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NEW YORK, SATURDAY, APRIL 17, 1875.

Contents.

(Illustrated articles are marked with an asterisk.)

TRADE MARKS.

The law presents to every one inducements and facilities for honest effort. The inventor of a new manufacture is, by way of compensation, secured in the exclusive right to make, use, and sell the same for a limited number of years.

But without having created a new entity, he may wish to engage in manufacturing some special commodity, and by his skill and honesty may seek to establish a reputation that shall secure a preference for his goods over those of any of his competitors. This reputation is a property in which the law also aims to protect him. He may, in any way he pleases, inform the public how his own productions are to be distinguished from those of other manufacturers, and any attempt at fraudulent deception on their part, in that respect, will be the subject matter of an action at law against them, and all this without any statutory regulation on the subject.

Any mark or device attached to his goods is sufficient for this purpose. A word or a symbol is generally selected for thus designating them, and this constitutes what is known as a "trade mark." When by long custom it has become known to the public in its signification, its use by another person embodies a falsehood, and can be dealt with as such, so far as that can be done in a civil suit. It is morally the same as a theft, a forgery, or a counterfeit, but cannot be punished as a crime without a special statutory provision to that effect.

The statute in relation to trade marks operates in aid of the common law on this subject—modifying it to some extent, fixing specifically the penalties attached to transgression, facilitating the giving of the requisite testimony in any remedial proceedings, and providing for a registration which fixes at once the rights of the proprietor, of which every one is bound to take notice at his own peril. In other respects the rules fixing the rights and liabilities of the respective parties seem to remain substantially unchanged by the statute. Some of these rules will now be briefly considered.

The Commissioner of Patents is prohibited from receiving and recording any proposed trade mark which cannot lawfully become such. This condition refers to the rules and principles on this subject which are dictated by reason, and especially those which have been adopted by the courts.

One of these rules prescribes that the name sought to be used as a trade mark should not be descriptive. If one should seek to appropriate the word "inexplosive" as a trade mark on his preparation of an illuminating fluid, or the word "indelible" on a new marking ink, such a trade mark would not be received or recorded at the Patent Office, or sustained by the courts as legitimate. Any other person who had contrived preparations for such purposes would have a just right to commend them to public favor by like designations respectively. Any law or regulation that should prohibit him from the exercise of such a right would be wholly tyrannical and unjust.

Again it has been held that the name of any particular locality could not, as a general rule, be selected as a legal trade mark. A party who had sought to appropriate the name "Lackawanna" as a trade mark for his anthracite coal, was not sustained in that attempt by the highest of our courts (*see Canal Company vs. Clark*, 1 *Official Gazette, p.* 279.) The ground on which this decision chiefly rested was that no other person who should be engaged in mining coal in the Lackawanna district could legally be prevented from designating it by that name.

For a similar reason, the statute prohibits the registration of a trade mark which is merely the name of a person, firm, or corporation, unless such name is accompanied by a mark sufficient to distinguish it from the same name when used by other persons. And also, as a matter of manifest justice, no one is permitted to select as a trade mark a word or symbol which so nearly resembles one, previously appropriated by another person, that it will be likely to deceive the public.

But it must not be supposed that any one can with impunity attach a name to his productions, although such name could not have been appropriated by any other person as a trade mark. The great underlying rule that fraud will not be allowed to achieve success, wherever it can be detected, will interpose to prevent the consummation of an effort to compass its ends by falsehood or deception. If, therefore, a salt manufacturer at Onondaga should adopt the word "Onondaga" as his trade mark—although that trade mark would be wholly invalid as such, unless at all events he had monopolized all the manufacture of salt at that locality—still, if another manufacturer at Saginaw or Kanawha should label his commodity "Onondaga salt," he would be liable to an action by the Onondaga manufacturer. This would not be on account of the trade mark adopted by the latter. He might maintain such an action irrespective of his trade mark, and so might any other person who had sustained an injury by the fraud.

A trade mark then should be novel, that is to say, so far differing from any one previously attached to a like commodity that there will be no danger of causing deception; it should not be descriptive of the quality of the goods to which it is attached; it should not consist merely of the name of any person, firm, corporation, or locality; and finally it should not be attempted to be used for an immoral or illegal purpose. Subject to these conditions, it may consist of any device, symbol, or word—no matter how arbitrary or unmeaning in itself—that the proprietor sees proper to select.

These rules are believed to be sufficient to serve as guides in most of the cases which shall present themselves to the mind of the honest inquirer.

HOME NEWS BY WAY OF THE SUN.

"Go abroad to learn the news" is a very old saying. Just now the study of the sun's constitution furnishes a remarkable verification of the correctness of the proverb: that far away orb affording a better and closer view of the early stages of the earth's development than could possibly be gained at home, and furnishing at the same time an altogether unexpected means of estimating the relative character of the earth's chemical structure as compared with the other members of the solar system.

It is well known that the elements which compose the earth and its atmosphere are very unequally distributed. Of the part which we are acquainted with, oxygen constitutes by weight fully one half. Silicon makes up a quarter. Aluminum, calcium, magnesium, potassium, sodium, iron, and carbon, in decreasing proportions, constitute nine tenths of the remaining quarter. There is left only one tenth of a quarter to be made up of the other fifty-five non-metallic and metallic elements. Nor are these various elements uniformly mixed in the parts of the earth open to our investigation. The outer portions, being mainly sedimentary strata, derived from an original nucleus of primary rock, are of no assistance in determining the primal distribution of the elements. For this we must interrogate the basic rocks. These are naturally divided into two great divisions, holding on the whole a definite relation to each other. The upper mass consists of granite and other plutonic rocks rich in silica, moderately rich in alumina, and poor in lime, iron, and magnesia. Below are basaltic and volcanic rocks poorer in silica, equal in alumina to the upper series, and much richer in iron, lime, and magnesia, and containing also a great variety of other elements as occasional constituents: the proportion of the denser metals increasing downward. These relatively precious constituents of our earth, as we all know, reach the surface only through veins which traverse the outer layers.

How did it happen that a few of the elements are provided so plentifully for us, while there is such a scanty provision of the rest? And why are the useful metals chiefly hidden in the depths?

The Pope, the Turk, and—not the devil, as the old litanies ran, but his chief opponents—the clergymen, (some of them at least) reply: "It is the will of God," and that ends the inquiry with them. But Science rests with no such thought-repressing dogma. Present conditions are, because some other conditions were: what were those conditions? In pursuit of the answer to this question scientific men stop at nothing short of "interviewing" the Universe. Naturally the ruler of our planetary system is the most instructive witness in regard to the genesis of his family, the earth included.

It appears to be pretty conclusively shown, by spectroscopic analysis of the sun's light, that the following twenty terres trial elements (with indications of perhaps two otherwise unknown elements which need not be taken into this account) exist in the sun's atmosphere:

Aluminum	Chromium	Lead	Sodium
Barium	Cobalt	Magnesium	Strontium
Cadmium	Copper	Manganese	Titanium
Calcium	Hydrogen	Nickel	Uranium
Cerium	Iron	Potassium	Zinc

These various substances are not indiscriminately mixed in the vapors which surround the sun. Thanks to the interposing face of the moon in total eclipses, it is possible to study the sun's atmosphere in sections, so to speak: by which study it appears that, by virtue of the high temperature which prevails there, and the varying specific gravity of the different elements, the latter are enabled to arrange themselves in layers, in spite of the storms and gaseous outbursts which would tend to disturb their positions. It is observed too that, in the main, the number of elements increases downwards. The outer "coronal" atmosphere contains cooled hydrogen. The "chromosphere" shows incandescent hydrogen, magnesium, and calcium. The "reversing layer," which lies next the photosphere, exhibits sodium, chromium, manganese, iron, nickel, and the rest, with the probable exception of aluminum, the place of which has not been determined by observation, but which most likely lies between magnesium and calcium.

Theoretically the metalloids should lie, as a group, outside the metallic atmosphere: and Mr. Lockyer has submitted some evidence to show that they probably do, explaining why, under the conditions which prevail, their record among the Fraunhofer lines should be a feeble one, and insisting that, in the lack of such lines, we have no argument against the presence of some quantity of the metalloids in the sun, although that quantity may be small. As collateral evidence it is proper to add in this connection that, in the spectra of granite, greenstone, and lava, no trace of metalloids is seen, notwithstanding the (chiefly) non-metallic character of those rocks.

Assuming, in accordance with the nebular hypothesis, that the earth was once in the condition which the sun now presents, we can readily understand why its chemical constitution should be what it is. From the known behavior of the elements, it is inferable that, as the external metalloidal vapors cooled, they would condense and fall upon the underlying layer forming these binary compounds capable of existing at a high temperature, such as the vapors of water and hydrochloric acid, silica, carbonic acid, and others.

As the cooling went on, the precipitation of these binary compounds would give rise to numerous reactions, forming silicates, chlorides, sulphates, etc. With still further cooling, the condensation of water and the formation of minerals would ensue, and the consolidation of the outer shell would begin. The condensation of the metals would come much later and nearer the center.

The same line of facts and reasonings give a clue to the probable constitution of the planets. Assuming the solar nebula to have once existed as a nebulous star at a temperature of complete dissociation, and to have contracted with loss of heat, throwing off the planets successively, we may infer that the outermost would be chiefly if not entirely metalloidal; the inner ones would be increasingly metallic as their orbits approached the central portion of the nebula. Mr. Lockyer considers that the low density and the gigantic and highly absorbing atmospheres of the outer planets accord with their being more metalloidal than the earth: on the other hand the high density and comparatively small and feebly absorbing atmospheres of the inner planets point to a more intimate relation with the inner layers of the original nebulous mass, and consequently a more metallic constitution. For the same reason we should expect to find the metalloids scarcer in the sun than in the earth. The otherwise mysterious fact that the moon is of lower density than the earth, and the moons of Jupiter similarly less dense than their primary, is easily explained by this hypothesis.

The news which we have briefly summarized awaits confirmation, though (as the newspapers say) it comes direct, and from a trustworthy source. It is certainly good enough to be true, commending itself, as Professor Prestwich observes in his review of the present aspects of geology, not only by the simplicity and grandeur of the views presented, but for their high suggestiveness for future inquiry and research.

GERMAN PATENT LAW.

At present the various States, comprising the German Empire, have each a separate patent law. At the time of the Vienna Exposition it was proposed to initiate a general patent law, and to abrogate the State laws. For this purpose the German Patent Protective Association was formed, and they have prepared the details of a new law, which has been presented to the Federal Council, with a petition for its enactment.

The proposed new law is substantially a codification of existing provisions, and embodies the current continental notions about patents and inventors. The latter are regarded as interlopers or trespassers, who must be watched, surrounded by restrictions, and compelled to surrender their property to whoever demands it.

In this country, the inventor is regarded as a public benefactor, enjoys entire freedom in the possession and working of his patent, is encouraged in his work, and honored by the people. It is chiefly when he goes before Patent Office officials that he meets with rebuffs and discouragements.

The proposed German law provides for a commission who shall decide as to the propriety of granting patents. Official fees small. Duration of the patent, 14 years. Annual payments to be made; neglect to pay forfeits the patent. Within six months after the application is made, but before the patent is granted, the applicant must show that the invention has been actually worked within the Empire. The Patent Office may extend the term for working to a year in special cases, and will then decide whether or not to grant the patent. Patentees are compelled to grant the right of use to any persons who desire; and if the parties cannot agree as to terms, the Patent Tribunal shall name the price which the inventor must accept. The government may use any invention, without negotiating with the patentee; the Tribunal will name a sum, which the patentee must accept, or get nothing.

A STREET RAILWAY IMPROVEMENT WANTED.

We publish in another column a note from the president of the Third Avenue Railway of this city, inviting the attention of inventors to a needed improvement in the joints of the rails of street railways. The Third Avenue Railway is one of the most extensively patronized roads in the world. Its length is eight miles, and it carries about thirty millions of passengers per annum. Its rails are spiked down upon longitudinal wooden beams, with an iron plate under the ends of the rails. In addition to the enormous traffic of the company, the rails are subjected to much wear and tear from heavy street vehicles. The improvement called for must be of such a nature as to be readily applied to existing rails.

A NEW DODGE.

We have frequently had occasion to warn patentees against the persistent efforts of designing persons in all parts of the country to abstract money from their pockets under various pretexts. The most numerous class of these impostors have hitherto been those who send circulars and letters to patentees, announcing their extraordinary facilities for selling patents, insinuating that they have a customer for the invention, etc., and all they require to consummate the sale is a power of attorney and a small fee in advance.

Our exposure has very nearly effected an extermination of their operations in this line, but now they turn up in a new rôle.

Instead of sellers of patents, they now appear as solicitors. They look through the list of patents each week, and write to the patentees, stating that their claims do not appear to cover the whole of their inventions, and advise reissues in each case, and set forth special facilities for obtaining these reissues. We have before us a letter from one of these reissue solicitors which a gentleman has sent us, with the usual enquiry as to what we know of the writer. The solicitor's letter goes on to state that his only means of judging of the *strength* of the patentee's claims was from the published report. The writer had not even read or seen the gentleman's patent, but he has written advising him to apply for a reissue, stating that for $70, including all fees, payable when the order is given, he will do his best to get broader claims; but, he adds, the inventor must take all risk of failure. The writer is evidently a novice at this new dodge, and is either very stupid or has a streak of inherent honesty left; for he admits, as before stated, that he has never seen the patent, and he also frankly states in another portion of his letter that he does not know whether the patent can be strengthened, adding truthfully that the result would depend altogether on what had been done in this line before the patentee made his application. But he winds up by stating that he believes that better claims can be "engineered through." What is meant by "engineering through" is not explained; but the expression would seem to be a part of the means used for impressing the patentee as to the magnitude of the solicitor's influence in getting allowed such claims as he may ask for.

It is not a large number that will be deceived by such specious communications; but some will be made nervous, and wonder to themselves if they have a valid patent. We would advise such persons to consult their own agents for information, but under no circumstances to place their business and money in the hands of these letter-writing solicitors, with whom they have no acquaintance.

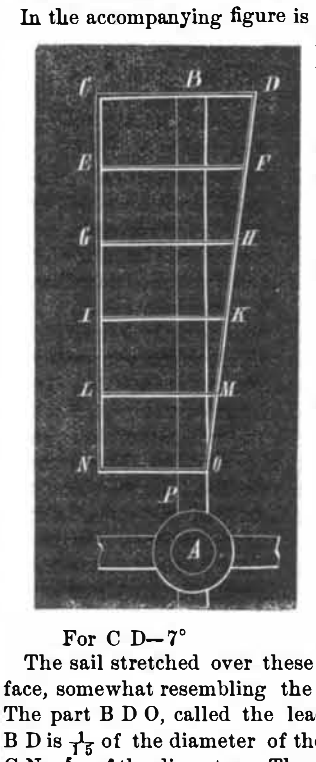
It is not often that unsolicited advice from a stranger is worth very much, and the motive that prompts it may usually be looked upon with suspicion. We do not assert that advice thus tendered is necessarily given from pernicious motives; but we believe that it is not wise to follow the advice of strangers whose opinion is volunteered; and that those who place their business in the hands of such persons will be likely to find the experiment an expensive one.

HOW TO BUILD A WINDMILL.

The principal data connected with windmills were discovered by experimenters early in the present century, the best proportions for sails being ascertained, and most of the important details of construction being worked out. We do not mean to say that manufacturers have made no improvements since that time, only that nothing of any great novelty has been produced. We must refer the reader to some standard treatise on mills and millwork, and to the circulars of manufacturers, for information in regard to the various details and patents, and will content ourselves with a description of a standard mode of construction and proportion. Windmills can be either horizontal or vertical, but the latter are almost exclusively employed. In the vertical windmill, the shaft is inclined to the horizon at an angle of from 5° to 15°, when the wheel is placed at the top of a tower; so that the wheel will clear the sides of the building, and allow space for the action of the wind. If the wheel is supported by a post, the shaft may be horizontal. The connection of the shaft with the pump or other mechanism may be made either with gearing, or by means of a crank and connecting rod. The shaft must be free to swing around in any direction, so that the wheel can always face the wind. It is moved, in the case of small windmills, by the use of a weather vane on the end of the shaft opposite to the wheel. With large windmills supported on towers, the top of the tower is generally arranged so that it can be rotated, and a small auxiliary wind wheel, connected by gearing, moves it into the proper position as the direction of the wind changes. The wheel of a windmill may be covered with cloth, or with slats of wood or metal, the cover in either case being technically known as the sail. It is frequently necessary to reef the sails, when the force of the wind increases; and windmills are often arranged so that this reefing is performed automatically. A common method of effecting this is to make the sail of a series of jointed slats, that present a close surface to wind of the ordinary velocity, and open, thereby decreasing the surface, as the velocity of the wind increases. A good number of the windmills in use, however, are covered with cloth, and reefed by hand as occasion requires. The best velocity for a windmill is such that its periphery moves about $2\frac{3}{5}$ times as fast as the wind. Thus, if the wind is moving at the rate of 20 feet a second, the tips of the sails should move at the rate of 52 feet a second, so that, if the wheel were 12 feet in diameter, it should make about 83 revolutions a minute. Of course, if the velocity of the wind varies greatly, it will be impossible to keep the speed constant, so that windmills are not ordinarily well suited for work requiring steady motion; although they answer very well for moving pumps, if an intermittent supply of power is not a serious obstacle. In some sections, however, the prevailing winds are quite steady, and in such cases windmills can be applied with advantage to grist mills and other useful work. The force and velocity of the wind can only be determined by experiment, but the results of previous experimenters may be useful to our readers, and we give below a summary of the most recent and reliable:

Velocity of wind. In feet per second.	Velocity of wind. In miles per hour.	Perpendicular force, in pounds per square foot.	Common expressions of the force of the wind.
10	6·82	0·33	Gentle pleasant wind.
20	13·64	0·91	Brisk gale.
30	20·56	2·04	Very brisk.
40	27·27	3·92	High wind.
50	34·09	6·25	Very high.
60	40·91	9·25	Very high.
70	47·73	12·75	A storm.
80	54·55	16·34	A storm.
90	61·36	20·74	A great storm.
100	68·18	25·28	A great storm.
110	75·02	30·89	A great storm.
120	81·84	36·75	A hurricane.
130	88·65	43·26	A hurricane.
140	95·47	50·32	A violent hurricane.
150	102·29	57·56	A violent hurricane.

In the accompanying figure is shown one of the four sails of a windmill, it having been found that four sails of proper proportion produce the best effect. The piece, P B, is called the whip of the sail; C D, E F, G H, etc., the bars of the sail. The bars are inclined to the plane of revolution, at different angles, the angle made by any part of the sail with this plane being called the weather of the sail. Making the distances A O, N L, L I, etc., each equal to $\frac{1}{12}$ of the diameter of the wheel, the best values for the angle of weather are as follows:



For N O—18°
For L M—19°
For J K—18°
For G H—16°
For E F—12½°
For C D—7°

The sail stretched over these bars will be a warped surface, somewhat resembling the blade of a screw propeller. The part B D O, called the leading sail, is triangular, and B D is $\frac{1}{15}$ of the diameter of the wheel, B C being $\frac{1}{10}$, and C N, $\frac{5}{12}$, of the diameter. The main body of the sail, B C N O, is commonly rectangular. A windmill of the best proportions, running under the most favorable circumstances, utilizes about $\frac{29}{100}$ of the energy of the wind that acts on an area equal to a circle having the same diameter as the wheel. It would not be advisable to count on realizing more than half this power in general practice; and on this assumption, we have the following empirical rule, for determining the diameter of a wheel, to give a certain amount of power, with an assumed velocity of the wind:

Divide the required horse power by the cube of the velocity of the wind in feet per second, take the square root of the quotient, and multiply it by the number 2024·8. The product will be the required diameter in feet. An example illustrative of the preceding principles is appended. A windmill is to be erected in a locality where the general velocity of the wind is about 20 feet per second. It is to be attached to a pump, the work required of it being to raise 1,000 gallons of water per hour through a hight of 20 feet: 1,000 United States gallons of water weigh about 8,320 pounds, and, taking into effect the resistance of the pump, the power required will be about $\frac{1}{6}$ of a horse power, or 0·167 horse power. Dividing this by 8,000, the cube of the velocity of the wind, extracting the square root, and multiplying by 2024·8, we obtain 9¼ feet as the required diameter of the wheel. Referring to the figure, we find that, in this case, C N is 3 feet 10¼ inches, B D, 7⅜ inches, and B C, $11\frac{3}{32}$ inches. The velocity of the tips of the sails should be 52 feet per second, or the the wheel should make about 108 revolutions a minute. These explanations will probably be sufficient to enable any of our readers who desire it to construct a wheel, and we shall be glad to hear of the success of their efforts.

SCIENTIFIC AND PRACTICAL INFORMATION.

NITRO-GLYCERIN.

Professor Mowbray, in a recent lecture before the Stevens Institute of Technology, on the subject of explosives, stated that nitro-glycerin is now largely made from the fatty waste of stearin and soap factories. Its density, which is 1·6, water being 1, enables it to exercise its tremendous force; for in a given bulk, there is 60 per cent more gaseous matter than would be contained in it were it only of the density of water.

NEW IMITATION SILVER ORNAMENTS.

In several stores in Munich various objects of art have lately been displayed, which are remarkable for their brilliant silver hue. It appears that they are mere plaster models covered with a thin coat of mica powder, which perfectly replaces the ordinary metallic substances. The mica plates are first cleaned and bleached by fire, boiled in hydrochloric acid, and washed and dried. The material is then finely powdered, sifted, and mingled with collodion, which serves as a vehicle for applying the compound with a paint brush. The objects thus prepared can be washed in water, and are not liable to be injured by sulphuretted gases or dust. The collodion adheres perfectly to glass, porcelain, wood, metal, or *papier maché*. The mica can be easily tinted in different colors, thus adding to the beauty of the ornamentation.

NEW PROCESS OF GILDING ON GLASS.

Professor Schwarzenbach, of Berne, has recently devised the following new method of gilding on glass: Pure chloride of gold is dissolved in water. The solution is filtered and diluted until, in twenty quarts of water, but fifteen grains of gold is contained. It is then rendered alkaline by the addition of soda. In order to reduce the gold chloride, alcohol saturated with marsh gas and diluted with its own volume of water is used. The reaction which ensues results in the deposition of metallic gold and the neutralization of the hydrochloric acid by the soda.

In practice, to gild a plate of glass, the object is first cleaned and placed above a second plate slightly larger, a space of about one tenth of an inch separating the two. Into this space the alkaline solution is poured, the reducing agent being added immediately before use. After two or three hours repose the gilding is solidly fixed, when the plate may be removed and washed.

The Clark Revolving Shutter.

It is announced in the advertising columns of this issue that Messrs. Clark & Company, of London, Eng., patentees and manufacturers of self-coiling shutters made of steel, iron, or wood, have an agency at 218 West 26th street in this city. Messrs. Clark & Company's shutters are to be found in all parts of the world, and are known for their ease in working, security against burglars, and finished and ornamental appearance. The firm have other branches at Boston, Mass., Dublin, Edinburgh, Manchester, Liverpool, Melbourne (Australia), Paris, Berlin, and Vienna, their headquarters in London being a very large and complete manufacturing establishment. In New York city, the Clark shutters are to be seen on the new building for the Lenox library, 100 of them having been put into the structure; and the Delaware and Hudson Canal Company's new building and the *Tribune* offices are also being supplied with them. They are to be seen in many other of our principal cities, and there cannot be two opinions as to their convenience and efficacy in use and light and ornamental appearance.

NEW subscribers to the SCIENTIFIC AMERICAN will hereafter receive the papers from the time of our receiving the order, unless they specify some other date for commencing. All the back numbers from the commencement of the volume (January 1) may be had if requested at the time of sending the order, or on request, after receipt of first number.

PREPARING SOIL FOR POTTING.—We find the following under the heading of "House Plants" in a popular and excellent family magazine: "Ladies who find their efforts to raise house plants frustrated by worms may be able to win success by boiling the earth before setting the plants. Use little water, and allow it to simmer away after a few minutes of hard boil."

THE New York city authorities, who once peremptorily refused to allow the American Telegraph Company to lay its wires underground, are now seeking to compel all the companies to bury their wires.