CENTENNIAL NOTES.

THE BELGIAN WOOLEN MACHINERY.

Bede & Co., Verviers, exhibit a fulling machine for cloths and woolen stuffs, such as flannel. Five or six pieces of fine cloth or three pieces of military cloth can be treated at a time, and the entire mechanism is arranged so as to be of easy access to the workman. The same firm exhibits a machine for cleaning wool, which is represented to be an improvement on the American invention, and the manufacturers have supplied several factories in this country with machines of this kind. It is said to clean 250 lbs. per hour, and with an automatic feeding apparatus one man can attend it. All kinds of wool may be cleaned by it. Those for carding are worked dry, and those for combing in a damp state. A carding machine with a patent condenser is also exhibited by Bede & Co. It is fitted with cast iron cylinders, carefully turned. The patent condenser produces any desired number of slivers, which are rolled into fine rovings, and the latter may be spun direct to 1,000 yards per ounce. It is claimed that the usual waste of carding is avoided by this condenser, and that more is done with it because there is no necessity of roving or drawing halfway. The condenser can be used for all kinds of wool, from the shortest to the best merino.

Wool-spinning machinery invented by Celestin Martin, of Verviers, a distinguished Belgian inventor, recently deceased, is exhibited. He was a poor working machinist, who, through his mechanical skill and inventive genius, worked his way to the head of a great industrial establishment, and won from the King of Belgium the offer, twice refused, of the decoration of Chevalier of the Order of Leopold. His *métier fixé* or stationary spinning machine is exhibited with other machinery for wool manufacture, including a model for a new carding machine. There are a few wool-carding appliances shown by other exhibitors, and Horstmann Brothers, Liège, exhibit carding cloths.

THE FLORAL AND BOTANICAL DISPLAY.

The display of plants in the vicinity of Horticultural Hall is said to be the finest collection of the kind ever exhibited in this country. The flower beds are all made in different shapes and designs. Some are carpet bedding, so arranged as to display the figures of a carpet; others are ribbon bedding, in strips, made to secure the effect of ribbon, while the walks are laid out in geometrical and winding figures that make the place look very beautiful. In the western section of the grounds there are nearly 70,000 plants laid out, so the reader can easily imagine the result attained.

To the American exhibit are devoted 239,173 square feet, and 45,000 square feet to the foreign. The American exhibit is composed of 59,500 plants, and the foreign of 10,233. A magnificent display of the agave, or American century plant, and lemon and orange trees bearing fruit, immense sugar canes, crape myrtles—a little shrub bearing an exquisite pink flower—are on these grounds. The flowering plants embrace, among a legion of varieties, hollies, rhododendrons, roses (600 plants), gladiolus, magnolias, lilies, tulips, azalias, begonias, caladium, dahlias, geraniums, carnations, pansies, and hyacinths. Then there are the yuccas, coleus, fir trees, evergreens, and various deciduous and succulent plants.

All kinds of landscape gardening are represented. In one section of the grounds is a complete arboretum, embracing 750 different species. The flower beds, to which allusion has already been made, are made of achyanthus, centoria, alternanthera, golden feather fen, Madagascar periwinkle, gladiolus, cannas, petunias, caladium, and the castor oil bean plant.

Among the more striking trees and plants, there is a tall mahogany tree, looking like a giraffe among its fellows. The *cinchona succirubra* is one of the most valuable plants in the collection. From its bark the drug quinine is manufactured. The East India apple tree is a rather attractive-appearing shrub. The alligator pear tree yields a rich, large fruit, which the natives use instead of butter. The *Strelitzia requia* is a large plant bearing a large flower shaped like a bird's tongue and beak. The flowering banana is here in full bloom.

Coffee trees are abundant, and also the fan palm, with leaves ranging all the way in size from the ordinary palm fan to the size of a center table. With the latter leaf the people of the tropics thatch their houses. Loquat is the name of a peculiar, dark-looking Japanese plant with rich fruit. There is the common fig tree, and the *ficus Australis*, with aerial roots growing down from the branches like flowing hair. The moisture in the air affords them sustenance. The Chinese wampee fruit tree and the papyrus plant attract a good deal of attention. Many specimens of the *bambusa* (the bamboo tree) are on exhibition, some of them very high. The *eucalyptus globulus* is the fever tree of the tropics, and is highly prized because it absorbs all the malaria in the air. The *icica Indica*, or incense plant, is so called because it yields a sort of perfumed gum which is used for incense. There are also some very fine specimens of the *ficus micophylla* or india rubber tree, a plant which is pretty well known in this climate.

THE TURKISH SECTION.

If one might judge from the lavish profusion of so-called Turkish goods exhibited for sale in booths located almost at every turn, both within and without the grounds, Turkey is by far the best represented nation in the entire Exposition. Unfortunately for whatever credit the fact might bring, the majority of the small objects displayed evidently originated in that great mart of imitation jewelry and storehouse of all strange articles, from Chinese idols to Maori nose rings, Birmingham, England. Those not derived from this source are unmistakably French, while carpets savor more of German looms than those of Smyrna. A perfume of geranium oil, supposed by the uninitiated to be attar of roses and purchased as such at ten times its value, pervades the booths, and the oriental glamour is hightened by the Gibraltar Israelites and Bohemian Greeks, who assume the *rôle* of genuine Moslem salesmen. The stands, however, are extensively patronized, principally by visitors from the country seeking mementoes of the Exposition. Compared with this spurious display, the genuine Turkish exhibit, though excellent as representing the country, is small. Great carpets woven on the hand loom, in which no improvement has been made since the days of Mahomet, hang from the roof. The patterns are as old as the manufacture, but they are delightfully ugly and resplendent with their outlandish shades of red and queer blue-greens, dear to the antiquarian and *bric-a-brac* collector. The choicest of these Turkish rugs are apparently the coarsest. This last quality attests the genuine production, for the finer rugs are now imitated in great perfection on power looms in many parts of Europe. A real Turkish carpet is irregularity itself. The sides are never truly parallel, the texture rarely even; and as for the pattern, that follows the vagaries of the weaver, who takes every imaginable liberty with the normally rude design. Seated in front of his loom, he laboriously fastens a bunch of colored yarn to each warp thread. When a row is thus finished he passes the linen weft, then puts on a new row of tufts, and so continues until he completes a narrow strip of carpeting, which is neatly attached to other strips to make a large rug, the coarse long nap serving to conceal the seams.

There are several specimens of cloth exhibited which are likewise peculiar to the country. Camel's hair cloth resembles coarse silk, and the Angora wool fabrics have a like similarity. The tissues are all poorly woven. The same is true of the light silks, also handwork. In fact, wherever the work of Turkish men is displayed, there the inherent laziness of the true Mahometan is apparent. He has admirable materials, and controls a class of goods in which he has few rivals abroad; but the repressive policy of his government on one hand, and his own disinclination to labor any more than is necessary to provide for his wants from day to day on the other, effectually block his industrial progress, and he contributes nothing toward the advancement of the age. With Turkish women, if the results of their labor be taken as a standard, the case is different. They work, high and low alike, as a relief to the dreary existence to which their social position consigns them. The magnificent embroideries on silk, the gold thread stitching on velvet, and similar productions proving patience and skill, are mostly made in the harems, and by women ignorant that such a thing as education exists.

Turkey is the land of the far-famed attar of roses, and the visitor may buy, or rather may imagine that he buys, a minute bottle, holding three drops of the extract, for two dollars. The genuine attar does not appear to be exhibited, although it might be, for it can be found by the pint in the Constantinople and Smyrna bazars. The material at the Exposition comes from Kizanlik in Roumelia. It probably is olive, sandal wood, geranium, or other oil, perfumed with a minute quantity of the genuine article, as such is the compound most commonly sold the world over as the true attar. The latter, if genuine, is worth between $50 and $100 per per ounce, and to make that quantity 400,000 full blown roses are needed. The mode of preparation consists in boiling the roses in water and gaining the oil through distillation. The oil is volatile, nearly colorless, and deposits a crystalizable substance soluble in alcohol. A drop of it on the handkerchief perfumes the fabric indefinitely, despite numerous washings.

The best industrial productions displayed are the thin leather known as Turkey morocco, specimens of prepared opium, dried figs from Smyrna, gall nuts used for ink making, and various dye stuffs. There are a large number of ancient arms, some superbly inlaid in mother of pearl and silver, showing that the old Turks possessed a manipulative skill and a degree of patience which have not descended to their posterity. Turkish tobacco is likewise exhibited, and visitors are permitted to purchase a poor quality for a high price. The best Turkish tobacco is worth here from $4 to $8 per pound. The Turks themselves favor a Persian tobacco much more than the finely shredded material sold as Latakia or Scarfalatti. The former is used mainly in the nargilehs or water pipes, looks like dried oak leaves, tastes like them, and has to be moistened before packing in the pipe bowl; and then the constant attention of a servant is required to keep live coals on the damp mass, otherwise the fire promptly goes out. It therefore takes two persons' labor to keep the pipe lit, and their accumulated energy is represented by a scarcely perceptible whiff of faintly blue smoke, which is swallowed or inhaled before escaping from the mouth.

One of the best exhibits in the Turkish department is the sponge collection, and this represents a really important industry, which flourishes despite the unlimited taxation imposed upon it. Sponges of all varieties are exhibited, some marvelously fine. As might be expected, books are few, and such as are present are poor specimens of both printing and binding.

Zinc Roofing.

A controversy is just now going on in Germany as to the durability of zinc used for roofing purposes. The *Zeitschrift für Gewerbe* reproduces the calculations as to the durability of zinc made by Dr. Pettenkofer in Dingler's *Journal* some years since, but points out an error in them. Rectifying these afresh, on the basis that the oxidation of 1 square foot reaches 130 grains in 27 years, the *Zeitschrift* finds that a sheet of zinc $\frac{1}{50}$ inch thick would occupy 1,243 years in complete oxidation. A weight of 130 grains of zinc spread over the surface of a square foot would make a layer only $\frac{1}{5000}$ of a line thick. If the sheet be 0·25 line thick, there will be 46·04 such layers, and this, multiplied by 27, gives 1,243, the total number of years.

RAMBLING NOTES.

NUMBER II.

A GEAR-MARKING DIAL.

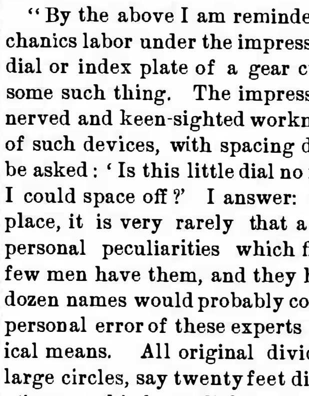
"I was up in George's pattern shop a few days ago. He was showing me a dial plate, which he had just gotten up for his gear pattern work. It is the neatest affair I have seen lately, and seems to be a real money-saving device. It is simply a cast iron dial fitting the spindles of the pattern lathes. It is machine-divided for all numbers below 200. A stationary marker completes the rig. After a gear pattern is so far finished as to be ready for spacing, it is put in a lathe with this dial. In ten minutes a wheel of 200 teeth can be accurately spaced, much more so than if done with dividers as usual. I believe it would take a good pattern maker fully three hours to step off such a gear, especially if he failed in luck, which seems to have a great deal to do with such processes. The device mentioned is convenient and very light. George says it only cost him twenty dollars."

"By the above I am reminded of the fact that many mechanics labor under the impression that the graduations on a dial or index plate of a gear cutter are of divine origin or some such thing. The impression is wrong. Some steady-nerved and keen-sighted workman stepped off the progenitor of such devices, with spacing dividers. The question will be asked: 'Is this little dial no more accurate than one which I could space off?' I answer: Much more so. In the first place, it is very rarely that a man is found possessing the personal peculiarities which fit him for such work. But few men have them, and they have become famous. Half a dozen names would probably cover the list. Next, the small personal error of these experts has been reduced by mechanical means. All original dividing of this kind is done on large circles, say twenty feet diameter or more. The graduations on this large dial are then transferred by mechanism to a small dial, say two feet in diameter. Now the proportion of error in the two dials will be precisely the same; but it will be readily understood that an operator's liability to error will be reduced as the sizes of his divisions are increased. There are graduated circles in this country which, by laying one upon the other, will be found to coincide at each division. Shifting their relative position still shows a coincidence. This process, watched through a microscope, constitutes the test of the accuracy of a graduated circle.

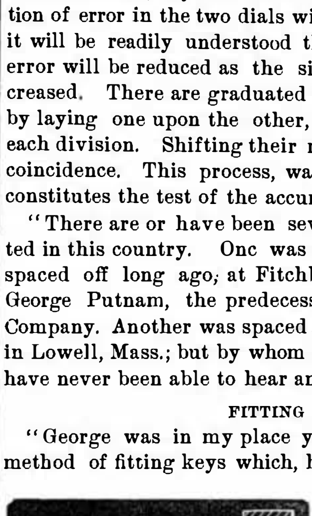
"There are or have been several original circles graduated in this country. One was a heavy twenty foot wheel, spaced off long ago, at Fitchburg, Mass., I think by Mr. George Putnam, the predecessor of the Putnam Machine Company. Another was spaced at the Lowell Machine Shop, in Lowell, Mass.; but by whom I have never learned, and I have never been able to hear anything of the others."

FITTING KEYS.

"George was in my place yesterday. He showed me a method of fitting keys which, he says, is as old as the everlasting hills. I know I never heard of it before. Fig. 1 shows the method



The key seats in both shaft and hub draft the same way, and the key is consequently straight. If the fit is simply neat, the thing is firmly locked. It applies especially to bevel gearing in millwork, which must back up against something; and in many cases, finding no shoulder on the shaft or convenient box near, the firmness of the hub on the shaft depends on the key entirely. Fig. 2 shows this key in such a place. It will be noticed that in one direction the gear may even be slipped by hand and the key picked out; but in the other direction everything is self-tightening. It will be a novelty to many, and, I think, of considerable value.

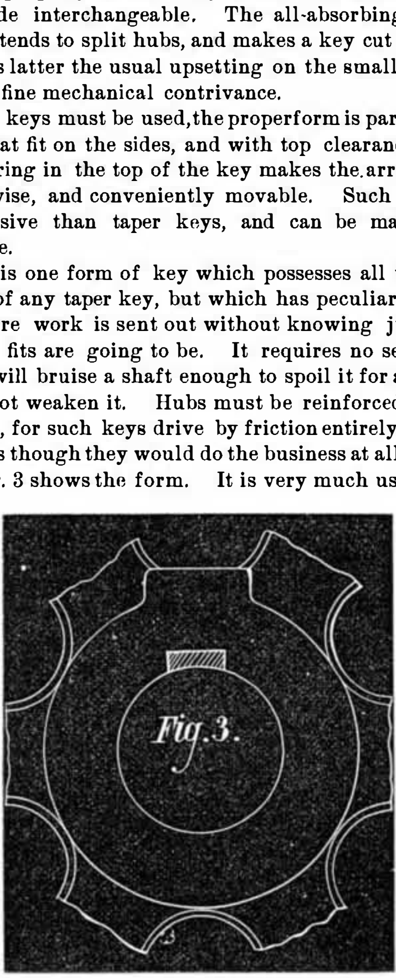


"Keys in shafting seem to be an indispensable nuisance, but they are often the only hope. I have become so disgusted with them that I never put one in where it can be dispensed with. They are all bad enough, but the taper key is the worst of the lot. The intention in these keys is to have the sides fit snug, so that they do all the work, the top and bottom or taper fit being just tight enough to prevent end motion. But I know, as others do, from vexatious experience, that it is almost impossible to get visemen to fit these keys solid sidewise. They will invariably slack off the sides, and then waste their skill on the least important fit. Most visemen seem to think that, when they do this, they have a 'soft thing' in making the fit.

"These taper keys are miserable things anyhow, and cost $1 a lb., if properly fitted. They weaken the shaft, and cannot be made interchangeable. The all-absorbing top and bottom fit tends to split hubs, and makes a key cut and lock. Add to this latter the usual upsetting on the small end, and we have a fine mechanical contrivance.

"Where keys must be used, the proper form is parallel both ways, a neat fit on the sides, and with top clearance. A set screw bearing in the top of the key makes the arrangement firm endwise, and conveniently movable. Such keys are less expensive than taper keys, and can be made interchangeable.

"There is one form of key which possesses all the disadvantages of any taper key, but which has peculiar merits in cases where work is sent out without knowing just where the keyed fits are going to be. It requires no seat in the shaft. It will bruise a shaft enough to spoil it for a bearing, but will not weaken it. Hubs must be reinforced to stand the strain, for such keys drive by friction entirely. It does not look as though they would do the business at all, but they will. Fig. 3 shows the form. It is very much used by the



millwrights of the Northwest. The shops up there plane their keys out concave, from a steel strip. They are then cut off, and a little draft given to them. They are tempered blue. The circle of the key should be a trifle smaller than the shaft."

SETTING CALIPERS.

"Give an ordinary lathesman a pair of inside calipers (Haswell says *calibers*, and I think he is more than half right) and a six inch scale, and tell him to stand where he is and set them at 2 inches. They will be found to be about $\frac{1}{50}$ of an inch too large. Let him try it again, but with the privilege of butting one end of his scale up against something, the planed side of the tail stock of his lathe most generally; and he will get the calipers about $\frac{1}{100}$ too large. I have noticed that good, fair workmen, who have but one end of a thing to look out for, will work just about $\frac{1}{100}$ inch too large always, and many common workmen do worse The natural suggestion to my mind is that a lathesman should have a shouldered rule, one with a flange or button on one end, similar to a lumber rule. In addition a sliding sleeve, without set screw or vernier, would help him. Spring friction, holding the sleeve where set, would allow the calipers to be set by touch, and knocked into nicety, without having to hunt up the place on the scale a dozen times. Every lathesman knows that if, in adjusting his calipers, he goes too far two or three times, he begins to loose nerve and patient vision. The tool described would be a real convenience. The suggestion is made to the Providence scale men, for what it is worth.

FRENCH CALIPERS.

"Did you ever notice the ungainly caliper gages, or rules, or whatever they may be, which the refugees bring over from Alsace and Lorraine? They are big, clumsy things, about 14 inches long, and look like shoemakers' tools; but bad as they look, they are excellent contrivances. When you hire one of these refugees, he finds that we use inches, while his pet tool is graduated by centimeters; so he regretfully locks the ugly thing up for ever." LEFTWICK.

[For the Scientific American.]

GLYCERIN.

Glycerin is one of the constituents of the fixed oils and solid fats; and although discovered by Scheele nearly a century ago (1779), it is but a few years since it has become familiar to the unscientific public. The principal reason for this was that the processes of manufacture, in use until quite recently, rendered it too expensive.

Fats consist of two substances, namely, glycerin and one or more fatty acids, usually stearic and oleic; while the fixed oils are composed chiefly of oleic acid combined with glycerin. Palmitic acid is another of these fatty acids, and occurs in palm oil, in human fat, Chinese tallow, Japan wax, and several other substances. In the manufacture of soap a caustic alkali is added to the oil or fat, and at once takes possession of all the fatty acids present, forming with them stearates, oleates, and palmitates of soda or potash, as the case may be. These compounds we know as soaps, calling the former hard soap and the latter soft soap. In this operation the glycerin is liberated; and in order to separate the soap from the glycerin, salt was formerly added. The glycerin which remained in the lye after "salting out" was thrown away. In the manufacture of lead plaster, which is really a soap in which oxide of lead takes the place of potash or soda, the salting out is unnecessary, and it was in the residuary liquor that Scheele discovered glycerin. He gave it this name from its sweet taste, from the Greek word γλυκύς, sweet. For many years all the glycerin of commerce was obtained in this manner, as it was only necessary to precipitate the lead with sulphydric acid gas and evaporate the filtrate on a water bath to obtain the glycerin.

Modern chemists consider glycerin to be an alcohol, which combines with acids to form ethers. From this point of view fats and oils are compound ethers, called glycerides, and soaps are neutral salts. The chemical formula for glycerin is $C_3H_5(OH)_3$.

The extensive use that stearic acid has found, under the name of stearin, in the manufacture of candles and for other purposes has led to the invention of several new methods for its separation from the glycerin. The best of these is the one invented by our fellow countryman of sand blast fame, Mr. Tilghman. It consists in the saponification of the fats by means of superheated steam, and is largely employed in the manufacture of stearin candles, glycerin being a secondary product. The temperature most favorable to the operation lies between 550° and 600° Fah. Glycerin is purified by distillation in steam and filtration over animal charcoal. The annual production of glycerin in Europe is now 520,000 cwt.

Glycerin, as it appears in commerce, is a sirupy liquid having a specific gravity of 1·26, colorless, inodorous, sweet to the taste, and neutral to test paper. It is combustible but not so readily as ordinary alcohol. It has been frozen when exposed to a low temperature during transportation, and then melted at 45° Fah. Under ordinary circumstances it may be cooled to zero without freezing; but if a crystal of frozen glycerin be dropped into it when cooled to 20° or 21° Fah., it will all become solid. It dissolves in all proportions in water, and thus reduces its freezing point; hence Dr. Wurz proposed in 1858 to use it in gas meters, and it is now largely employed for that purpose. It also dissolves in alcohol and chloroform, but not in ether. Its solvent powers are, however, more important and interesting.

Klever has determined the solubility of forty-eight different substances, and has found that 100 parts of glycerin will dissolve 60 parts of borax, 50 parts of tannic acid, 40 parts of alum, 30 parts of sulphate of copper, 98 parts of carbonate of soda, and various quantities of the alkaloids. When bicarbonate of soda and borax are dissolved in glycerin, effervescence takes place, the carbonic acid being expelled from the former.

The uses which have already been found for glycerin are very numerous. It is frequently applied to the skin as an emollient, and administered internally as a substitute for cod liver oil. It is used as a lubricant on clocks and for delicate machinery. As it neither evaporates nor freezes, it is well adapted for floating compasses, and has been employed for thermometers. For keeping modeling clay moist, to impart to paper the peculiarity of retaining a permanently damp condition so that it may be used in taking copies of letters, to prevent inks drying too rapidly to permit of taking press copies, to prevent printers' inking rollers becoming dry and hard, for keeping photographic plates moist during long exposures, and as a solvent for gum arabic, glycerin is particularly valuable, as also in paste, cement, mortar, mastic, etc., intended for daily use. When mixed with litharge, it forms an excellent cement. Bandages for surgical purposes are treated with glycerin to render them absorbent. It is employed instead of salt for preserving untanned skins and hides. Glycerin dissolves aniline violet, alizarin, and alcoholic madder extract, hence it finds some use in dyeing. A solution of aniline colors in glycerin is often used for stamping with a hand stamp, but cannot be employed as a transparent paint on glass because of its non-drying property. The photographer finds several uses for pure glycerin, first as a test for the purity of the silver bath, secondly (as above stated) to prevent drying of the film in wet plate photography where long exposures are necessary, as in the case of interiors of rooms or shaded nooks. In combination with acetic acid it is used as a restrainer, enabling the outdoor photographer to dispense with the use of water entirely while in the field. After exposing the plate it is developed with iron as usual, and then flowed with the restrainer. At the end of the day's work the plates are taken home, where they can be fixed and finished in the usual manner. Glycerin is employed to extract the perfume from flowers and the aromatic principle of red peppers. Wine made from inferior grapes is improved and sweetened by the addition of glycerin, and an extract of malt made with glycerin is much used by brewers.

In the chemical laboratory, it is used to prevent the precipitation of the heavy metals by the alkalies. It forms the best known blowpipe test for boron in all its compounds, as was recently discovered by Mr. M. W. Iles.

Glycerin may be employed for preserving fresh fruits and meat, and if pure imparts no disagreeable flavor. It is also used instead of alcohol for preserving anatomical specimens. In pharmacy its uses are numerous and important. For disguising medicines, especially those of an oily nature, it is unequaled. It is said that castor oil mixed with an equal part of glycerin, and one or two drops of oil of cinnamon added, has been administered to physicians without their discovering that they were taking castor oil. Cod liver oil, turpentine, etc., are more easily administered when in combination with glycerin. A very little glycerin will obviate the astringent sensation produced by the chloride of iron dissolved in sirup. Carbolic acid is now generally administered in combination with glycerin, and many other acrid substances should be administered in this way. When introduced in small quantities into pills, it prevents induration and decomposition. Vaccine lymph is frequently mixed with glycerin to preserve it. Several different glycerin lotions, ointments, and plasters are described in pharmaceutical works. Sulphate of quinine dissolves in ten parts of glycerin when hot, but when cold separates in clots, which, when triturated with the supernatant liquid, gives it the consistence of a cerate, very useful for frictions and embrocations.

Another use, quite different from the above, to which glycerin is applied is the manufacture of nitroglycerin, $C_3H_5(NO_2)_3O_3$, the most powerful and dangerous explosive employed in the arts. The process of manufacture is exceedingly simple. Strong nitric and sulphuric acids are mixed together, in the proportion of two parts of the former to four of the latter by weight. Into this is poured, with constant stirring, one part by weight of pure glycerin, the temperature of the mixture being kept below 77° Fah. by external cooling with ice. When oil drops begin to form on the surface, the mixture is poured into a large quantity of cold water. The nitroglycerin then separates and is purified by washing and drying. It is a light yellow, oily liquid, inodorous, but has a sweet pungent aromatic taste, and when placed on the tongue produces a fearfully intense headache which lasts for hours.

Its explosive properties are already too well known from the numerous fatal accidents that have recently attended its use hereabouts, to say nothing of the Bremerhaven explosion.

The complex nature of the glycerin molecule renders it peculiarly susceptible to the action of reagents; it readily forms other substitution compounds, and is general a dangerous substance to experiment with. A warm concentrated solution of permanganate of potash poured into glycerin decomposes it with explosive violence; chromic acid and glycerin are likewise explosive, facts which should be remembered when putting up prescriptions containing glycerin.

E. J. H.

A Materialized Hole.

Take a sheet of stiff writing paper and fold it into a tube an inch in diameter. Apply it to the right eye and look steadfastly through it, focussing the eye on any convenient object; keep the left eye open. Now place the left hand, held palm upward, edgeways against the side of the paper tube, and about an inch or two above its lower end. The astonishing effect will be produced of a hole, apparently of the size of the cross section of the tube, made through the left hand. This is the hole in which we propose to materialize another and smaller hole. As we need a genuine aperture, and it would be inconvenient to make one in the left hand, let a sheet of white paper be substituted therefor and similarly held. Just at the part of the paper where the hole equaling in diameter the orifice of the tube appears, make an opening ¼ inch in diameter. Now stare intently into the tube; and the second hole, defined by its difference of illumination, will be seen floating in the first hole, and yet both will be transparent. The illusion, for of course it is one of those odd pranks our binocular vision plays upon us, is certainly one of the most curious ever devised. Besides, here is the actual hole clearly visible, and yet there is no solid body to be seen to define its edges. It is not a mere spot of light, because, if a page of print be regarded, the lines within the boundaries of the little hole will not coincide at all with those surrounding it and extending to the edges of the large apparent aperture. Each eye obviously transmits an entirely different impression to the brain, and that organ, unable to disentangle them, lands us in the palpable absurdity of a materialized hole.

Inventions Patented in England by Americans.

[Compiled from the Commissioners of Patents' Journal.]

From August 11 to September 11, 1876, inclusive.

AIR BRAKE, ETC.—C. A. Bonton (of New York city), London, England.
ALARM PUNCH.—J H. Small, Buffalo, N. Y.
BENDING WIRE, ETC.—H. W. Putnam, Bennington, Vt.
BOILER CIRCULATOR.—B. S. Koll, Pitsburgh, Pa.
BOOT-SEWING MACHINE.—G. McKay, Boston, Mass.
BOOT-SEWING MACHINE.—J. Cutlan, Philadelphia, Pa.
CARPET LINING, ETC.—O. Long, Brooklyn, N. Y., *et al.*
COTTON OPENER, ETC.—S. D. Keene, Providence, R. I.
CRUSHING QUARTZ, ETC.—D. D. Mallory, Mystic Bridge, Conn.
DRESSING BRISTLES, ETC.—E. B. Whiting, St. Albans, Vt.
FENCE, ETC.—L. E. Evans, New York city.
FLOOR COVERING.—J. F. Gloyn, Astoria, N. Y.
FURNACE.—A. L. Holley, Brooklyn, N. Y.
GAS GOVERNOR.—R. H. Plass, New York city.
GLOVE FASTENER.—J. Lewine, New York city.
HYDRAULIC ELEVATOR, ETC.—T. Stebins *et al.*, Boston, Mass.
KNIFE HANDLE.—J. W. Gardner, Shelburne, Mass.
KNITTING MACHINERY.—J. L. Brown, Chicago, Ill.
MAKING STEEL, ETC.—H. Schierloh, Jersey City, N. J.
MUSICAL INSTRUMENT.—C. F. Hill, Stamford, Conn.
PREVENTING SMOKE,—J. Todd, Potosi, Mo.
PRINTING TELEGRAPH —G. M. Phelps, Brooklyn, N. Y.
PUNCH.—D. L. Kennedy *et al.*, New York city.
RAILWAY.—E. E. Lewis, Geneva, N. Y.
RAILWAY SIGNALS, ETC.—F. W. Brierley, Philadelphia, Pa.
RAILROAD TIE.—G. D. Blaisdell, Cambridge, Vt.
RAISING BLINDS, ETC.—L. H. Gano, New York city.
RIVETING MACHINE, ETC.—J. F. Allen, New York city.
ROTARY BOILER.—C. W. Pierce, New York city.
SEWING LEATHER, ETC.—E. R. Gardner, New Bedford, Mass.
SEWING LEATHER, ETC.—G. V. Sheffield *et al.*, Brooklyn, N. Y.
SEWING MACHINE.—H. P. Garland (San Francisco, Cal.), Dundee, Scotland
SMOOTHING PLANE.—C. E. Smith, Crawfordsville, Ga.
SPINNING MACHINERY.—J. Goulding, Massachusetts.
STEAM ENGINE.—G. B. Massey *et al.*, New York city.
VELOCIPEDE.—S. Gilzinger, Rondout, N. Y.