assistant surgeon in the army. While on duty on the Texan frontier, where a clear atmosphere and broad reaches of plain offered superior facilities for signaling by vision, his attention was drawn to the possible advantages of a system of sight signals in military and naval operations. The result was the preparation of a "Manual of Signals for the United States Army and Navy," which was published in 1858. During the next two years he was engaged in developing a special signal service for the army, becoming Chief Signal Officer in 1860. His service during the war was brilliant and vitally important, and his advancement was correspondingly rapid. One of the most dramatic episodes of the war was the saving of Allatoona, Ga., in 1864, by bringing up troops by signals in time to relieve and defend that valuable post, the messages being sent over the heads of the enemy.

After the war General Myer introduced a course of signals at the naval and military schools at Annapolis and West Point, and was largely instrumental in establishing telegraphic communication with military posts on the extreme frontier, 5,000 miles of telegraph lines having been built under his supervision. In the spring of 1870 he was, by Act of Congress, charged with the special duty of developing a national system of meteorological service, which was accomplished within a year. The success of this system under his admirable management has led to the establishment of a uniform international system of simultaneous meteorological observation over nearly all the northern hemisphere; arrangements being made at the International Meteorological Congress at Vienna in 1873, for the exchange of one report of observations taken daily at the same instant over all the United States, nearly all of Europe, Northern Asia, and Northern Africa. It is seldom that a work begun by one man grows under his own supervision into a service of such far-reaching and comprehensive usefulness.

The Kelley Run Colliery Fire.

The attempt to quench the fire in the new slope of the Thomas Coal Company, near Shenandoah, Pa., by sealing the outlets and forcing in steam, has failed. The mine caved in August 24, and to all appearances the fire is beyond control. The alternative plan for quenching the fire with carbonic acid gas and nitrogen, undertaken by a Pittsburg firm, has also been abandoned, the flames having secured so large an opening to the outer air that there seems no possibility of cutting off the supply of oxygen.

A Rude Tramway.

Seven miles of log track are being laid at Essex Center, Ontario, connecting four saw mills with timber cuttings in the woods. The road is made of small trees, stripped of their branches, and laid end to end, like rails. Four cars are being built for the road, the rim of the wheels being concave, so as to run on the track, and the axles turned longer than the hubs of the wheels to allow play for any unevenness. The trains will be drawn by a steam locomotive.

Hollow Ground Razors.

It is not long since it was confidently asserted that, even if the required quality of steel could be produced here, the United States could never compete with England in the manufacture of razors and other fine cutlery, owing to the excessive cost of grinding and finishing. Like a good many other "insuperable" obstacles to American success in the arts, this seems to have been pretty well overcome, since large quantities of Sheffield razor "blanks" are now sent here expressly to be finished. It seems that the art of "hollow grinding," German style, requires a degree of skill a little beyond that of the Sheffield workmen. Accordingly Sheffield manufacturers have to pay double freight across the Atlantic to secure the fine finish to their razors that the trade now demands.

The Habit of Self-Control.

If there is one habit which, above all others, is deserving of cultivation, it is that of *self-control*. In fact it includes so much that is of value and importance in life, that it may almost be said that, in proportion to its power, does the man obtain his manhood and the woman her womanhood. The ability to identify self with the highest parts of our nature, and to bring all the lower parts into subjection, or rather to draw them all upwards into harmony with the best that we know, is the one central power which supplies vitality to all the rest. How to develop this in the child may well absorb the energy of every parent; how to cultivate it in himself may well employ the wisdom and enthusiasm of every youth. Yet it is no mysterious or complicated path that leads to this goal. The habit of self-control is but the accumulation of continued acts of self-denial for a worthy object; it is but the repeated authority of the reason over the impulses, of the judgment over the inclinations, of the sense of duty over the desires. He who has acquired this habit, who can govern himself intelligently, without painful effort, and without any fear of revolt from his appetites and passions, has within him the source of all real power and of all true happiness. The force and energy which he has put forth day by day, and hour by hour, is not exhausted, nor even diminished; on the contrary it has increased by use, and has become stronger and keener by exercise; and, although it has already completed its work in the past, it is still his well-tried, true, and powerful weapon for future conflicts in higher regions.—*Phila. Public Ledger.*

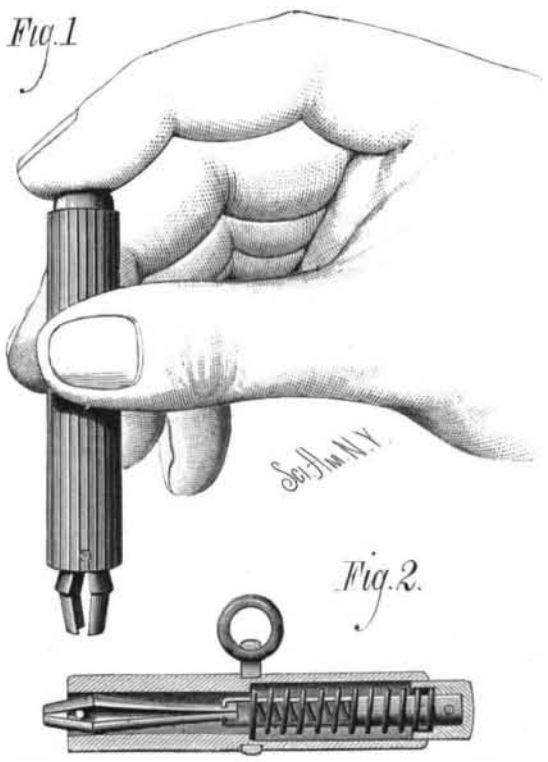
SELF-ADJUSTING WATCH KEY.

With few exceptions no article is more universally used than the watch key, and it is singular that an article even as simple as this should have been used for centuries without some improvement. It is only recently that any real improvement has been made in this direction. Our engraving represents an adjustable key—one that will wind any watch—which is manufactured by Messrs. J. S. Birch & Co., 38 Dey street, New York.

The engraving shows the construction and manner of using this key so clearly that scarcely a word of explanation is required. The instrument consists essentially of a pair of griping jaws held in the forked end of a spindle arranged to slide in the tube. The end of the spindle is attached to a cap, which slides in the tube and is pressed by a spiral spring resting on a shoulder in the tube. The tendency of the jaws is to spring apart, so that when the cap is pressed downward, so as to project the jaws from the tube, they are separated more or less. While in this position they are placed on the arbor to be turned, the cap is then released, and the jaws clamp themselves tightly on the arbor. The jaws are prevented from twisting or turning in the tube by a pin passing transversely through the tube between the jaws.

As to the usefulness of this invention it is only necessary to say that the key will fit any watch, and will not only answer the purpose of winding and setting the watch, but it will fit the abors perfectly, thus avoiding the wear of these parts, a thing unavoidable when common keys are used.

This key is absolutely proof against the danger of conveying dust to the movement. By springing the jaws open all



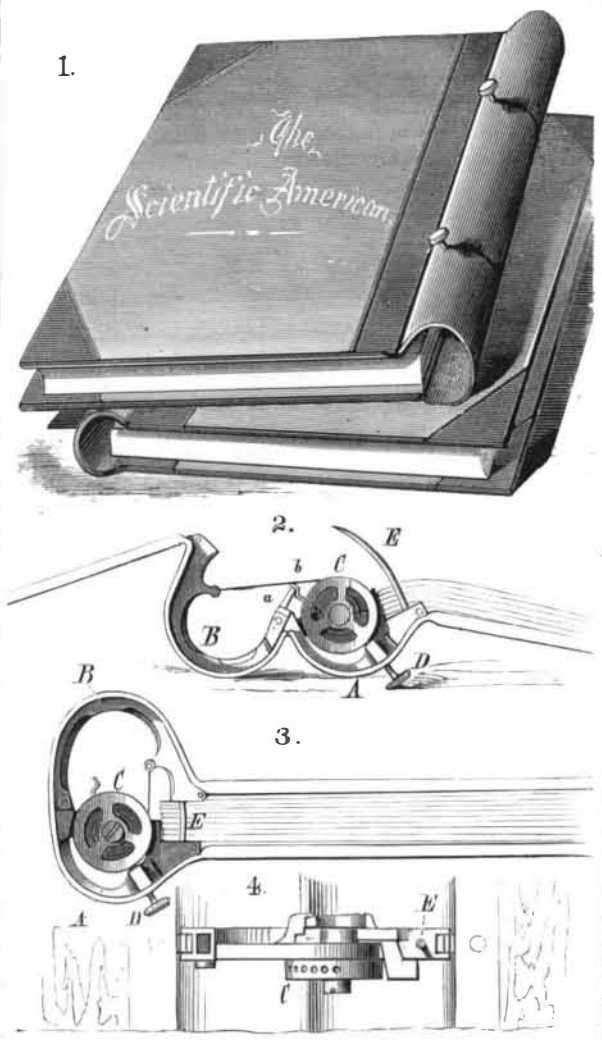
BIRCH'S SELF-ADJUSTING WATCH KEY.

accumulations in the pipe or jaws of the key are at once expelled. All the adjustable parts are made of the best tempered steel, and the shells are substantially mounted in a large variety of ornamental designs (some 37 in number), which render them appropriate and attractive charms to be worn on watch chains.

Full particulars may be obtained by addressing the sole manufacturers as above.

A NOVEL BINDER.

The engraving shows a new binder for binding newspapers, pamphlets, letters, bills, etc., recently patented by Mr. William Keenan, of 79 St. George street, Toronto, Ontario, Canada. Fig. 1 is a perspective view representing the exterior of the binder; Fig. 2 is an end view showing the back



KEENAN'S BINDER.

of the binder open and ready to receive papers; Fig. 3 is an end view showing the back closed, and Fig. 4 is a detail view of the fastening mechanism.

The binder has two covers connected by a back of leather, and also by jointed metallic frames, A B. The part, B, of each frame has a cam, *a*, which is engaged by a spring, *b*, on the part, A, when the binder is opened to receive a paper, and holds it open while the paper is being placed on the curved needles, E. The two parts of the jointed frames are drawn together as the binder is closed by springs in the drum, C, turning on a stud projecting from the part, A, of the jointed frame. The drum carries a band or piece of watch spring, which is attached to the opposite half of the frame, and serves to draw the two parts together. The part, B, is made hollow to receive the needle, E, and a milled screw, D, passes through the frame and enters one of several small cavities in a rim attached to the drum, C, to keep it from turning.

The articles to be filed are placed upon the curved needles when the device is arranged as shown in Fig. 2; then by closing the two halves of the back the spring, *b*, is released from the cam, *a*, and the spring in the drum, C, holds the binder closed. To secure it still more firmly the screw, D, may be brought into use.

It will be seen that no thread is used in this binder and that threading is consequently avoided. The covers may be opened wide and will be flat, and the papers can be easily referred to and read.

American Machines in England.

In his recent address before the Institution of Mechanical Engineers, President Cowper said:

"Sewing machines ought to be made here, and I urged English makers, years since, to go in thoroughly for making every part accurately and by machinery, so as to fit together at once without 'fitting;' but I could not get this carried out, and now sewing machines come from America literally by millions, though labor is dearer, metal is dearer, and there are upwards of 3,000 miles of carriage against them. But 'machine manufacture' is cheaper and better than 'hand making.'

"In gun making I counseled some of the Birmingham makers, years before they did anything in the matter, that they would actually lose their trade if they did not adopt good machinery to manufacture every part exact to size; and at last, when the government had the means of doing most of the work, they did adopt machinery, but many years too late.

"Then with regard to common pumps, they are now imported from America by thousands, and are sold here, without being commonly known to be American; clocks and watches also come in immense numbers, some of them very cheap and common, while others are very well made.

"Another trade, nearer perhaps to most of us, is that of rolled iron girders, which, I am sorry to say, are coming by hundreds and thousands from Belgium; indeed, almost every house that is now built in London with rolled iron girders is supplied from Belgium. These things should not be; we have iron in plenty, and labor in abundance, but we want special machines, schemed as fast as they are wanted, to fit the work properly, and turn it out accurately in large quantities; and we should show more enterprise in adopting a good 'new thing,' which I am sorry to say is what some of our old-fashioned manufacturers are slow to do, often little knowing how they damage the trade they are in by not adopting the best known process."

DE LOCHT'S PANTELEPHONE.

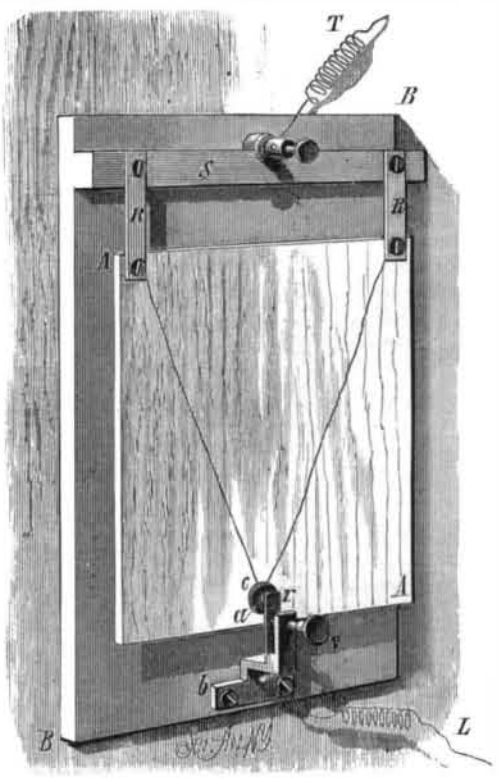
Leon de Locht, Mining Engineer and Professor at the College of Mining, Mont St. Martin 49, Liege, Belgium, after several years' experimenting with a view of overcoming the defects of the best telephones in use, and after the invention of one or two forms of apparatus, which have been the subject of patents in various countries, has finally perfected an instrument which he calls the pantelephone.

This apparatus is a microphonic transmitter which is sensitive to sonorous vibrations emanating at a great distance. It is capable of transmitting words spoken at forty-five feet from the apparatus to a distance of several miles through the medium of receiving telephones. The pantelephone, which is extremely simple, is composed essentially of a movable plate carrying a carbon contact, which presses against a disk of carbon or metal—silver or platinum.

Referring to the accompanying cut, the plate is seen figured at AA. It may be of aluminum, sheet iron, steel, brass, mica, cork, or of any substance whatever that is capable of being formed into plates of large superficial area, while at the same time possessing the requisite amount of lightness. It is preferable that its form should be rectangular, fifteen centimeters square in size, and, when made of metal, two to three tenths of a millimeter in thickness. It should be as inflexible as possible, and not liable to bend out of shape through the influences of temperature and humidity. It is suspended by two small very flexible steel springs, R R, from a support, S, which is perfectly straight and stands out from the fixed plate, B B, forming the framework of the apparatus. To the middle of the lower end of the plate is riveted or soldered a small carbon disk, *c*, which, when the apparatus is in a vertical position, rests against a small piece of silver or platinum fastened to the end of a short and somewhat inflexible spring, *r*, the latter being fixed by means of a screw, *v*, to the copper support, *b b*. By means of a thumb screw, V, passing through the support, the contact of the carbon, *c*, with the piece, *a*, may be regulated at pleasure.

The pantelephone is placed in the circuit of a voltaic pile in such a way, for example, that the current entering at L, proceeds to the support, *b b*, and from thence through the spring, *r*, to the contact, *a*, then to the carbon, *c*, and through the plate, A A, to the springs, R R, and leaves the apparatus at T.

There are other and secondary details of construction, by means of which the inventor is enabled to so regulate the apparatus as to insure of the greatest sensitiveness and of the best possible performance. There are certain arrangements employed, too, to deaden and stop all noises which might arise from tremors of the earth, or from the shaking of the wall to which the apparatus is attached. It is claimed that the pantelephone, when once properly regulated, is not liable to get out of order; and, moreover, that the expense



DE LOCHT'S PANTELEPHONE.

attending the use of the system is insignificant, since the apparatus under proper conditions requires for its making only the electromotive force of a single voltaic couple. The instrument transmits all sounds, articulate or inarticulate, which reach it, through the medium of either solids or the air. It is inclosed in a box (which may be made as ornamental as desired) in such a way that its sensitiveness to sonorous vibrations is in no way impaired.