IMPROVED CAR TRUCK.

The engraving shows a railway car truck of novel construction, which may be used upon rails without ties, or upon any temporary railway having sharp curves in either a vertical or horizontal plane, such as may be laid upon an uneven surface without grading.

This invention is intended principally for transporting saw logs and other timbers to mills or shipping points, in which case temporary railway tracks are laid without grading. It may also be profitably employed by contractors and others requiring means for the transportation of quantities of material.

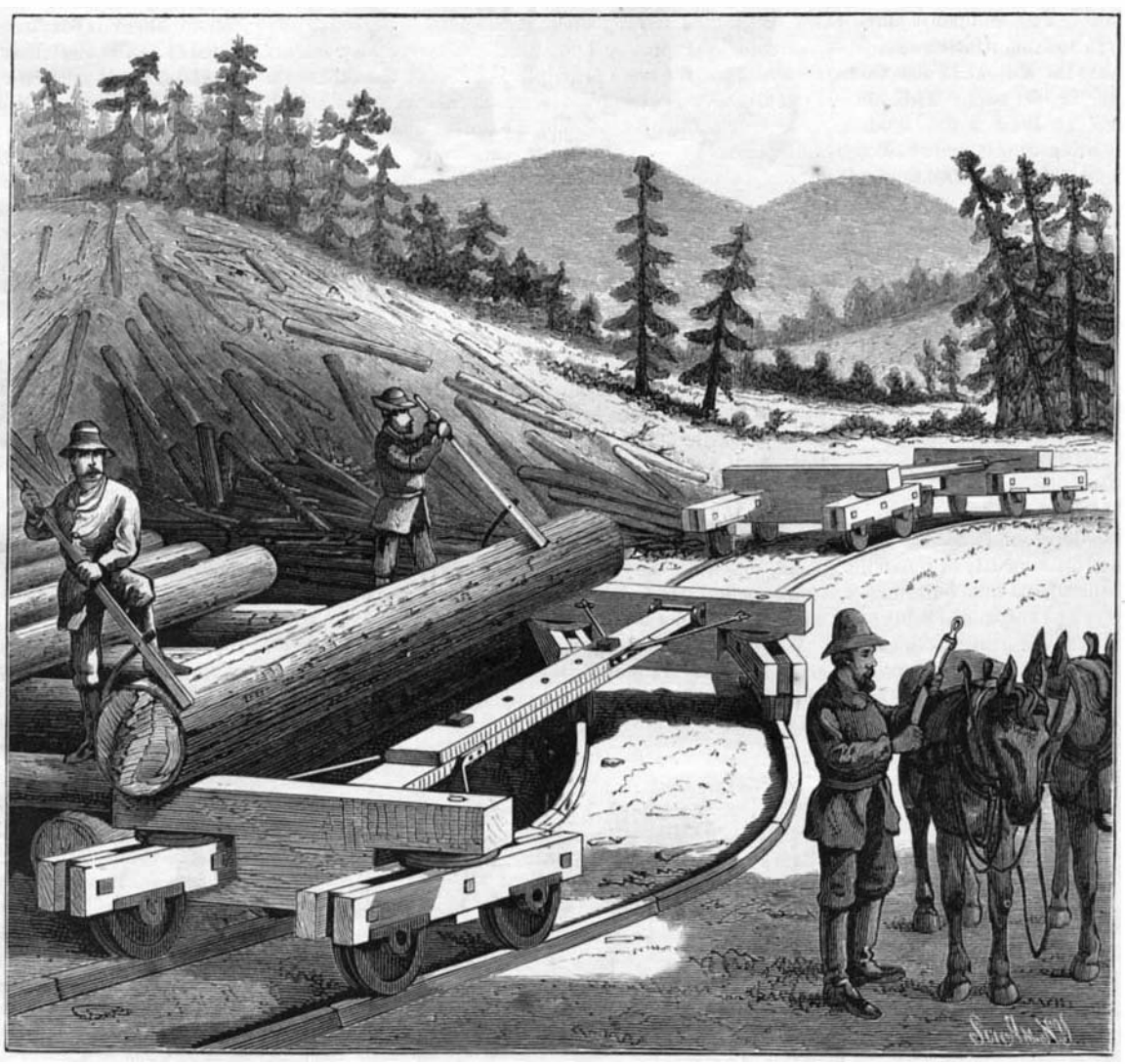
Where a track is laid on uneven surface of ground it is of great importance that the car truck shall be so constructed as to adapt itself automatically not only to sharp curves in a vertical plane, but also to undulations in a horizontal plane, to prevent straining of the framework and running gear of the car truck, and to avoid waste in propelling power. To accomplish this a series of truck frames are employed, which are swiveled independently of each other to opposite sides of the running gear by means of bolts passing through the ends of the bolsters.

Each truck frame is provided with two wheels arranged one in front of the other, and the wheels are constructed with a double flange adapted to overlap the rail on both sides, so that two rails are thus braced without the use of cross-ties. The tread of the wheels is made slightly broader than the rails, so that the two wheels of each truck frame will safely keep the track when turning a sharp curve.

The advantage of a truck frame having two wheels over one having but a single wheel is obvious in a case where great strength is desired; but this class of truck frames have been more or less rigidly connected together in pairs, and when so connected an undue amount of friction is caused between the wheels and rails for want of sufficient flexibility. Where a temporary track is used, composed frequently of wooden rails without ties, it is evident that a great degree of friction would necessitate constant repairing; but with the use of independent two wheeled truck frames, the desired flexibility of movement and action is secured, so that wooden rails are found to answer the purpose satisfactorily.

Each of the bolsters is provided with a reach which is hinged thereto, so that it will oscillate vertically, and the reaches of two bolsters are made to overlap each other, and are secured together adjustably by means of a bolt passing through holes in both. These truck frames are allowed to accommodate themselves to undulations in the track without disturbing the position of the load, and it will be seen that this car truck is adapted for use under exceptional conditions, where almost any other car truck in use would be all but impracticable. While this car truck is primarily designed for use upon rudely constructed tracks for the purpose of transporting immense timbers out of forests and for similar uses, it is also adapted for ordinary railways, and in some respects it may be found to be better adapted for this use than other trucks in use.

Any further information in regard to this invention may be obtained by addressing the patentees, Messrs. Blackman Brothers, Snohomish, Washington Ter.



BLACKMAN BROTHERS' LUMBER CAR TRUCK.

Floods in the Ohio Valley.

It is but a little while since the charitable of this country were making liberal contributions for the relief of sufferers by the floods in Europe. Now the distress has fallen upon our own people. At this writing it is estimated that at least 40,000 people in Cincinnati alone, and as many more along the river, are homeless or imprisoned by turbulent floods; thousands of others are out of employment; the loss in property is incalculable; many lives have been lost; and the sickness and suffering incident to present exposure, and sure to follow from the unsanitary condition of the now flooded district when the water shall have receded, are quite appalling.

Widespread and persistent rains falling upon frozen ground and ground covered deep with melting snow have caused a rush of water to the lower river valleys, such as their inhabitants have never seen before. On February 15, the depth of water in the Ohio at Cincinnati was over sixty-six feet, sixteen feet above ordinary high water, and two feet above the highest point recorded in the hitherto unparalleled flood of February, 1832. A large part of the city, including the gas works, is submerged, and the same is true of Covington and Newport across the river, and, indeed, of most of the towns on both sides of the Ohio River and in the lower valleys of its tributaries.

Louisville, Kentucky, has suffered grievously, hundreds of buildings having been carried away, while for seven miles along its water front, and over large areas in the lower parts of the city, back from the river, the water is up to or above the second floors. Three thousand houses are reported as entirely deserted. Many other large towns and cities on both sides of the river are in great part under water, or, like Lawrenceburg, entirely flooded. Other cities are surrounded by water and practically cut off from communication except by telegraph and boats. The interruption of the railways is general, and very serious, since the victims of the floods, especially in the smaller places, are largely without food or fuel.

It may be weeks before the real extent of the disaster can be made clear, and years before its calamitous effects can be obliterated.

The immediate cause of the flood is obviously an unusual fall of rain over a large area at midwinter, when the ground is in no condition to retain it. That the flood should be so sudden and violent is largely attributed to the destruction of the forests about the head waters of the river. No doubt the general clearing of the country has had some influence in hastening the precipitation of the flood-waters upon the main drainage valleys, but the circumstance that the worst previous flood on record happened over fifty years ago, and before the lumberman had seriously begun his inroads upon the forests west of the Alleghanies, is enough to forbid the throwing of any large part of the blame—if there be any—upon him.

The essential question now is how to reach and relieve speedily and generously the unfortunate victims of the flood.

Method of Preparing Canvas for Photography.

Dr. Sturenburg, in the *Deutsche Photographen Zeitung*, gives the following as his method of photographing upon linen, etc., as a foundation for painting upon: Take the whites of several eggs and add one gramme of chloride of ammonium to each egg; then beat these together to a froth *without* the addition of water, and let the mixture settle, and store in bottles. To use it coat the linen or canvas with a thin film of it by means of a paint brush, and then equalize the surface. In order to make the albumen less brittle, a little glycerine may be added when preparing the linen. The linen or canvas is then dried and sensitized upon a 1:8 silver bath. The prepared surface is rapidly dried beside a stove, and then immediately printed upon. The linen must not be allowed to stand when in this condition, because it would then easily become brown.

When the linen is stretched a board is placed under it, and the negative is laid upon the prepared surface. The whole is then carried out into the daylight and *printed very dark*. The negative should not be too soft, but very clear and powerful. After printing, the whole is slightly toned and then fixed in a 1:5 solution of hyposulphite of soda and water. After being well washed, the picture is coated with a moderately strong solution of bromide of potassium, and then, after being pretty well washed, is perfectly dried. The foregoing is useful for painting upon in water colors. When strongly sized drawing paper is used as the foundation instead of linen, the albuminous coat may be dispensed with and water substituted, when it is better to float the paper upon the latter than to put on the coat with a brush.

Olive Oil in the Holy Land.

The following is an extract from an interesting article contributed to the *Zeitschrift* of the German Palestine Exploration Society by the Rev. F. A. Klein:

The finest plantations of olives are in the Nablus district, but nearly every village has its larger or smaller grove. There is no doubt that the olive tree is one of the most valuable products of the country, and that it could be made a still greater source of revenue than it is at present. It requires but little attention, and lives and yields fruit even when neglected. It only requires grafting and a little digging up and clearing out, and this done, it yields a plentiful crop in return for the small amount of pains bestowed upon it. The *fellaheen* say that the vine is a *sitt*—a delicate town lady who requires a great deal of care and attention. The fig, on the contrary, is a *fellahe*—a strong country woman who can flourish without such tender care; but the olive tree is a bold *bedawiye*, who, in spite of neglect and hardship, remains a strong and useful Arab wife. The olives ripen toward the end of the summer; the trees are then beaten with long sticks, care being taken not to destroy the young leaves and shoots. The fruit is collected and spread out on the roofs or somewhere, and then put into heaps for a little while in order that it may slightly ferment; after which it is taken to the oil press, where it is crushed under a heavy millstone, and, packed in little straw baskets, is finally pressed.

The oil (*zayt*) runs into a little cemented cistern, from which it is drawn in leathern bottles or large earthenware jars for carrying away. The *fellah* uses it both for light and nourishment. If he has nothing better, he is content to eat some bread soaked in oil. It is also used a great deal in town cookery, but as a means of light it has been almost superseded by petroleum. Much inferior olive oil is used for making soap, and in some years a great deal of oil is exported to France and Italy. The *jift*, or refuse of the olives, is used for fuel, having great properties of heat.

Steel Water Pipes.

The Chameroy Company make pipes of steel plate for conveying water under high pressure. The steel plates are coated with lead on both sides by immersion or otherwise, then rolled to form, riveted, and soldered the whole length, and covered with pitch. The first cost of the steel is not much greater than that of iron, and the steel pipes possess considerable advantages over those of iron. The lead coating is superior on account of the fineness of grain in the steel; the resistance to tensile strain and internal pressure is fifty to sixty times, and the resistance to deformation longitudinally from thirty to forty times greater, while the superior elasticity of the steel plate permits of the pipes receiving tolerably hard knocks without being permanently deformed. For equal thickness the steel tubes stand twice the internal pressure of the iron, and being both light and strong, they are admirably adapted for laying down temporarily and taking up again.—*Iron.*

Influence of High Temperatures on Diastase.

It has been observed by F. Huppe that the diastase of malt is not affected by a temperature of a 100° C. (212° F.), provided the diastase itself be quite dry; in the presence of water, or even of slight traces of moisture, the diastase would be seriously affected at much lower temperatures than the above. The same investigator states that diastase is completely destroyed as a ferment at a temperature of from 160° to 170° C. (320° to 348° F.), even when quite dry. It is, therefore, important that no malt or raw grain should be submitted to a temperature of 100° C., until practically all the moisture has been expelled; and that under no circumstances ought malt or raw grain which is intended to retain any diastatic power be submitted to a temperature in excess of 100° C.

Two Thousand Electrical Inventions in One Year.

The Washington correspondent of the New York *Evening Post* reports the substance of a recent address by Mr. Edward M. Bentley, one of the examiners in the electricity division of the Patent Office. Speaking of the work of the electricity division and of the recent marvelous development of electrical inventions, Mr. Bentley said that about two thousand applications for patents in electricity were filed in 1882, of which about two-thirds were granted. To show how the subject had grown in importance within a very few years, he said that in 1877 electricity was a sub-class in a division. Now it is the largest division in the office and regarded as the most important.

This astonishing growth is due chiefly to two causes: first, the invention of the telephone; and second, the development of the magneto-electric machine. The telephone had opened, directly and indirectly, a wide field of invention. The minds of many persons throughout the country were turned to this class of inventions, and not only were improvements on the telephone itself attempted, but attention was given to a great many incidental appliances useful in its successful application.

The second great stimulus to invention was the development of the magneto-electric machine. For thirty years the world had been awaiting a cheap and convenient source of electricity. Immediately following the discoveries of Faraday and others, from 1830 to 1840, there was a widespread effort to make practical use of them, and special activity was manifested in the line of electric lighting. The arc light was put into practical form, and the foundations of incandescent lighting were laid. But no economic source of electricity was at hand, for the galvanic battery consumed too much zinc for profit. The principle of the magneto machine had, indeed, been long known, but it was left for an Italian, Pacinotti, in 1860, to perfect a machine wherein continuous and constant currents were generated. The idea literally lay on the shelf, however, until 1870, when Gramme reinvented practically the same machine, and pushed it into notice. He was speedily followed by the Siemens brothers, of Berlin, and by Mr. Brush and others in this country.

The magneto-machine, affording a cheap and abundant supply of electricity, immediately rendered practical all the half completed inventions of thirty years, and opened the way to many new ones. Brush got his patent in 1877, Weston soon after, and the growth of the electricity division has been steady and marvelous ever since. The inventions have been, however, rather in the application of known principles than in the discovery of new ones; for, during the fifty years that have elapsed since the investigations of Faraday, little new has been added to the science of electricity. The present activity springs from the application of well known exhibitions of the still unknown force. And, moreover, only a few of these features of the science have been as yet made of practical use.

One of the broadest and most successful patents appears to be the telephone. The man whose name is perhaps more widely known than any other in connection with inventions in this branch of invention is Edison. The "Wizard of Menlo Park" is an inventor rather than a scientist. His most famous achievements have been in the improvement in telegraphy and in the incandescent light. The versatility and fertility of his mind are amazing, and he enjoys the distinction of being the man who has taken out more patents than any one in this country and probably in the world.

Generally patents do not discover and cover new fields. By far the largest part consist of improvements affecting details. Thus, of the twelve hundred or more electricity patents issued in 1882 only a few possess a general interest. A singular feature in patents is the tendency to come in groups. At one time some particular subject, such as electric bells, seems to occupy the attention of inventors; then their minds will be turned in the direction of motors or lighting. Perhaps the leading tendency of late has been toward secondary batteries, or what is called the "storing" of electricity. It is well known that if the two terminals of a circuit, each of which is tipped with a small lead plate, are inserted in a vessel of acidulated water, so that the water will complete the circuit, a passing current of electricity will rapidly decompose the water into its two constituents, oxygen and hydrogen, the oxygen collecting at one terminal and the hydrogen at the other. If now they are allowed to unite again, the recombination gives out a current into a wire which is the reverse of that which effected their separation. Thus, as this form of battery can be charged at one time or place and discharged at another, it forms a most useful portable source of electricity. The popular conception of a secondary battery as a store box, in which electricity is bottled up like soda water and drawn off at will, is very erroneous. There is, to be sure, a "condenser," which actually stores up electricity; but a secondary battery, ready for use, contains no electricity whatever. It is simply an apparatus whose elements are in such a chemical condition that, upon their being placed in external electrical connection, a current will be generated therein.

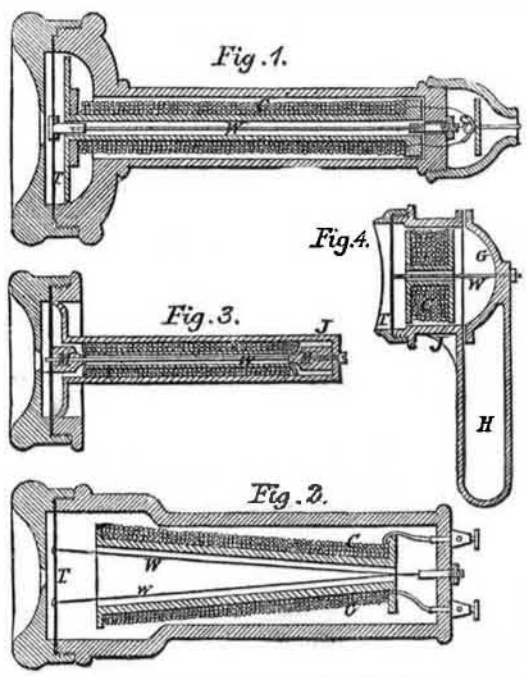
There can be no doubt that galvanic batteries, both in the simple and secondary form, are destined to play an important part in the application of electricity to common use. It is to the magneto-electric machine, however, that we look with most confidence. Electricity already is very serviceable to man. It sends our messages, calls the servant, gives an alarm of fire, announces the stealthy entrance of a burglar, regulates the temperature of a room, locks doors and windows, lights the gas, and does a hundred other services. In short, wherever it is wished to produce a mechanical movement at any distance, electro-magnetism is a ready, cheap, reliable, and tireless servant. On a large scale electricity as a motor is only useful in transferring power to convenient localities, as when a machine which generates a current is driven by a distant waterfall, but the translation of power into electricity and then its retranslation from electricity into power entail such losses that the electric motor must remain subordinate to steam, water, or other original force until a new and cheaper source of electricity is discovered.

THE REIS-THOMPSON TELEPHONE RECEIVER.

Professor Silvanus P. Thompson has lately devised, says *Engineering*, a new form of telephonic receiver of the type originally invented by Phillip Reis. In the Reis instrument the telephonic currents are received in a coil of wire surrounding a needle or rod of iron or steel mounted upon a suitable sounding box of wood. The variations of the strength of the current produce variations in the degree of magnetization of the needle, which, in consequence of the molecular changes thus set up, emits sounds. The final result of such molecular changes is, in general, to produce either an expansion or a contraction of the needle. If it be iron, steel, or cobalt, an increase of magnetization will cause it to expand in the direction of its magnetization, while if it be nickel, the contrary will take place.

In the well-known needle instrument of Reis, the sounds emitted are not loud, partly because the mass of magnetic metal is too great to permit the required changes in its degree of magnetization to be rapidly effected, and partly because the acoustic arrangement of the parts is defective and inconvenient. Professor Thompson's improved instruments are based upon the same principle of utilizing the expansion and contraction arising from the molecular changes set up by the varying degree of magnetization due to the telephonic currents, and the improvements relate to various methods of obviating or avoiding the defects of the Reis instrument, while preserving and developing its fundamental principle.

The figures annexed illustrate four of the forms that the instruments may take, similar parts being indicated by like



THE REIS-THOMPSON TELEPHONE.

letters of reference in each case. In the example shown in Fig. 1, a thin rod or piece of wire, W, of iron, steel, or cobalt, is fixed by one end to the center of a tympanum, T, of mica, horn, ebonite, sheet metal, or other suitable substance. Its other end is fixed to an adjusting screw or pin, S, by means of which the rod can be strained to any degree of tension. C is a coil of wire wound upon a tube of sufficient diameter not to interfere with the vibrations of the central rod. The combined tympanum, wire, and coil are inclosed in a case of convenient form, having an ear piece.

The general action of the instrument is as follows: If the current received in the coils, C, through the line from the transmitter increase in strength, it will change the molecular condition of the central rod, causing it to elongate slightly if of iron, steel, or cobalt, or to contract slightly if of nickel. A decrease in the strength of the currents will be followed by a partial demagnetization of the central rod, producing an inverse movement. Hence, as one end of the rod is tightly screwed up to the case of the instrument, the varying or fluctuating currents will cause corresponding vibrations of the tympanum. This telephonic receiver, when connected up with any suitable transmitter, reproduces sounds much more loudly than the original Reis needle instrument, and its articulation, especially of the sibilants and of some other consonants, is much clearer and more distinct than that of the common magneto-telephonic receivers.

In the form of instrument shown in Fig. 2 there are two wires, W and *w*, attached to the tympanum at different points, but terminating in a common adjusting screw, and surrounded by one coil. The wires may both be of iron or steel, but a better effect is obtained if one is of iron and the other of nickel, so that while one is expanding the other is contracting. Fig. 3 illustrates a modification wherein the ends of the central wire, W, are embedded in masses, M, of magnetic material, in order more effectually to produce its magnetization. One end of the wire is connected to the tympanum and the other to the closed end of an iron tube, J, which serves as the case of the instrument. In Fig. 4 the iron case, J, is shown wide and short, and provided with a bent handle, which carries an iron cup, G, to the center of which the wire, W, is screwed, the spring of the bent handle being serviceable to keep the wire in the proper condition of tension.

Status of the Telephone Patent Case.

The great interference case in relation to speaking telephones has not yet been decided by the United States Patent Office, although the arguments were closed on November 10, 1881, or more than one year ago. The interferences were preliminarily declared on March 26, 1878, the interfering applications and patents being those of Messrs. A. G. Bell, E. Berliner, A. E. Dolbear, Thomas A. Edison, Elisha Gray, A. G. Holcombe, James W. McDonough, and George B. Richmond. These interferences apparently involved at the outset eight different persons, two patents, and fifteen applications. Subsequently, Messrs. Berliner, Holcombe, and Richmond went out of the contest, either by default or their own concessions, and Mr. William L. Voelker was taken in. Recent developments in regard to transactions in telephone stock and other commercial movements in the telephone business give this great interference case an importance which at one time it did not have.

There are apparently six parties to the case—Messrs. Bell, Gray, Dolbear, McDonough, Edison, and Voelker. All had filed applications for patents upon inventions for transmitting speech by electricity, and to Bell patents had been issued. The interferences were declared by the Patent office, and the examiner was directed to determine to whom priority belonged. There are many complications in the case, and it is unnecessary to describe them now. A well informed electrician says that, in fact, there are only two parties to the case, and that these are McDonough and the interests controlled by the American Bell Company and the Western Union. Bell's application is, of course, in the interest of the Bell Company; Voelker, he says, is controlled by the Bell Company, through the Western Union, and by the Western Electric Company; Edison's interest is controlled by Bell, through the Western Union Company; Dolbear's interest is controlled by the Bell Company, and Gray's interest is controlled by the Bell Company, through the agreement with the Western Union. So the fight, according to this gentleman's statement, is McDonough against the field and against the Bell and Western Union combination. This combination was established after the suit for infringement brought by the Bell Company against Peter A. Dowd. In that suit testimony was taken, and then an agreement was reached that the Western Union should turn over to the use of the Bell Company all the telephone rights and patents in controversy; that the Bell Company should not interfere with the Western Union's telegraph business; and that the Western Union, or that part of it known as the American Speaking Telephone Company, should receive twenty per cent of the Bell Company's gross earnings.

It appears, therefore, that McDonough is the adversary of the established telephone interests in the great interference case. McDonough's interest is controlled by the United States Telephone Manufacturing Company, of New York, and it is said that this company, which has no plant as yet, has more than eighty valuable patents, some of them absolutely essential to the telephone business. In support of these patents the company has sued the Bell Company for infringement in New York and New Bedford, for using the telephone switch, and in Hartford for infringement in using what is alleged to be the McDonough receiver. These suits are pending. When the interference examination began in the Patent Office, the Voelker interest was, it is said, controlled by the Western Electric Company, but the controlling interest of the Western Electric Company has since been bought by the Bell Company. No one seems willing to predict the result of the interference case, although advocates of McDonough seem confident that this decision will favor him so far as the telephonic receiver is concerned. It is probable that whatever the result may be, an appeal will be taken to the full Board of Examiners, and perhaps afterward to the Commissioner of Patents.

The most formidable adversary of the Bell Company, so far as patents are concerned, is the United States Company, which controls the McDonough patents. The Bell Company's success in the Dolbear suit is not regarded as an important victory by some persons in Washington, and the suit at Harrisburg, based upon an injunction secured by the Bell Company, relates to the inventions of Drawbaugh, who is so far behind in the Patent Office that he is not included in the interference case. The McDonough company is, however, aggressive, and the decisions in its several suits against the Bell Company are awaited with considerable interest.—*The Operator.*

Melting Point of Fats.

Kratschmer conducts this experiment by bringing the substance to be tested into a capillary tube, placing a drop of mercury upon it, and then sealing the upper end of the tube. At the moment when the body melts, the drop of mercury sinks. The experiment can be repeated as often as desired with the same specimen.—*Zeitschrift fur Analyt. Chem.*