

antimony would be most suitable, but it should be mixed with the picrate of ammonia with caution.

This plan of obtaining a powerful metallic light is specially recommended for illustrating some of the phenomena of spectrum analysis. At present it is usual to employ the electric light for the purpose of projecting spectra on a screen in order to exhibit them to a large audience. The cost and inconvenience of the electric light is, however, so great as to debar many from trying to exhibit these beautiful experiments. Edelmann now proposes the above plan for producing intensely brilliant metallic flames as a substitute for electric method, and states that he has succeeded perfectly in projecting the spectra on a considerable scale when using the very simple and inexpensive source of light above described.—*British Journal of Photography.*

LETTER FROM UNITED STATES COMMISSIONER
PROFESSOR R. H. THURSTON.

NUMBER 14.

BRUSSELS, September, 1873.

Leaving Berlin immediately after breakfast by express train, after a ride of four hours across a level and frequently sterile country, which is remarkably devoid of interest, we arrived at the pleasant and quaint old German town of

HANOVER.

Here we dined, and then spent two hours strolling about the principal streets and the noble park, and calling at the celebrated polytechnic school, of which our venerable and distinguished friend, Dr. Karmarsch, is the head. The curious architecture of the older buildings of the town, in which wooden framing with brick filling produce an odd and not unpleasing effect, contrast remarkably with the pretty cottages and fine modern residences which have been built in brick and stucco near the railroad station. Hanover is well known as the capital of the late kingdom of the same name, but is not less widely known as the birthplace of Herschel and the home of Leibnitz.

Resuming our journey toward Cologne, we were entertained by the conversation of an intelligent young Turk, whose place of residence was Constantinople, but who had left his home and his harem to see the great exhibition and to travel in Europe. We were pleased to learn that the women of his country are, at last, offered some opportunities of acquiring knowledge. There are twenty-four advanced schools for young women, in his native city, which are fully attended, the students being from fifteen to eighteen years of age. The seclusion of females is, however, quite as carefully looked to as ever, and our fellow traveller was greatly shocked and surprised by our accounts of the progress and of the aspirations of the strong-minded of the sex in the United States.

Crossing the Rhine on a fine specimen of a very bad kind of iron bridge, the lattice girder, the traveller finds himself in

COLOGNE,

or *Cöln*, as the Germans call the city. It is a curious old town, with exceedingly narrow and labyrinthine streets; but it contains almost nothing to attract the stranger, with the important exception of its great cathedral. This famous structure is well worthy of the reputation it has acquired, notwithstanding the fact that it is still far from completion, although commenced six centuries ago. Its immense size and its symmetry of form, and the beauties of its architecture, make it probably the finest specimen of the gothic style in existence. The length of the building is something over 500 feet, its breadth 231, and the height of the principal towers, when finished, will be 532 feet. The ridge of the roof is 250 feet above the pavement, the nave rises 165 feet, and the aisles 80 feet. No description can do justice to this magnificent and colossal pile; and only repeated visits and comparison with surrounding objects enable the traveller to obtain a just idea of its immensity. The gracefulness and the richness of gothic architecture are nowhere in the world, probably, more fully illustrated than in the cathedral of Cologne. The work of completion is now progressing rapidly, but the building has been so long in course of erection that the repairing of the decaying stonework of the earlier must accompany the labor of completing the later construction. The excursion up

THE RHINE

is always anticipated by the traveller in Europe with a degree of interest which is perhaps unequalled by that felt in any other part of his journeyings. And he is probably seldom disappointed. Our little party certainly was not, and the long sail from Cologne to Mayence, occupying the whole day, was one of extraordinary pleasure, while the return next day over the same route was hardly less enjoyable.

There is probably no point on the Rhine at which the natural beauties of the scenery exceed those of our own noble Hudson where it breaks through the Highlands at West Point; no part of the Rhine can equal in its picturesque and wild beauty those northwestern examples of fine river scenery, the Dalles of the St. Louis or of the St. Croix, and nowhere on the Rhine can be found any one spot of as great historical interest as many that might be named in Great Britain; yet it may well be asserted that in no other part of the world can the intelligent traveller and the appreciative observer of Nature find such a combination of these attractions, in one uninterrupted series, as upon this splendid German river, between Cologne and Mayence. Magnificent scenery of ever changing but never intermitted beauty, picturesque old ruins of castles, around which cluster the most interesting and important reminiscences of a thousand years of German history, and each of which is founded upon some prominence of craggy mountain side which itself is of-

ten the subject of an old and romantic tradition, or of some still more improbable but none the less interesting fairy tale, in which sprite or gnome or nymph lures an unfortunate victim to destruction or leads him to unimaginable bliss, are seen at every turn. Leaving Cologne, and passing Bonn, the noted *Sieben Gebirge* (seven mountains) rise into view, their rugged sides and ruined castles awakening in the traveller a sensation of mingled admiration, surprise, and interest which is not again lost until he reaches Mayence. On the one side, at an imposing height, is the splendid old ruin of

DRACHENFELS,

near which Siegfried, the hero of that noble but sanguinary ancient German poem, the *Nibelungenlied*, killed the dragon so many centuries ago. On the other side is Rolandseck, another fine ruin, which has been rendered famous by Schiller, who here lays the plot of his "Knight of Gottenburg." In the river we notice the island in which was immured the beautiful girl who had supposed her long absent lover lost forever, one of the thousands who fell fighting the barbarians of the East; and above, on the top of the overhanging precipice which forms the river bank, is the castle built by the lover after his return from a long imprisonment, and where he spent the remainder of his life, looking down upon the roof which sheltered his lost bride. Farther on, the high rock *Werpelrei* raises its basalt crest seven hundred feet above the river; and from top to bottom, wherever earth will lie and wherever terraces can be made to sustain them, it is clothed with a mantle of green vines laden with the wine-producing grape.

We pass the old city of

COBLENTZ

and, opposite, the immense fortification of Ehrenbreitstein with its four hundred guns and its immense range of outlying works. It is stated that this almost impregnable stronghold has sufficient storage capacity to provision 8,000 men for ten years, and that the cost of the fortification amounted to nearly ten millions of dollars. We pass the bridge of boats and go on up the river, meeting with beautiful gems of scenery and romantic ruins at every bend of the stream. We pass the extensive ruins of Rhinefels, and the beautiful remains of Rhinestein, the homes of the booty-loving and law-defying old robbers who, in ancient times, took toll of all who passed on the river. We pass around the projecting rock where, sitting high above the stream, the beautiful *Lurlei*, by her entrancing songs, draws the unfortunate fishermen resistingly into the raging whirlpool at her feet. Then we pass the two old castles, which, confronting each other, are called the "Mouse" and the "Cat." Near Bingen we see an island in the middle of the stream on which is an old tower, and, overlooking it from the river bank, is the equally old castle of Ehrenfels. Here, according to tradition, the rich and avaricious old Bishop Hatto (of Southey's ballad) stored his grain in the tower, and lived in comfort in his castle, while the people, far and near, were dying of famine. Holding his grain in expectation of a rich harvest of gold when the highest attainable price should induce him to sell, the miserly wretch finally removed, for safety, to the tower where he could better watch his treasure, as well as defend himself against the attack of the maddened people. He was there destroyed by an army of starving rats, which gathered from all directions to feast upon his stores, and to visit upon the wicked proprietor a righteous judgment. We pass

JOHANNISBERG,

the source of the finest of Rhenish wine, and, steaming along through a more level and less beautiful country, we gaze with intense interest upon the scenes which were, centuries ago, so attractive to Charlemagne, and which were so often visited by his successors.

At Mayence we find another bridge of boats, and we watch the operation of opening and closing, to allow the passage of vessels, with some curiosity. The rapidity and ease with which a section is dropped down with the current and swung out of the way is as remarkable as is the difficulty and the slowness with which it is hauled back into its place. Near the bridge are several *schiffmühle*, grinding away very busily, and, about them, are several small boats, either bringing grain to be ground, or taking to the city the flour which has been prepared for the market.

Some distance lower down, we passed a dredging machine, anchored in midchannel and dredging most effectively, its machinery driven, like the *schiffmühle*, by great paddle wheels turned by the current. With unusual reluctance we left this beautiful valley of the Rhine, the most fruitful of all regions of poetry and romance, and pursued our journey westward. A few hours were spent at

AIX-LA-CHAPELLE,

an interesting old town in which we found another of the great German technical schools. With a splendid building, erected by private contributions of public spirited citizens, a fine corps of instructors, and a small but well selected and increasing stock of apparatus, and more than full of students, this school is doing its share of the important work which is so rapidly bringing continental nations into successful competition with Great Britain, in industrial pursuits. The current expenses of the institution are defrayed by the State.

Another moderately long ride by rail brought us across the frontier, and we made our next stop at

LIEGE,

Belgium, near which busy and pleasant city is the town of Seraing and the great establishment of the *Société Cockerill*, the largest of its kind in Belgium and one of the largest in

the world. It was this Cockerill company which exhibited the immense blast furnace blowing engine, which, with their locomotive and marine engines, formed so striking a collection in the machinery hall of the great exhibition. The principal works are situated in the valley of the Meuse, six miles from Liège and upon a great coal formation which constitutes one of the principal deposits of Belgium. The works were founded by Cockerill Brothers, a half century ago, for the purpose of manufacturing steam engines and flax spinning machinery. The first blast furnace was erected in 1826.

The establishment now comprises four collieries, producing annually about 350,000 tons of excellent bituminous coal, thirty iron mines from which are raised 150,000 tons of ore per year, five blast furnaces yielding 55,000 tons of pig iron, four new blast furnaces for the production of Bessemer metal, which are still unfinished, two iron and one copper foundries turning out 5,000 tons of excellent castings, a rolling mill which turns out 40,000 tons of rails and other sorts of rolled iron, a large steel works containing ten Bessemer converters and producing 17,000 tons of steel per annum, a forge which has an annual production of 1,500 tons, large machine shops employing 1,500 workmen, a bridge and boiler shop in which are built 6,000 tons of boilers and bridges annually and, beside all this, the company has, at Antwerp, a large shipbuilding yard.

THE SERAING ESTABLISHMENT

covers an area of 200 acres, and employs 9,000 workmen. On the place are over 250 steam engines, having a collective power of 8,000 horses. Two millions of dollars are paid annually in wages, 350,000 tons of coal are consumed, and the annual receipts from sales amount to five or six millions of dollars. This immense establishment has grown up from the small beginnings of John Cockerill and mainly through his energy and business capacity. The great engineer is now deceased, and the works are carried on by the "Société John Cockerill" among whom, it is said, is no less a personage than the King of the Belgians. The coal raised from the shafts within the works is of fine quality, and cokes well. The coking is done partly in ordinary ovens, and partly in Appold kilns, which are said to work finely. The coke is hard, clean, and bright, and seems capable of sustaining a burden nearly equal to that borne by the celebrated English Durham and Newcastle coke.

Pig iron for ordinary purposes is made, of very good quality, from ores of the neighborhood, but ores are imported from Spain and from England for Bessemer pig. Molding sand, fire brick, and fire clay are obtained from the neighborhood, and thus the principal part of the raw materials used in the works is obtained from deposits close at hand.

The castings made in the foundries are unusually smooth and clean. The work turned out in the machine and boiler shops is exceedingly creditable. An important feature of the practice here is the use of steel for nearly all moving parts of machinery. It has displaced iron almost entirely in forged work, and, to some extent, it is substituted for iron in even cast pieces. This introduction of steel has taken place here more than at any other place which we have ever visited, and the general success here met with may be taken as an indication of one of the directions in which improvement is going forward. The new steel plant will be expected to produce one hundred and fifty tons per day of Bessemer metal. The riveting in the boiler and bridge work is, wherever possible, steam riveted. The work, in all departments, seems invariably well done, and is finding a market in all parts of Europe, and, to some extent, even in Great Britain and the United States.

The workmen are paid about three fourths as much here as in Great Britain. Molders receive about seventy-five cents per day, puddlers a dollar to a dollar and a half, pattern makers seventy-five cents, machinists from seventy-five cents to a dollar, riveters seventy cents, and foremen in the several shops from one to two dollars. A day's work is twelve hours, nominally; actually it is sometimes less and not infrequently more. A few women are still employed in the lighter kinds of labor.

The workmen of Belgium are probably more nearly equal in skill to the English mechanics with whom they compete than are those of any other European country.

R. H. T.

Solidification of Nitrous Oxide.

According to Wills, nitrous oxide may be easily solidified by causing a rapid current of air to pass through the liquified gas. Differing in this respect from carbonic acid, nitrous oxide may be kept liquid for some time in open vessels. Carbonic acid solidifies, as soon as it escapes from its containing reservoir, because the tension of the vapor of the solidified acid, even at the moment of its formation, is considerably superior to atmospheric pressure; while liquid nitrous oxide attains -133° Fah. and solidifies at -146° , so that the tension of its vapor is weaker than one atmosphere. The density of the liquid protoxide at 32° Fah. is equal to 0.9004; its coefficient of dilation is very considerable. It is insoluble in water.

A CORRECTION.—In our article on "Specific Heat," on page 208, current volume, the expression (lines 45 and 46) "Specific heat at temperature $39^{\circ} 1^{\circ}$ (T) = 1(C)," should read: "Specific heat at temperature $39^{\circ} 1^{\circ} = 1$; specific heat at temperature T = C."

In Saginaw county, Mich., a poor man named Reif, while boring a well, is reported to have been greatly frightened by the upward flow of gas, the escape of which shook the earth, produced a noise like thunder, and, when fired, shot up a flame fifty feet high.

Recovery of Silver from Cyanide Baths.

Dr. Graeger states that there are many methods of accomplishing this object; but none have been so easily carried out or have obtained enough of the silver as to be satisfactory. The process recently described by Ney, in which the silver was precipitated as a chloride by the addition of muriatic acid, had both these faults. The silver was not all precipitated, the subsequent treatment of the precipitate was not a simple one; and beside, the operation was attended with a strong evolution of prussic acid, which is extremely unpleasant to many persons, not to say dangerous to life.

"By accident," says Dr. Graeger, "I discovered a method of obtaining all the silver in a very simple and easy manner, and one that may be operated by persons who are not chemists. It is based upon an observation made by myself that cyanide of silver is perfectly reduced to metallic silver by grape sugar, provided the solution contains no free alkaline cyanides (cyanide of potassium or of sodium). The cyanide of potassium present is destroyed by adding a suitable quantity of a solution of green vitriol, which converts it into ferrocyanide of potassium. Then grape sugar will reduce the silver in the alkaline solution. In carrying out this method, the silver bath, which has become useless, is allowed to settle, and is then decanted into a large iron kettle, where it is warmed, and protosulphate of iron slowly added until a slight precipitate (oxide of iron) is formed, which does not disappear on stirring. It is next heated to boiling and made strongly alkaline by adding caustic soda or potash, if necessary; and a solution of grape sugar is then added gradually until the liquid acquires a brownish yellow color. The heat is now to be removed and the precipitate allowed to settle, after which the clear solution is removed by means of a siphon, and the sediment, consisting of metallic silver and oxide of iron, is thrown on a filter, washed, dried and ignited. This residue is then treated with nitric acid, which dissolves all the silver and but little of the oxide of iron. The very last trace of silver in the bath is thus separated and dissolved in nitric acid. To test this process, the following experiment was made: 0.85 gramme nitrate of silver was dissolved in 5 cubic inches distilled water, and chloride of sodium, sulphate of copper, sulphate of zinc, caustic soda and carbonate of soda added, together with enough cyanide of potassium to produce a perfectly clear solution. One third part of this solution was treated with a suitable quantity of sulphate of iron, heated to boiling, and the glucose added. The precipitate obtained, when treated as above and tested volumetrically with chloride of sodium solution, showed 0.238 grammes of nitrate of silver; this taken three times = 0.714 grammes instead of 0.85 gramme taken, or 84 per cent. A second experiment gave 94.5 per cent. These results are very favorable, especially when we consider that we were dealing with a solution containing only 4 parts of silver in 10,000 of water. It is a striking phenomenon that not a trace of the copper, which was purposely added to test this point, was reduced by the grape sugar."—*Polytechnisches Notizblatt.*

Recent American and Foreign Patents.**Improved Sheet Metal Roofing.**

Edward C. Hegeler and Frederic W. Matthiessen, La Salle, Ill.—This invention consists in the employment of fine corrugations of the metallic sheets used in the construction of roofs, and for similar purposes, and the arrangement of the corrugations in the direction crosswise to the pitch of the roof, also crosswise to the length direction of the gutters, eaves troughs, etc. This fine corrugation may be made one eighth of an inch deep by half an inch in width, or in other proportions. It can be very fine and still allow by its curvings the expansion and contraction of the metallic sheet in the direction crosswise to the corrugation, and thus allow of the bending of the sheets transversely to the corrugation sufficiently to permit the use of the various modes of uniting the sheets of roofing now practiced.

Improved Mode of Attaching Journals to Feed Rollers.

George M. Amsden, South Boston, Mass.—This invention consists in making shafts with ends flaring conically outward, around which the rollers are cast. Screws and nuts on the shaft just beside the rollers draw the journals tight into the holes of the former in case they become loose through any cause.

Improved Doubletree Equalizer.

Wm. Martin, Clarence, Iowa.—This invention relates to double trees that are usually pivoted to the tongue of a vehicle or the end of a plow beam to allow a certain amount of vibratory movement. It consists in remedying the objectionable looseness on the beam or tongue and the want of a proper limitation of the motion of the said double tree by extending rearwardly the place of the center bolt, and placing in front a friction device which holds the doubletree steady until a greater force is applied at one end than the other, and which, at the same time, regulates the extent of its motion.

Improved Bridge.

Benjamin F. Davis, Hearne, Texas.—This invention consists in a novel method of constructing the arches and chords of truss bridges by successive layers of planks nailed together, and at the extremities of banded and braced wedges.

Improved Adding Machine.

Solomon Pool, Chapel Hill, N. C.—This invention consists in the use of concentric circles with partitions between them, turning upon a revolving plate, around a common center; the circles divided into two or more sections, and the sections into ten spaces each, and so arranged that when an inner circle is turned ten spaces, it turns the next outer circle one space, by means of a drop catch falling through a graded opening in the partition between them, from the outer circumference of the inner circle, and catching teeth arranged on the inner circumference of the circle. The teeth are so graded as to allow the drop, working loosely when down in the opening of the partition, to slide over them when the outer circle is turned backward.

Improved Car Coupling.

Wm. H. Waddell, Lytleton Waddell and John A. Lutz, Churchville, Va.—This invention consists in a spring-pressed lever in rear of drawhead, provided on one end with a foot piece by which the other end may be removed from over the link hook and allow it to rise; in a treadle and a grapple hook to hold the lever; in a grapple hook bar and trigger, so contrived that the latter lifts the former and allows a spring-pressed lever to turn back and lock the link hook; and finally in the combination of the essential parts so as to form an improved car coupling.

Improved Fruit and Egg Carrier.

Courtenay J. Simmons, Kansas City, Mo.—The invention consists in an egg or fruit carrier made of a series of rows of cardboard pentagonal cells, having their bottoms held thereto by a U-shaped clamp and fitted in obtuse angled recesses on the inside of the end pieces of frame.

Improved Porter's Box.

Isaac Barman, Portland, Oregon.—This invention consists in a box for the use of porters in stores, warehouses and similar establishments, the object of which is to provide a convenient place for the tools and materials used by them in their work. It has apartments, a receptacle for nails, stencils stencil brush, ink, etc., conveniently and compactly arranged.

Improved Steering Apparatus.

William E. Thomas, Queenstown, Md.—This invention relates to means by which rudders may be worked insteeringships, vessels, or boats, and consists in combining with the rudder a sprocket wheel, chain and reversely threaded screws rotating in opposite directions, also in connecting sliding the pinions with screws.

Improved Lemon Squeezer.

Edward M. Sammis, Babylon, N. Y.—This invention has for its object to furnish an improved lemon squeezer, so constructed that a whole lemon may be put into it and the juice expressed without its being necessary to first cut the said lemon, and which will prevent the juice from squirting out over the operator. The invention consists in the knife secured in the cavity of a lemon squeezer; in the arrangement of the knife in the cavity of a lemon squeezer in an inclined position; in the slit or notch formed in the knob or projection, and in side flanges which overlap the side edges and thus prevent the juice from squirting out.

Improved Lamp.

John C. Wharton, Nashville, Tenn.—This invention consists in the construction of a lamp in such manner as to interpose a body of water, or other incombustible fluid, between a small quantity of oil in contact with the wick and the main body of oil contained in a separate reservoir; also so as to supply the flame automatically with oil from said reservoir through the water to the wick; also, in certain cases, when a more complicated but safer lamp is desired, to isolate the oil contained in a suitable reservoir from all contact with any atmosphere whatever, thus preventing the possibility of ignition within the lamp.

Improved Combined Chair and Secretary.

George C. Taylor, Thibodeaux, La.—The object of this invention is to furnish a convenient piece of furniture for family or business use, which combines the advantages of an arm chair, secretary, writing table, drawers, etc., if used by a business man or invalid, with those of a work receptacle, scrap bag, needle and thread repository, etc., if used by a lady. The whole is portable, and may be easily moved to any desired place. The invention consists mainly in combining an arm chair with a case or secretary having movable pigeon hole arrangement, drawers, and folding leaves, with drawers under the seat of the chair, and casters on one side under the secretary to be lifted by the arms of the chair and rolled about.

Improved Coal Breaker.

Rufus A. Wilder, Cressona, Pa.—This invention consists in casting teeth on both sides of the rack plate composing the cylindrical breaker, so that the plate, when the teeth on one side are worn, can be reversed and used on the other side.

Improved Harvester Reel.

Charles F. Goddard, St. Ansgar, Iowa.—This invention has for its object to furnish an improved harvester reel, which shall be so constructed that the driver may conveniently adjust the reel bars, so as to bring leaning grain upon the platform. The invention consists in the reel shaft, made in two parts, provided with grooved and recessed flanged collars at their inner ends. The reel shaft is made in two parts, having flanged collars formed upon their inner or adjacent ends, the flanges of which are securely belted to each other. In the adjacent faces of the flanges are the reel arms which are bent inward at right angles, so as to enter a small disk placed in a cavity formed to receive it in the central parts of the flanged collars, which cavity is made larger than the disk, so that the said disk may be moved longitudinally in a recess with relation to the shaft. The inner part of the shaft is made hollow to receive a rod which passes through it, and to the inner end of which is attached the grooved disk. With the outer end of the rod is connected one end of a lever. The other end of the lever extends back into such a position that the driver can readily operate it with his foot to adjust the reel bars.

Collecting Dust in the Manufacture of White Lead.

Micalah Tolle, St. Louis, Mo.—The object of this invention is to utilize the lead dust which escapes in white lead factories after having passed through the separator in which the corroded lead has been separated from the uncorroded lead, so that a considerable saving be accomplished, and the health of the workmen be protected against the deleterious influences of the lead dust. The invention consists, principally, in the combination of an elevator with a casing or spout, through which the uncorroded lead is conducted on the elevator, which is submerged in a tank of water, so that the lead dust carried down from the separator is retained therein, and the uncorroded lead carried up by the elevator.

Combing and Mixing Tampico and Bristles.

George Willett, Burlington, assignor to Enoch B. Whiting, St. Albans, Vt.—This invention consists of movable endless chain holders, to which the tampico and bristles are carried by endless belt carriers and so presented to said holders that they project about half their length or more from the side as they are carried slowly along past a comb, so arranged and operated that it combs out the projecting portions thus subjected to it. The invention also consists of a combination, in one machine, of two of these movable holders and combs with endless carrier belts so arranged that they take the partly combed stock from the first holders and comb, and reverse and transfer it to the second holders, so that the uncombed portion is presented to the second comb to be completed by it. The stock is laid on the endless carrier belts a little in advance of the holders, and spread and mixed as evenly as possible, so that it combs together. It may be run through the machine several times till the mixing and combing are satisfactory.

Improved Clothes Reel.

Dennis L. Huff, Bay City, Mich.—This invention relates to the horizontal revolving reels used for hanging clothes to dry; and it consists of an arrangement of the rods or braces upon the upper side of the arms to reinforce and protect the spider in which the inner ends of the arms are secured.

Improved Rotary Engine.

Francis J. Hollenweger, New Rochelle, assignor to himself, Joseph Martin, and Charles F. Spaulding, of New York city.—This invention relates to two steam chambers and a rotary piston arranged between them, having similar spiral cavities in their adjacent faces. The chambers are provided with passages for the induction and eduction of the steam, and with passages for conducting the steam from the inlet to the outlet, passing successively through the cavities, so as to retain the steam and cause it to act by expansion upon the piston, causing said piston to make several revolutions before said steam reaches the outlet. The steam, acting upon both sides of the piston, balances it and limits its friction. The chambers are provided with bolts to enable them to be accurately adjusted to faces of the piston, and with grooves for containing water of condensation for lubricating said faces and packing them steam tight.

Improved Combined Water Cooler and Filter.

William J. English, Providence, R. I.—This invention consists of a double cased filter with a dead air space between; also of a partition in the inner case, dividing it into two compartments—one for the ice and the water to be filtered, and the other for the filtered water, with a filter in the bottom of the former compartment, arranged in three divisions, through which the water passes successively, the first and last containing gravel, and the middle one charcoal. The filter is also arranged with a sloping top, against which the filtering substances pack by granulation, so that the water must pass through them.

Improved Machine for Sorting Potatoes.

David M. King, Garrettsville, O.—This invention relates to means whereby potatoes may be simultaneously screened and sorted; and consists in two inclined endless screens, the fine one arranged with its upper end projecting and sifting out only the dirt, while the latter is coarse and sifts out all the unmerchantable potatoes. It also consists in using cords and weights to operate with hooks in rolling the bags.

Improved Letter Envelope.

John D. McAnulty, No. 127 South Ninth, corner of Fourth street, Brooklyn, E. D. N. Y.—This invention consists of a lock formed in the flaps of a paper envelope by a T shaped slit in one, and a dovetail-shaped tongue in the other, so contrived that by folding the tongue, inserting it in the slit, and then unfolding it, a practicable lock is formed, which, when sealed, cannot be opened without mutilating the envelope to such extent as to clearly show that it has been opened. An engraving of this device was published on page 590, volume 28 of the SCIENTIFIC AMERICAN.

Improved Machine for Making Window Sash.

James Travers, Roslyn, N. Y.—This invention is a device for facilitating the manufacture of window sashes; and consists in a guide for governing the position of the stiles and meeting rails of the sashes in sawing the dovetails and mortises for putting them together.

Combined Chest Protector and Shirt Bosom Support.

John A. Aston and Charles C. McMurphy, Leavenworth, Kan.—The object of this invention is to supply to the public a chest protector made of some stiff material, so that the same may serve also as a support to the shirt front, and not only keep the chest warm and comfortable but prevent also the ungainly folds and wrinkles of the shirt front. This invention consists of a piece of stiff pasteboard or other material covered by linen, flannel, or similar fabric, and suspended around the neck or otherwise applied to the chest.

Improved Tyre Tightener.

Milo E. Jacobs, Winnebago, Ill.—The object of this invention is to provide a device for tightening tyres, when cold, around the wheel without removing them, so that the same are fully protected and strengthened when in use. It consists of the tyre with two ends, so constructed that they are recessed to pass beside each other, and rest with face plates toward the felloes, to be tightened by means of a screw bolt passing through them.

Improved Manufacture of Dies for Punching.

Robert J. Mullin, Providence, R. I., assignor to himself and Michael R. Hanley, of same place.—The object of this invention is to improve the die used for the cold punching of nuts, washers, jewelry, etc., so that they are more durable, require less steel, and offer a greater punching surface. The present difficulty lies in welding the steel and iron parts of the dies together so that the face does not break off in hardening, or when working with it. The invention, which is intended to overcome this trouble, consists in welding the steel into the iron base, flush at the top and extending to within a short distance from the bottom, so that there is a greater depth of steel and greater strength, as the iron part surrounds the steel core.

Improved Machine for Dressing Wood Rails.

Horatio G. Angle, Chicago, Ill.—This invention consists of a small truck on ordinary wheels, and have lateral guide wheels adapted to run along the wood rails or stringers after they have been laid. Vertical and horizontal rotary planing tools are arranged in advance of the front wheels to plane the upper and inner surfaces of the stringers as the truck is moved along. The planing is gaged by the wheels of the truck, and the planing tools are operated by belts and pulleys in the ordinary way, driven by steam or by any power. The depth of the cutting on the upper surface is regulated by a vertical adjustment of the frame on the front truck axle, and the adjustment of the vertical cutters for turning curves and the like is effected by a lateral adjustment of the frame at the rear relatively to the axle and wheels.

Improved Eaves Trough Hanger.

Thomas F. Palm, Toledo, O.—This invention consists in one continuous wire, passing around and over the eaves trough, and which is provided with loops and fastened ends.

Improved Grinding Mill.

Ephraim H. Austin, Scott's Hill, Tenn.—This invention pertains to improvements in grist mills of the ordinary kind, having special reference to the means of feeding the grain to the spiral passages in the eye of the runner, and the means of connecting the water wheel, shaft and spindle of the runner.

Improved Turbine Water Wheel.

Angus A. Herriman, Greensborough, N. C.—The object of this invention is to so improve the gates and chutes of a water wheel that an unbroken sheet of water is admitted to strike the wheel without any space for expansion or break of the water, whether the gate be fully or partially open, so that thereby the greatest attainable percentage of power with a partially drawn gate is obtained. The invention consists in the arrangement of flexible wings or guide plates in connection with a circular sliding gate and the chutes.

Improved Windmill.

Ovett B. Knapp, Brandon, Wis.—This invention relates to that class of pumping windmills in which an oscillating regulator vane with automatic apparatus for working it so as to take the wind or not, and another to turn the wheel which has non-adjustable vanes edgewise to the wind for stopping it, are used; and it consists in having the oscillating regulator vane arranged below the shaft on which it is suspended and around which it oscillates, whereby it is made more sensitive to the effect of the wind, and is controlled better than when pivoted at the middle or above it.

Improved Sled Brake.

Peter Cable, Elizabeth, Ill.—This invention consists in the arrangement of a toggle lever having a rule joint and projecting arm or brace for attachment of the operating rod, whereby a dog pivoted to the runner may be caused to take into the snow, and is held in that position without continuance of the force necessary to apply at the outset.

Improved Corpse Cooler.

John Hoffman, Toledo, Ohio.—The object of this invention is to furnish, for the use of undertakers and others, an improved cooling and ventilating casket, through which a constant current of fresh cold air is supplied which carries off all gases of decomposition, conveying the same to the chimney, window, or other place, so that dead bodies may not only be preserved a greater length of time without difficulty, but also without causing annoyance by foul and putrid odors. The invention consists of a casket connected with ventilating pipes or tubes, and a cooler which sends a current of fresh air through apertures of the casket, the cooler forming at the same time one of the supports for the casket.

Inventions Patented in England by Americans.

(Compiled from the Commissioners of Patents' Journal.)
From September 9 to September 18, 1873, inclusive.

- AUTOMATIC VALVE.—G. L. Kitson *et al.*, Philadelphia, Pa.
BLAST FURNACE.—B. Ray, Hudson, N. Y., *et al.*
BRACKET.—J. B. Morrison, Brooklyn, N. Y.
BRAKE.—E. P. Jones (of Shell Mound, Miss.), London, England.
BRIDGE.—J. B. Eads, St. Louis, Mo.
BRIDGE.—J. B. Eads, St. Louis, Mo.
CLOCK CASE, ETC.—C. W. Roberts, Chicago, Ill.
COTTON SCUTCHING, ETC.—A. T. Atherton, Lowell, Mass., *et al.*
DIAMOND CUTTING MACHINE.—I. Hermann, New York city.
ENGINE VALVE.—W. J. Stevens, New York city, *et al.*
FEED WATER INDICATOR.—A. S. Goodrich *et al.*, New York city.
HECKLING MACHINE, ETC.—J. Rinek, Easton, Pa.
MAKING FERTILIZER, ETC.—J. J. Storer, Boston, Mass.
PAPER BAG.—E. J. Howlett *et al.*, Philadelphia, Pa.
PULPING PROCESS AND FURNACE.—W. Sellers, Philadelphia, Pa., *et al.*
RUBBER TUBING, ETC.—C. Righter, New York city.
SCREW PRESS.—G. E. Boomer (of Syracuse, N. Y.), London, England.
SCREW VALVE.—P. Corrigan, New York city.
STEAM BOILER AND CONDENSER.—B. T. Babbitt, New York city.
TELEGRAPH PAPER, ETC.—T. A. Edison, Newark, N. J.
TOY.—T. Alexander, Washington, D. C.
TRANSMITTING MOTION, ETC.—T. A. Weston, Ridgewood, N. J.
TRAVELING SIDEWALK.—A. Speer, Passaic, N. J.
WINDMILL.—A. P. Brown, New York city.
VENTILATING AND PUMPING.—G. W. Richardson, New York city.
WASHING MACHINE.—T. Bell, Catskill, New York.
WEIGHING SCALES.—S. Harris, Philadelphia, Pa.