

critical that the ultimate results on the navy may prove disastrous if some relief is not soon afforded. The old talk of regenerating the old Engineer Corps distinct from the line is now revived. This would mean the re-establishment of a corps of officers who would have no other duties than those of the engineer-room. Examinations are now being held, in the Philippine Islands and at all the principal naval stations, of enlisted machinists for the rank of warrant machinists, and fifty of the two hundred applicants will be immediately appointed. In this competitive examination some good men will be brought forward, and it is believed in some quarters that these fifty appointees may become the nucleus of the new Engineer Corps.

DEFECTIVE ASSIGNMENTS OF PATENTS AND ROYALTIES.

In the transfer of property from one holder to another, certain forms of law must be observed for the protection of both parties. In the case of real estate or any merchandise whatever, conveyances may be properly drawn by attorneys familiar with the usual forms, but if a transfer of patent rights is to be made to an incorporated company, involving the allotment of shares, rights to make and vend upon royalty, the proceedings must accord with the laws of the State in which the company has been incorporated, and a thorough knowledge of corporation law is indispensable to the attorneys; otherwise, when the company attempts to transact the business for which it was organized, it will find itself unable to do so legally. Example: in some States shares cannot be assigned in payment for services rendered or for merchandise, but this has been done; consequently there has been an illegal issue of stock, and if litigation ensues at any time in the transactions of the company it may prove a bar to recovery. If an inventor finds that his company has not been properly organized, all proceedings are irregular until the work of organization has been done over, causing great delay and extra expense.

A case of this kind recently occurred in a nearby State. John Doe, the inventor of a staple article which is in great demand, and has involved a large investment of capital, had manufactured the goods upon a small scale, but finding his business growing beyond his facilities, applied to a firm of brokers to increase his capital. To do this they required him to have the company incorporated, having, of course, previously investigated the proposition as an investment. The company was incorporated, the work having been done by a lawyer who asserted that he was familiar with the procedure, and had started several companies upon the road to success. A directory was elected and regular meetings held to take over the property of John Doe, after which it devolved upon the brokers to arrange for the issue of full-paid, non-assessable shares at certain prices, and both parties awaited results. John Doe, as the owner of the patents, was to receive a certain sum for them from the sales of stock made by the brokers, the company itself advancing no cash in the first instance to secure the property to itself, and the rights of John Doe in the patents were not to be transferred until he had received the money for them. This was thought to be an equitable arrangement for both parties, but in the light of better legal advice it was seen that there had been no transaction whatever. The company, although ostensibly ready to do business, had nothing to do it with, for the company did not own anything, having actually bought nothing, and certainly could not issue, transfer or sell what it did not own; the shares allotted to be sold by the brokers or guaranteed by them, were not merchandise or lawful tender, because no one owned them. All the proceedings, therefore, were null and void, and the work had to be done over upon proper methods. Fortunately for John Doe no irregular proceedings affecting the status of the company had been taken, but delay was caused by the incompetency of the attorney, himself a resident of the State where the company was incorporated.

In the granting of licenses to make and vend, it is necessary for inventors to be very careful in selecting attorneys to draw up the papers; in no case should so-called "mutual agreements" be entered into, as between man and man, relying solely upon the assumed good faith and intention "to do what is right," as it is often termed, by both parties; the covenants should be clearly and definitely set forth. Papers or agreements which are drawn up in apparently legal phrases are sometimes wholly contradictory and adverse to both parties. One such "agreement" was drawn by parties of the first part in which a certain commission was to be paid them for the performance of certain work; but who was to pay the commission, when and where it was to be paid, was not stated. An example of the difficulties persons are liable to meet with from defective licenses is shown in the experience of Richard Roe; he had invented a certain device which was a great improvement upon a similar one then on the market and made by an old established house. The

inventor went to these people, who, after examining his device, said it was better than theirs, and they would like to make it on royalty. Papers were drawn up in which they agreed to pay a certain small bonus, and thereafter a minimum amount yearly, after the manufacture had begun. The bonus was paid and the inventor at the end of a year applied to the licensees for the minimum yearly amount, having heard nothing whatever from the parties in the interim. When he asked for an accounting for the past year, no one seemed to know anything about the matter, but persistent inquiry revealed the fact that the matter had not yet been acted upon; or, in other words, the firm had simply locked the proposition up in their safe, and had no intention of ever putting the article on the market. It would have spoiled the sale of the goods they had made for years, and required a new outfit to get it up, so it was simply shelved. If the inventor had had a proper agreement, he could have instituted suit, at least, but he had put himself out of court by an agreement that gave him no recourse.

As a rule inventors are not business men; also, as a rule, they are prone to think that any paper or writing stating certain facts in legal verbiage is ample protection against trespass, but they are seriously mistaken, and cannot be too careful in parting with their rights.

INTRODUCING AMERICAN METHODS IN ENGLAND.

The immense workshop that the British branch of the Westinghouse Engineering and Manufacturing Company are having erected at Manchester is rapidly approaching completion. When in working order it will be a busy hive of British industry, giving employment to some 6,000 people. Americans will control the business for the first few months, and will then be succeeded by English engineers who at present are being initiated into American business methods at Pittsburg. The works cover 40 acres of ground and are divided into seven departments. The machine shop covers eight acres. From the north end of this shop to the south end of the power house there is a single stretch of roof 1,135 feet in length by 427 feet in width. The steel and iron foundries each cover nearly six acres; while the brass and malleable iron foundries each cover approximately four acres. There is also a fine six-story block of offices with a frontage of 250 feet. The building contains 15,000 tons of steelwork, which has cost \$90 a ton, and 9,000,000 feet of timber. The electricity will at first be generated by steam power, but this will be subsequently supplanted by gas engines. All through the grounds culverts are laid for the cables for the transmission of power throughout the various departments. The buildings alone are costing \$4,500,000, and the plant to be installed will represent another \$2,000,000. The location of the factory is ideal. It stands on the bank of the Manchester Ship Canal, so that vessels can proceed up to the very doors of the factory, which will result in great economy in handling the goods, while the Bridgewater Canal, which also runs alongside, will enable coal to be purchased and delivered at the factory very cheaply; and it is also in close connection with the principal railroads of the country. When completed it will be one of the largest engineering factories in Great Britain.

MANUFACTURE OF CELLULOID BEADS.

In these articles German celluloid manufacturers, we read in the Gummi-Zeitung, are unable to compete with the makers in Gablonz, who would underquote them even if the former sold at cost price, and a few details which explain this are given. There is one firm in Gablonz employing about 30 hands, and the beads are not pressed, but each one is singly turned in the foot lathe. Ordinary living rooms serve as workshops, which are lighted by electricity. It must not be presumed that this is the result of progress; it is only a matter of convenience, as Gablonz, in electric lighting, is ahead of small towns in Germany. One room contains 20 to 25 lathes, surrounded by round celluloid rods. Another room holds 6 to 8 American quick-drilling machines, also worked by foot, and attended by 6 to 10 female hands. The rods are cut up with a circular saw, which is fixed on the lathe, to the size required, and a man can cut about 3,000 per hour. They are then drilled at the rate of two to six gross per hour, according to length. After this they are turned on the lathe, each bead being separately placed tightly on a pin. The turning tool is a sharp chisel, which leaves the surface of the bead quite smooth. The polishing is done by simply holding the beads in the fumes rising from a vessel containing boiling spirit. The wages paid are very low, turners earning \$2.50 to \$3.75, drillers \$1.75 to \$2.00, and girls \$1.00 to \$1.25 per week.

The Cathedral of Notre Dame at Paris, which has up to the present time been only lighted by candles, is about to be lighted by electricity.

SCIENCE NOTES.

The population of Paris has increased 6.98 per cent in the last five years. At the present time the total population is 2,714,068.

The Society of German Engineers in Berlin has undertaken the preparation of an international technical dictionary to be published in English, French and German. Its aim is to secure exhaustive completeness in technical words and expressions, exactness in translation, and uniformity in usage.

A curious phenomenon was observed at the village of Le Ghazil, in the French Alps, recently. One day toward evening the inhabitants were disturbed by a loud rumbling in the vicinity of Mont Farand, which increased in intensity. Looking toward the scene of the disturbance, the villagers were further startled by seeing bright flashes of fire. At first the unusual spectacle was attributed to volcanic agencies, and a party of civil engineers set out to examine the cause of the phenomenon. They discovered that the intense dry heat had caused the chalk rocks on the summit of the mountain to crack and to break away in all directions. These rocks had descended the mountain like an avalanche, and being thickly veined with silex, in descending they had struck one another with terrific force, scattering brilliant showers of sparks in all directions, with such rapidity that they resembled one single sheet of flame.

From the known latitude of a station it is possible to calculate the number of hours that the sun is above the horizon during a year. The observations at the various stations of the United States Weather Bureau give the actual number of sun-lit hours. A comparison of the two numbers gives the percentage of sun-lit hours at the station. From the last report of the bureau (just published) the following data are selected: Albany, N. Y., 55 per cent of sun-lit hours; Atlanta, Ga., 53 per cent; Atlantic City, N. J., 58 per cent; Baltimore, Md., 66 per cent; Boston, Mass., 52 per cent; Buffalo, N. Y., 54 per cent; Charleston, S. C., 55 per cent; Chicago, Ill., 53 per cent; Cincinnati, Ohio, 61 per cent; Cleveland, Ohio, 44 per cent; Denver, Colo., 71 per cent; Detroit, Mich., 50 per cent; Galveston, Tex., 61 per cent; Indianapolis, Ind., 49 per cent; Jacksonville, Fla., 67 per cent; Key West, Fla., 71 per cent; Los Angeles, Cal., 76 per cent; Minneapolis, Minn., 52 per cent; New Orleans, La., 49 per cent; New York, N. Y., 52 per cent; Phoenix, Ariz., 84 per cent; Philadelphia, Pa., 58 per cent; Rochester, N. Y., 41 per cent; St. Louis, Mo., 62 per cent; San Diego, Cal., 73 per cent; San Francisco, Cal., 71 per cent; Santa Fe, N. M., 75 per cent; Washington, D. C., 58 per cent.

Another attempt to ascertain the difference in the longitude between London and Paris is shortly to be made by the Greenwich and Paris observers, respectively. This will make the fourth occasion upon which these two observatories have endeavored to settle this point, but their results have always differed. At the beginning of the last century the difference in longitude was estimated by primitive methods to amount to 9 minutes 21½ seconds. When the electric telegraph came into use a determination by this means proved the calculation to be one second in excess. As time progressed various circumstances proved that even this estimation was fallacious, and in 1888 a determined attempt was made by two French astronomers at the Paris Observatory and two astronomers at the Greenwich Observatory, respectively, to ascertain the actual difference. Notwithstanding their working in conjunction, no final data was attained, for, whereas the French geodists calculated the difference to be 9 minutes 21 seconds and some few hundredths of a second, the Greenwich observation was a fifth of a second less. In 1892 another attempt was made on precisely similar lines, and again the English calculation was about one-fifth of a second less than the French result. It is anticipated that the progress of geodesy within the past nine years will enable the results of the two observations to coincide this time. It is imperative that their calculations should be the same, since nations often divide their territories, when no natural boundaries are possible, by longitude and latitude. For instance, the boundary line between South Australia and New South Wales is nominally by longitude 141 degrees east of Greenwich. Telegraphic calculations, however, prove this delimitation to be erroneous by several hundred feet, a result probably due to uncertainties in the determination of the longitude. Such inaccuracies, trifling though they may appear from an evanescent point of view, are of vital importance in discussions over the boundaries between different countries, and may possibly lead to serious results. For example, the exact delimitation of the boundary line between Canada and this country in Alaska, which is at present under discussion, depends upon the astronomical observations. It will thus be seen that if the English and French observers can succeed in their measurements, or ascertain the sources of error, they will have accomplished a valuable service.