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Contents.

(Illustrated articles are marked with an asterisk.)

TABLE OF CONTENTS OF

SCIENTIFIC AMERICAN SUPPLEMENT

No. 994.

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STATISTICS CONCERNING GERMAN TRADE MARKS.

The German manufacturers are not as indifferent as are American manufacturers to the benefits to be derived from the protection afforded by the trade mark laws.

This new law went into effect on the first of October last and resulted in the most wonderful activity in this department of the Patent Office.

During the month of October, 1894, about 8,000 applications for the registration of trade marks were filed in the German Patent Office; 5,950 of these applications related to trade marks which had already been registered under the provisions of the trade mark law of November 30, 1874, the present law requiring all such trade marks to be registered, anew before October 1, 1898, to preserve their validity.

Such a result was entirely unexpected, and the Patent Office officials have their hands full in attending to the great mass of work which is piling up in the office.

ON THE CHOICE OF A CAREER.

There are times in a young man's life when he is beset as to what he shall do for a livelihood, and the question as to a choice between a profession and a technical course is before him. In looking over an experience of nearly fifteen years, it seems as if, notwithstanding the many disappointments in life, there is a greater opportunity for a young man in the field of technology than anywhere else.

If the question were to be put as to what branch of technology offered the greatest opportunities for a successful career, the answer would be, In the domain of technical chemistry. The world is full of men who cannot make a success in any career, and yet they get along somehow. But they are not the ones to whom one should look as examples. Rather study the careers of those who have succeeded and who have overcome the obstacles that have at times impeded their progress. The success of Carnegie in this country and the success of Bessemer in England are well known illustrations of men who have succeeded, but for fear some captious individual may say, "Yes, but that was when times were different," let us take a modern example, one of the immediate present. No one in recent years has so thoroughly made a high reputation for himself as a chemist as H. Y. Castner. Let us examine his career for a short while, and see if there is not something in it that may encourage the young man about to enter upon a technical career. Castner left the School of Mines in 1879 without a degree, and at once devoted himself to the practice of analytical chemistry. An analyst has, unfortunately, but few opportunities of developing his abilities. He does one thing, and the one thing that dozens of men can do, and do equally well. There is no future to that sort of work. This Castner promptly recognized and devoted his leisure to the study of chemical processes. It was not long before he became interested in the manufacture of boneblack, and soon invented a continuous process for making that article. It was a chemical success, but, for reasons that had to do with the economic conditions of the market, it failed to be a pecuniary success. The cheap production of aluminum was then a subject of considerable study on the part of chemists both here and in Europe. Castner examined the ground very carefully, making a very complete study of the literature of the subject, and then set to work experimenting. He soon invented a process concerning which Sir Frederick A. Nobel, in his presidential address before the British Association in 1890, said that it constituted "one of the most interesting of recent illustrations of the progress made in technical chemistry, consequent upon the happy blending of chemical with mechanical science through the labors of the chemical engineer." A unique success was made, and the world heralded the new discovery with applause, but soon electrolytic processes compelled the abandonment of the direct chemical production of aluminum.

The characteristic feature of the Castner process was its method of making sodium, and he promptly turned his attention to that element, creating a demand for it which he supplied. He also called attention to the value of sodium peroxide, which was promptly recognized, and his plant at Oldbury continued in active operation, furnishing at a profit many of the sodium salts. Here we have a career of a chemist who is not yet forty years of age, but who has invented three valuable improvements in existing processes. These inventions, each of which has marked a distinct era in the progress of science, have gained for the inventor a handsome fortune.

More recently Castner has invented an electrolytic process for the decomposition of alkaline chlorides, yielding caustic soda and chlorine, which, according to certain English technical journals, may result in revolutionizing the long accepted Le Blanc and Solvay processes.

It is not necessary to enter upon any discussion of the merit of these inventions. They are cited simply for the purpose of illustrating that opportunities exist around us all the time, which, if promptly seized upon, lead to fortune and reputation.

In no country in the world are the possibilities of a successful career in the line of technical chemistry more evident than in these United States. With the single exception of potassium salts, there is no limit almost to the amount of crude substances existing in nature, capable and ready for use. One single illustration of this fact may be permitted. Candles made from the paraffine contained in ozokerite are considered superior to all others. If the deposits of this mineral that exist in Utah were developed and used for the making of candles, the entire supply required for the region that exists between the Mississippi River and the Pacific Ocean would be at the mercy of the maker. And yet we import candles.

The magnificent soap establishments in Chicago and Cincinnati are striking examples of the growth of enormous plants from very small beginnings. It is for such work that the chemist must educate himself. First he needs an education at some technical school, and there are many of these. In New York City there is the School of Mines of Columbia College; in Boston there is the Massachusetts Institute of Technology; in Chicago there is the Armour Institute; in Golden there is the Colorado School of Mines; and near San Francisco there are the technical departments of the University of California. In any one of these, and they are all good, a young man may prepare himself for just such a career as Castner has made for himself. He must devote himself to the study of principles. These will be of more value than skill in manipulation or a special knowledge of details. It is a great deal better to know how to make any analysis than to be able to make any one single analysis without error.

It is a great deal better to know how to install any factory than to be able to put up one kind of works. With this general idea the student pursues his course until graduation. Places do not come at once, and even sometimes are hard to obtain, but in time the way will open, and then, if the fledgling is able to put into practice the knowledge that he has acquired, there are no heights in the professional world to which he may not soar. Watch your opportunities. If you study the career of any great man, you will find that it was the opportunity that made him. Grant might have remained a tanner in Galena if his opportunity had not come to him with the civil war. If opportunities do not come readily, you must try and force them. No process is perfect so long as it is of human origin. Therefore, select a process, study it, find out its weak point, and endeavor to improve that. In this way your opportunity will come. Find uses for refuse materials. Remember that the refuse of gas works became the source of the aniline colors. Frequently the value of by-products is sufficient to pay for the process. Thus the precious metals obtained in the electrolytic refining of copper enable the smelters of Montana and Arizona to sell refined copper at a price far below that which English smelters can afford. Inspiration and suggestions frequently come from sources that are seldom expected. A poet was once speaking of his valuable reference library. The connection was at first blush not apparent, but it soon transpired that in his descriptions of nature he always verified his fancies by reference to his books. The reason of his having gained the reputation of being a poet true to nature was thus disclosed. His appreciation of a value or an application in something apparently remote from his work showed his genius. So it is in chemistry. The man who is successful will find suggestions when he least expects them, and which, if properly applied, will bring him wealth or that which is better, a high reputation.

Earthquake Waves.

Some of our readers may remember that the pulsations of the great earthquake in Greece last April were perceived in England and, it was believed, at the Cape of Good Hope, by means of very delicate instruments contrived for the purpose of registering any slight shaking of the earth's crust. In like manner the shock of the Constantinople earthquake of July last was perceived at various meteorological observatories in Austria, Russia, Germany, Holland, France and England.

By a comparison of times, combined with the distances from Constantinople of the places where pulsations were observed, a fairly accurate estimate of the velocity with which the earthquake waves traveled was obtained.

The average speed was about two miles per second. This is almost exactly the same velocity as that which was calculated for the pulsations of the Greek earthquake in April. At this rate, if it were continued without diminution, the wave would pass completely round the earth, along a great circle, in about three hours and a half.

One of the English instruments which registered these pulsations is at the bottom of a deep mine near Newcastle on-Tyne, and its delicacy may be judged from the fact that it has recorded the beating of the waves on the sea coast ten miles away.

How the Illustrations of the Magazines and Papers are Made.

In our issue of last December 1 we described the process of engraving for newspaper work. The following from the New York Recorder contains a more complete description of the processes used in illustrating our monthly magazines and newspapers, which to the general reader is but little understood.

Pictures for the illustration of magazines and some newspapers are now made direct from photographs. A glass screen with diamond scratched lines ruled at right angles so closely together that the spaces can hardly be distinguished is placed one-eighth of an inch in front of the sensitive plate in the photographic camera. Looked through, the effect is much the same as gazing through a sieve. These lines reappear in the half tone engraving when printed.

The photograph or wash drawing from which the photo-engraving is taken is photographed in the usual way and with the usual sensitive plate, with the previously described screen in the camera between the plate and the picture. This produces a negative of the picture, showing the fine cross lines represented by clear glass. Now, in order to have the same position of the object of the engraving as in the original, the film of the negative is treated to one or two coats of collodion, which gives it a sufficient consistency to permit of its being removed. The film is then stripped, reversed and secured to another glass with the aid of collodion. After careful mounting this new negative is ready to be used as a medium for printing on the zinc plate.

The face of the plate is buffed to the highest degree of polish, then coated with a solution of albumen and gelatin, then sensitized with bichromate of ammonia. It is then dried and placed in the printing frame, the coated side next to the negative film. The case is then exposed to the sun or light three to five minutes or to an electric light for fifteen to twenty minutes. The light passes through the heavy inch thick glass of the printing frame, then through the negative, striking the sensitized plate and decomposing the chemicals wherever it may fall. Where the plate is protected by the shadows and half tones of the negative the sun light has less effect, and where the shadows are dense it has no effect.

This plate is then removed from the frame in a dark room and carefully washed under running water for several minutes, then dried and heated until the picture appears of a dark brown color. The back of the plate is rubbed with wax while hot to protect it from the etching solution, which is made from perchloride of iron. The picture on the plate is acid proof, and the etching solution eats only where the plate is unprotected, that part which is blank in the finished engraving. The plate is allowed to remain in the acid bath for about fifteen minutes, or until sufficient depth is obtained. It is then washed and is ready for the router and the printer.

What Drowning Feels Like.

A woman, who was among those saved in the recent deplorable accident in Morecambe Bay, is reported in the papers to have said that she remembered sinking twice and thinking she had "only to go down once more and all would be over."

There are several authentic records of such experiences. One of the most interesting is that of Admiral Beaufort, as described by himself in a letter to Dr. Wollaston. When a youngster he fell overboard in Portsmouth Harbor, and before relief reached him had sunk below the surface. All hope had fled, all exertion ceased, and he felt that he was drowning. Two minutes did not elapse before he was hauled up, and he found the return to life much less pleasant than drowning. Admiral Beaufort adds that he had heard from two or three persons who had had a similar experience that their sensations had closely resembled his own. Sir Benjamin Brodie relates the case of a sailor who had been snatched from the waves and lain for some time on the deck of his ship insensible, who on his recovery declared that he had been in heaven, and complained of his restoration to life as a hardship.

In a well known passage of the "Confessions of an English Opium Eater," De Quincey relates that he was once told by a near relative that "having in her childhood (aged nine) fallen into a river, and being on the very verge of death but for the assistance which reached her at the last critical moment, she saw in a moment her whole life, clothed in its forgotten incidents, arrayed before her as in a mirror, not successively, but simultaneously, and she had a faculty developed as suddenly for comprehending the whole and every part."

An American gentleman, Mr. C. A. Hartley, has recently given an interesting account of his sensations when drowning. He lay at the bottom of a river in a state of semi-consciousness, in which he saw his relatives and friends all about him with their eyes full of tears. All the events of his life, from infancy upward, passed slowly before his mental vision; he felt that he was drowning, and he remembers thinking, unlike Clarence, that it was not pain to drown. He was able even to speculate whether his body would be found, and he pictured his own funeral, and fancied he could hear the earth thrown on his coffin. He had sensations of the nature of tinnitus (ringing of bells, etc.) in his ears, and he had visual perceptions of the most marvelous combinations of colors. Next all was peace around him; he had a peculiar feeling of well-being in a medium of a temperature neither too hot nor too cold. Then he felt himself as if raised from the earth, and floating in space, and looking down on the world spread out at his feet. Lastly came mere darkness and oblivion till he found himself stretched on the river bank and being subjected to the disagreeable process of restoration to life.

It will be noted that all these accounts agree in two points, namely, the apocalypse of the past life, even in its minute details, and the absence of any unpleasant sensation. On the whole, the popular idea (which in such matters is never wholly wrong) that drowning is a pleasant form of death is confirmed by the testimony of the few who have practically reached the bourne of the undiscovered country and yet returned to tell the tale.—British Medical Journal.

NOTE.—A friend of the writer, a reliable gentleman well known in business circles in this city, claims he died a pleasant death from drowning at the time of a steamboat disaster a few years ago.

His experience, as related about the time of its occurrence, was very like these given in this article. He claimed the act of dying, as he termed it, was a pleasurable sensation, while the resuscitation was distressing. —EDS.

The Plymouth Meteorite.

BY HENRY A. WARD.

The Plymouth meteorite was found in the year 1893 by Mr. John Jefferson Kyser, while plowing in a field on his farm, about five miles southwest of the town of Plymouth, Marshall County, Indiana. Mr. Kyser had, about the year 1872, found in the same field another, larger mass of the same iron. This mass was pear-shaped, about 4 feet in length by 3 feet in its widest diameter, narrowing to 6 or 8 inches at its upper end. It lay for a year or two so near the surface of the ground as to be seriously annoying in plowing the field. On that account Mr. Kyser, aided by his son, dug a deep hole by the side of the mass and buried it to the depth of 1½ to 2 feet beneath the surface, where it should thenceforth do no more damage.

The account of this I had last June from the son, Mr. John M. Kyser, now city clerk of Plymouth. Mr. Kyser well remembers the circumstance of the finding of the large piece and assisting his father in burying the same; and he further thought that, notwithstanding the removal of certain landmarks (a fence and tree) in the field, he would still be able to locate it very closely. This he subsequently undertook to do by trenching, but was unsuccessful in finding the mass. I was myself present and assisted in a further search for it in September last, using a surveyor's magnetic needle, with the hopes of the same being attracted to the mass and discovering it, but all to no purpose. Mr. Kyser seems to feel very confident of his knowledge of the immediate vicinity of the mass where he buried it 22 years ago, but is unable to prove its presence by rediscovery. Nor has he the aid of another eye-witness, his father having died soon after the original finding and burying as above mentioned.

The smaller piece, which was, as before said, found in 1883, was presented by Mr. Kyser, Sr., to Mr. W. S. Adams, who, at that time, kept a plow factory in the city of Plymouth. It was retained in their family until last November, when it was brought to Ward's Natural Science Establishment in Rochester, N. Y., by Mrs. Adams, from whom I procured it.

The mass is a lengthened, tongue-like form, not unlike a rude mound builder's ax. Its greatest length is 12½ inches, its width 7⅜ inches, its thickness in the middle about 2 inches, from which, in the greater part of its length, it slopes in a somewhat even manner to a thin, rounded edge.

Its surface is deeply eroded by oxidization, so that, although sound and free from scales, it shows no signs of an original crust. The characteristic pittings of meteorites are also by the same cause rendered somewhat feeble, although still quite clearly visible. We have cut a number of thin slices from the mass. These etched in dilute nitric acid give very clear Widmanstatten figures. There are, further, several small nodules of troilite.

A careful analysis of this iron has been very kindly made for me by Mr. J. M. Davison, of the Reynolds Laboratory of the University of Rochester, and I give the same below.

ANALYSIS OF PLYMOUTH METEORITE.

Fe	88·67
Ni	8·55
Co	0·66
Cu	0·24
P	1·25
Graphite	0·11
S	0·07
	99·55

This iron, herein briefly noticed, is interesting in many ways, and it is much to be regretted that the large mass, of which the record seems to me to be entirely reliable, cannot be rediscovered.—Amer. Jour.

Boiler Explosions.

At a recent meeting of the Engineers' Club, Philadelphia, Mr. John L. Gill, Jr., exhibited and explained a table showing the energy stored in boilers of different types, dimensions, and horse powers, and the height to which this energy could throw the boiler, with its weight of water, if allowed to act through an explosion.

The explosion which occurred recently at Shamokin, Pa., in a plant of 36 boilers, arranged in nests of 3, whereby 27 of the boilers exploded and were thrown to a considerable distance from their original resting places, was possibly due to gas having collected under one or two of the boilers, and by its explosion breaking the branch connection to the main pipe, thereby causing others to explode; or it may have been occasioned by one set of boilers running out of water, the latter cause being the more probable. Mr. Gill then explained, by means of the projecting lantern, a number of photographs which had been taken in the neighborhood on the day after the explosion. All of the boiler shells were broken circumferentially, and many of them had been thrown with such force that they had been embedded many feet in the side of a culm bank, some distance from the boiler house.

Mr. James Christie—As stated by Mr. Gill, the boilers at Shamokin were horizontal cylinders, about 44 feet long, and were suspended by rods 11 feet from each end. Hence they were not only subjected to internal pressure, but also to unequal strains at the top and bottom, due to this manner of mounting, and the latter strains must have been very great. In long boilers like these there is also unequal strain, due to the differences in temperature between the bottom and top, the latter in this case being open to the air.

Mr. Henrik V. Loss—When I was connected with the Edge Moor Iron Company I remember to have made some experiments whereby we found that the differences between top and bottom strains in some cases might be as much as 5,800 pounds per square inch.

Mr. John Overn—I examined the boilers at Shamokin on the day after the explosion and there was not a single case which showed any longitudinal strain. Each boiler shell was composed of 13 plates, and all but one of those which exploded broke in the section to which the suspension rods were attached. By the use of a blower the heat under the boiler cylinders was made very great, while the top of the boilers was cool. After inspecting boilers for many years, I have noticed that there are comparatively few exploded because of low water. The disturbance at Shamokin, I think, was due to unequal elongation on opposite sides of the boiler shells, and to the very poor quality of iron used in their construction.

The Great Staircase in the Capitol Building, Albany, N. Y.

During the past year the imposing stone staircase at the west entrance of the Capitol building at Albany, N. Y., has been practically completed, and as it now stands the stairway is one of the most beautiful constructions of its kind in the world. The entire cost of construction has been nearly $1,000,000, and about five and a half years have been consumed in building it. The staircase occupies a space of 76 feet 10 inches by 69 feet 10 inches, and the height from the tile floor of the first story to the uppermost cornice in the dome is 119 feet.

The stairway consists of broad central rows of steps, starting in the corridors and extending through the center openings between the cylindrical piers. The lower steps of each flight are constructed in convex curves, which serves to increase the length of the steps and makes it possible to introduce a platform or break in the steps about one-third the way up each flight. These platforms in turn are flanked by short rows of stairs on two sides, which extend at right angles to the main or central flights. These secondary flights extend to platforms which reach to the walls, and from these platforms next the walls four rows of steps, two from each platform, extend upward to the next floor, which also forms the landing of the central flight.

It will be seen that this construction provides for four wells, and these help to provide a plentiful supply of light and air to the lower floors. The central portion of the stairs is supported by eight bearings resting upon moulded granite bases, and extending up from the foundations to a height of three and a half stories.

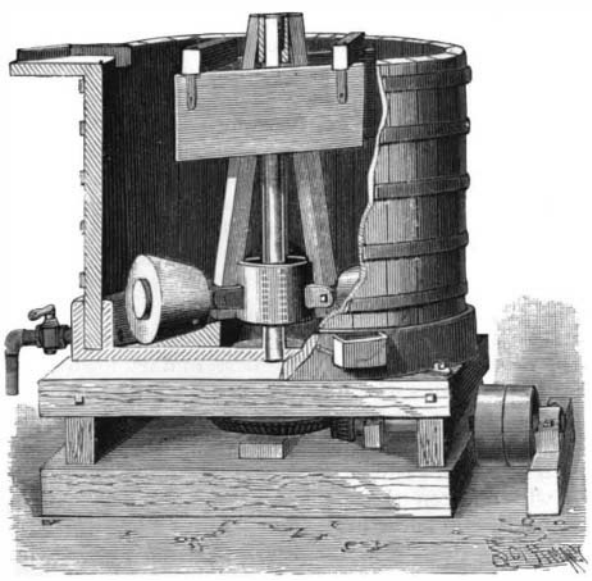
The decorations of the staircase are very elaborate. On the central ledge on the north side, for example, there is a head of Columbus carved in relief, with the three caravels used by him in the first voyage to America. The western ledge is decorated with the Viking ship, while on the east ledge is a modern steamship, both of these being in bass relief. The sculptured work is cut upon a plain surface surrounded by rich foliage. The rails, the steps, the ledges upon which the balustrades rest, and in short almost every exposed surface is also richly and tastefully decorated.

Lead Poisoning in the English Dyeing Trade.

Mr. Sydney Smelt, deputy coroner for Manchester, held an inquiry recently relative to the death of Emily Wood, 19, lately living in Irlam Street, Newton Heath, who had died from the effects of lead poisoning. The girl was in the service of Messrs. Kerr & Hoegger, dyers, Grimshaw Lane. Early in November she became ill, and was attended by Dr. A. Walker. He found well marked symptoms of lead poisoning. Dr. Walker said he had seen a number of cases of lead poisoning in the district of Newton Heath during the last few years. He gave evidence three years ago in the case of two girls working for the same firm who had died from lead poisoning. A girl named Carmichael, employed in the same room with the deceased, said that she had never used a respirator, and up to a week ago had never seen one in the place. The work was what is known as "noddling" yarn dyed in yellow and orange colors. Witness herself had been ill on several occasions from lead poisoning. Prior to a week ago the employes used to take their meals in the "noddling room. There was a place to wash their hands, but no towel was provided. Dr. Reynolds, who had made an examination of the body of the deceased, said the cause of death was lead poisoning. The manager of the works, while admitting that at a previous inquiry he had promised to see that washing accommodation and respirators were provided, said he had never seen more than two or three girls wearing the respirators up to quite recently. He only knew of three girls out of thirty-six who had never been away ill from lead poisoning, and he had never stopped the girls from taking their meals in the "noddling" room until recently. The occupation was a dangerous one, and he would not let his own daughter work at the place unless she wore a respirator. At the conclusion of the evidence the coroner suggested to the jury that they should recommend that this particular trade should be declared a special dangerous occupation under the Factory and Workshops Act. Mr. Smelt commented strongly on the conduct of the firm in not taking every precaution to prevent such cases, in accordance with a promise made on their behalf in the course of a similar inquiry in 1891. Nothing he could say could add to the feeling of indignation that everybody must have on this subject. The girls had simply been allowed to commit suicide in order that foreigners might be supplied with yellow dyed goods. After deliberating in private for some time, the jury returned a verdict to the effect that the deceased had died from lead poisoning, caused by the firm neglecting to carry out the promises made by them three years ago. Mr. Rogers, H. M. Inspector of Factories, and Dr. Niven, Medical Officer of Health for the city, were present at the inquiry. Mr. Pearson watched the proceedings for the firm.

A COMBINED CRUSHING MILL, AMALGAMATOR AND ORE CONCENTRATOR.

The mill shown in the illustration is designed to perform its work rapidly and effect the utmost possible saving of gold and silver. It has been patented by Mr. Samson Beer, of No. 645 West Granite Street, Butte, Montana. The bed plate is slightly thinner at its outer edge, so that the tapering crushing rollers fit and follow it nicely, and it has a central well in

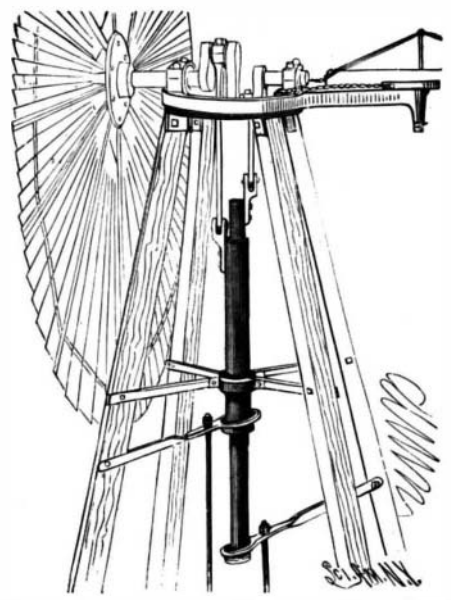


BEER'S MILL AND CONCENTRATOR FOR TREATING AND AMALGAMATING ORES.

which the quicksilver may lie, this well being supplied through a duct from an amalgam box on the outer side of the tub. Extending up through the center of the tub is a shaft casing, preferably cast integral with the bed plate, the driving shaft being stepped in a suitable bearing below, and on the shaft is a spider frame having at its top a collar which turns above the casing, and is keyed to the shaft. The lower ends of the arms of this spider frame merge in a collar on which are lugs between which are pivoted the shafts of the crushing rollers, which are thus allowed to swing vertically, that they may ride over any large or particularly hard rock without doing damage. In the tub, just above the rollers, is a cross frame of parallel cross plates connected by diagonal plates, to check the rotary current of water, so that the quicksilver in the central basin will not be disturbed. The tailings flow out with the water from a spout at the top of the tub, the free metal amalgamating with the quicksilver, while the concentrates settle on the bed plate. At one side, near the bottom, is a valve-controlled pipe through which the concentrates may be drawn out.

A PUMP GEAR FOR WINDMILLS.

With the construction shown in the engraving the wind wheel is free to turn to the wind without affect-



ERICKSON'S PUMP GEAR FOR WINDMILLS.

ing the position of the pump plungers, and the power of the windmill crank shaft is uniformly transmitted. The improvement forms the subject of a patent issued to Mr. Andrew S. Erickson, of Holdrege, Neb. On the shaft of the wheel are two crank arms connected by pitmen to two tubes, one sliding in the other, the outer tube being mounted to turn and fitted to slide in bearings attached to the tower. The lower ends of the tubes have flanges on which rest the eyes of two levers fulcrumed on the tower, and these levers are connected with the pump rods to impart a reciprocating motion to the pump plungers. It will be seen that, as the tubes are alternately raised and lowered by the motion of the wheel, the turning of the tubes, as the wheel turns in the wind, in no way affects the position of the levers connected with the pump rods, the eyes of the levers only loosely engaging the lower ends of the tubes. It will be obvious that a solid rod may, if desired, be used for the interior tube.

Railway Grade Crossings.

The blindness of city officials to the great and daily dangers to which citizens are exposed by the practice of permitting street railways to cross the tracks of steam railroads at grade is becoming so serious a matter, says Railway Engineering, that some kind of a surgical operation seems necessary to restore their sight. Nor does any thought of the rank injustice which the steam railroad suffers ever flit through the minds of those who grant franchises to street railway corporations. Here is a steam road with its right of way already established, and crossed by streets which may have been laid out years after the railroad entered the territory; a street railway corporation gets a franchise permitting it to use the streets without payment of anything but the boodle necessary to get the ordinance through the council, and then it essays to cross the tracks at grade, exposing its patrons to unnecessary danger, and compelling the steam road to share in responsibility for the lives of the passengers carried by the street railroad company. The cities of the land are anxious enough to have the steam roads elevate their tracks, but they do not display the same anxiety to protect citizens from the danger of street railway travel.

We believe that they will be awakened from this lethargy at no distant date by the electric railroads. The latter have a suitable power for high speeds, and the desire on the part of the populace for rapid transit already has and will compel them to adopt fast schedules, until when they successfully compete with steam roads for suburban travel the necessity for greater precautions for the safety of human life on street railways will be shown in no uncertain manner. On the question of electric and steam railroad crossings, the directors of the Pennsylvania Railroad, in their forty-seventh annual report, after describing the work of elevating and depressing its tracks in several cities, said:

"The object sought to be attained, however, through the large expenditures made in this direction, both by the railroads and the local authorities throughout the State, will be almost entirely defeated if the electric railways now being promoted throughout the country are permitted to cross the steam railways at grade, and thus create a new and most serious element of peril for the traveling public. It must be borne in mind that the entire movement of these electric railways is in the transportation of passengers, and that, therefore, the risk to life and limb from such crossings, owing to the frequent service, is proportionately much greater than on the steam railways, where the trains are not nearly so frequent, and where the movement is made up largely of freight traffic. It would hardly seem reasonable that the electric railways should be permitted to indefinitely increase the number of these crossings, while at the same time your company and the city of Philadelphia are expending over $400,000 to remove the grade crossings of your road by the North Pennsylvania Railroad in the northern portion of the city."

The directors of the New York, New Haven & Hartford Railroad in their report also refer to the matter as follows:

"The creation of level crossings of steam railroads by electric roads, whether by legislative or judicial permission, must lead to dreadful accidents. The people are calling for large expenditures by the steam railroads for the elimination of all grade crossings, and simultaneously their agents are increasing the danger to those which exist by allowing the electric roads to use them. Public sentiment sooner or later will condemn such inconsistency."

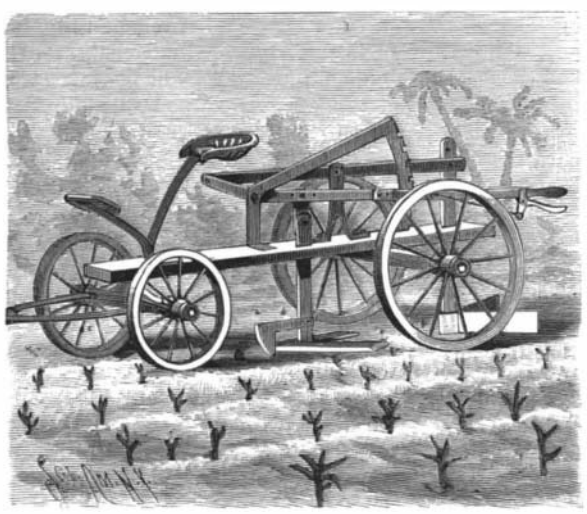
Punch Photograph.

The Consolidated Traction Company gives very liberal transfers, enabling citizens of Jersey City and Newark to go from almost any place in either city to any place in the other. To prevent cheating, the company has devised a ticket, on the top of which are printed in a row the faces of five men and two women. There is a smooth-faced man, the man with a mustache, and another with side whiskers, a fourth with chin whiskers, and the fifth with a full beard. There are only two women—one meant to be young and the other old—a hat designating the former and a bonnet the latter. There is also, as an additional safeguard, a mark just under the heads, which when punched according to instructions shows the age of the holder to be more than or less than forty years.

A SUGAR CANE CULTIVATOR.

The illustration represents a light, easily working machine, to loosen and clear the soil of weeds and vines, and throw it around the roots of opposing rows of cane. It has been patented by Messrs Louis Danos and Albert Haydel, Hohen Solms, Ascension Parish, La.

The platform of the truck is narrow, and supported centrally under it is a triangular scraper with a knife at its apex or front edge, the convex edge of the knife dividing the soil and severing vines, weeds, etc., in its path. The knife is attached by means of a shank to the standard of the scraper, which extends upward and is pivoted to a link adjustably attached to a hand lever fulcrumed just back of its forward end to an upright on the platform. Extending rearwardly from this upright is a rack upon which the lever has a guided movement, being provided with the usual thumb latch to engage the rack. A second lever, pivoted on a rear standard, is pivotally connected at



DANOS AND HAYDEL'S SUGAR CANE CULTIVATOR.

its forward end with the front end of the hand lever, and at its rear end this lever is adjustably attached to the upper end of a shank or standard on whose lower end is secured a follower or mould board, which travels over the surface that has been operated on by the forward scraper. As the machine is drawn between the rows of cane, the hand lever is pressed downward, bringing the scraper and its cutting knife into the desired engagement with the ground, the same motion also bringing down the mould board, by which the loosened soil is thrown to both sides and upon the roots of the plants.