

**The Saline Springs of Onondaga, N. Y.**

The brine from these springs results from water penetrating immense subterranean deposits of rock salt, made by the natural evaporations of salt water lakes, like the Great Salt Lake, Caspian Sea, etc., which lakes existed in geological periods millions of years ago, the basins forming them being afterward covered up by later deposits. They belong all to the upper silurian era, and are at such great depths that they are perhaps inaccessible to man, but the way the salt is obtained there is so economical that it is far superior to the quarrying done in dry salt mines; it is simply pumped up in solution through comparatively narrow and inexpensive tubes. When we take in consideration that most of the natural rock salt has to be dissolved, filtered, and recrystallized, we see here that nature has done the dissolving and filtering, in fact the brine in Syracuse is so clear that a simple evaporation, either by fire or solar heat, is sufficient to produce a superior article of table salt.

The state owns the springs, pumps up the water, chiefly by the water power of that part of the Erie canal passing through Syracuse, and sells the brine to the manufacturers of the salt. The total quantity of salt obtained in Onondaga county since 1797 is not less than 200,000,000 bushels, half of which was obtained during the last fifteen years. Each bushel contains 56 pounds of salt. Taking now in consideration that one cubic foot of solid salt weighs 140 pounds, 15 cubic feet make a ton. The amount of salt, therefore, removed during the seventy years that the springs have been in operation amounts to 5,000,000 tons or 80,000,000 cubic feet of solid salt. This would form a single excavation in the earth of about 450 feet long, wide, and high; but the salt is not all removed in one breadth and the excavations are certainly distributed irregularly, over a large extent of subterranean territory. As the brine contains about 15 per cent of salt, it took seven times that amount of water to dissolve it; 560,000,000 cubic feet or 5,000,000,000 gallons of water have therefore all been evaporated by the heat applied during seventy years, and probably more, as the brines formerly used were not so strong by far as those obtained later by boring to a greater depth.

**Editorial Summary.**

**GREEK FIRE.**—In anticipation of further Fenian demonstrations, a memorandum relative to the treatment of nitroglycerin and Greek fire has been issued in England by order of the Home Secretary. Of the former explosive, the simplest mode of disposal recommended is to sink the containing vessels in deep water without attempting to open them. True Greek fire, it says, is simply a solid, highly-combustible composition, consisting of sulphur and phosphorus dissolved in the bi-sulphide of carbon, to which occasionally some mineral oil is added, with the view of increasing its incendiary powers. When the liquid is thrown on any surface exposed to the air, the solvent evaporates, leaving a film of the phosphorus or sulphide of phosphorus, which then inflames spontaneously. The proper mode of extinguishing such a fire is to throw damp sand, ashes, sawdust, lime, or any powder, wet sacking or carpeting, in short, any material which will exclude the air from the fire. No attempt should be made to remove the covering for some time after the flame has been extinguished. The place should afterward be thoroughly washed by a powerful jet of water forced upon it.

**CONCERNING FROZEN POTATOES.**—Dr. Adolph Ott, a frequent contributor to these columns, has been examining frozen potatoes for the purpose of confirming or disproving the truth of the common theory that the sweet principle of frozen potatoes is due to the conversion of starch into sugar. After a long series of experiments he concluded that this sweet principle was caused, during the freezing and thawing, by the sap bursting the cell and thus destroying vitality; at the same time decomposition sets in, which, though retarded by the cold, is not entirely arrested; the more so as at the season most likely to freeze, and especially during a snow storm, there abounds that powerful oxidizing agent, ozone. The outer portions, no doubt, are first attacked by it, and may thus be transformed into diastase, a body possessing the power of converting a comparatively large quantity of starch first into dextrine, and then, at the temperature of 140° to 170° as in the process of cooking, into sugar.

**OBSERVING THE BESSEMER CONVERTER FLAME.**—At the Atlas Steel Works, Glasgow, a very neat contrivance has for some time been used for enabling the observer to determine the point when the combustion of the carbon is completed. A square thin frame contains a combination of colored glasses, for instance, one dark yellow and two blue, or any other colors giving together a very dark neutral tint. Looking at the flame through these glasses affords the double advantage of preserving the eye from unpleasant effects of the intense light, and of making all smoke and other disturbing changes invisible. The flame, when thus viewed, looks white so long as the intense brilliancy due to the burning up of the carbon continues, but changes to a deep red at the moment all the latter has been consumed.

**UTILIZATION OF SPONGY CELLULOSE.**—In the process of making paper from wood, as practiced in Europe, round disks of wood are first subjected to the action of hydrochloric acid to dissolve out the spongy cellulose. This latter has, until lately, been a waste product, but is now converted into alcohol in this way: The wood is boiled for twelve hours in hydrochloric acid, diluted with ten times its volume of water. The acid liquid, which is charged with grape sugar formed from the spongy cellulose, is then withdrawn, the excess of acid saturated with lime or chalk, and a small quantity of yeast is

added, the temperature being kept at about 68° Fah. Fermentation soon ensues, and when bubbles of carbonic acid gas are no longer evolved, the liquid is distilled to obtain the alcohol.

**THE POISON OF RATTLESNAKES.**—A Philadelphia physician, Dr. S. W. Mitchell, has been experimenting upon the venom of rattlesnakes, and concludes that there is no antidote to the poison, the remedies usually applied being nearly or entirely useless. Carbolic acid applied externally sometimes delays the result merely by affecting the local circulation. He has also confirmed the general belief that the poison is absolutely innocuous when swallowed, it being incapable of passing through the mucous surfaces; also that it is so altered during digestion that it enters the blood as a harmless substance. The venom is not injurious to the rattlesnake itself or to any other of its own species. The doctor attaches considerable value to large doses of alcoholic liquors, especially where the patient was not intoxicated at the time of being bitten.

**SMOKE FROM GAS LIGHTS** is not usually occasioned by impurity in the gas, but the evil arises either from the flame being raised so high that some of its forked points give out smoke, or more frequently from a careless mode in lighting. When we suddenly open the stop cock and allow a stream of gas to escape before applying the match, a strong puff follows the lighting and a cloud of black smoke rises to the ceiling. Daily repetition gives in time a blackened wall.

**GARDINER**, in his "Music of Nature," asserts that dogs in a state of nature never bark—they simply whine, howl, and growl. The Australian dog never barks, and Columbus found that the dogs he had previously carried to America had lost their propensity for barking. This peculiar explosive seems to be an acquired faculty, which the animal derives from his associations with man.

**TIERS-ARGENT.**—This beautiful white alloy, first made by Taloureau, consists of two thirds of aluminum and one third silver. It is now made perfectly homogeneous, and is easily fabricated. Its hardness and lightness are valuable qualities in table furniture. Spoons, forks, goblets, and salvers made of this material are rapidly coming into use in Paris.

**LEUWENHOEK** has computed that 100 single threads of a full grown spider do not equal the diameter of the hair of the beard, and when the young spiders begin to spin, 400 of them are not larger than one of a full growth, consequently 4,000,000 of a young spider's threads are about the size of a single hair of a man's beard.

**M. SALVERTE**, in his work on the occult sciences, shows the probability that the ancients defended their buildings from lightning by conductors, and that the Temple of Solomon was thus protected.

**MANUFACTURING, MINING, AND RAILROAD ITEMS.**

A bill to incorporate the Idaho, Oregon and Puget Sound Railroad Company has been introduced in Congress, petitioning for power to build a railroad from a point on the Union Pacific 113° 30' west longitude, north to Snake river valley, thence northwesterly to Columbia river valley, thence to Portland, Oregon, and finally to Puget Sound. The company ask for every alternate section of public non-mineral lands to the amount of twenty alternate sections per mile on each side of the railroad line; also, United State bonds to the amount of \$16,000 and \$32,000 per mile for level and mountain routes respectively. A branch road is to extend to Montana.

One of the furnaces of the Crane Iron Company, at Catsauqua, Pa., lately turned out two hundred and forty tons of iron in one week; a yield scarcely ever equalled in this or any other country.

The only coal mines which last year were worked within the limits of the Pacific territory, were those of Bellingham Bay and Monte Diablo, while the amount extracted was but 8,816 tons from the former, and 71,822 from the latter, making a total of 80,638 tons, against a product during the preceding year of 90,000 tons. At the Monte Diablo mines increased facilities for transportation to tide water have been created by the construction of railroads, and it is expected that the beneficial results of these improvements will be felt another year.

A well of naphtha has been discovered at Kudaca, in the Caucasus, by boring. The liquid was first struck at a depth of 274 feet from the surface, and the yield for several weeks was at the rate of 1,500 barrels a day. Since then a fresh source has been met and a jet of naphtha, four inches in diameter, rises with great force to the height of forty feet above the ground, affording a supply of 3,000 barrels daily.

The famous Thames tunnel, which for the twenty-five years since its completion has proved an indifferent speculation, is at last to be made of some practical use. It is stated that two railroads on opposite sides of the river propose forming a junction by means of this subaqueous passage-way, and will make gradual entrances a mile distant from either bank. The original cost of the tunnel was over \$2,000,000. It was sold a few years ago for one half that amount, and even at this sacrifice the purchasers have found it to be a very unfortunate investment, the receipts, principally tolls from foot passengers drawn thither by curiosity, averaging but \$125 per week, which have been entirely consumed by expenses. Under the railway management, the tunnel may possibly become a pecuniary success.

The manufacture of salt commenced in the United States at Syracuse, in the year 1797, since which time this locality has produced eighty millions of bushels. Last year's yield amounted to 10,000,000 pounds, or about two thirds of all the salt consumed in this country. A correspondent writes that salt of excellent quality is manufactured in Oneida county, Idaho Territory.

The citizens of Minneapolis are very much concerned over the unpleasant fact that the Falls of St. Anthony are receding up stream at the rate of three hundred feet per year. All efforts to prevent this stampede of the rapids, by protecting the ledge, have proved insufficient, and the inhabitants are fearing the total destruction of the water power upon which their prosperity depends, and the consequent degeneration of the city to the rank of a mere village.

The iron and steel works at Birmingham, Conn., used 4,000 tons of scrap last year, making 3,500 tons of finished iron, 350 tons of imported steel in carriage and truck springs, and made 1,000 tons of iron into axles of all grades and styles.

MM. Carver & Co., of St. Etienne, France, have successfully utilized the gases given off in converting bituminous coal into coke. These gases are collected, drawn off into pipes, and cooled. From the liquids, condensed benzene, naphtha, sulphate of ammonia, and several dyestuffs are made; the uncondensed gas is used for illuminating purposes.

An establishment in Vienna manufactures knives from tungsten steel, which are so hard as to cut glass like the diamond.

A singular gas explosion in an oil well is reported in the Titusville Herald, the like of which, it says, has never been known in the oil regions. While drilling an oil well, near Enterprise, the tools broke through the second sand rock into a crevice where an immense quantity of gas had collected. Thus liberated, the gas rushed out with a loud rumbling sound, tearing out the driving pipe and throwing it upward into the derrick. A loud explosion ensued on the gas becoming ignited from the fire in the engine, and the derrick and engine house were both destroyed.

The manufacture of starch from potatoes is extensively carried on in the Northern and Eastern States. A single firm in New England consumed 25,000 bushels of potatoes for this purpose in 1867.

**Recent American and Foreign Patents.**

Under this heading we shall publish weekly notices of some of the more prominent home and foreign patents.

**WATCHES.**—George Frederick Roskopf, Chaux de Fonds, Switzerland.—This invention relates to an improvement in the construction of watches, which consists in having that portion of the mechanism of a watch known as the "escapement," fitted or attached to a plate or frame separate from the frame in which the "train" or other portion of the movement is fitted, the plate or frame to which the escapement is fitted being attached to the frame of the train in such a manner that it may be readily detached when necessary, and any of the known escapements, on a similar detachable plate or frame fitted or applied to the other portion of the movement. It also consists in constructing the detachable plate in such a manner, or arranging the several parts comprising the escapement on said plate in such a way that the 'scape wheel may be readily adjusted in a proper relative position with the pallets or other part or parts which work in contact with the teeth of the 'scape wheel, the detachable plate being secured to or in the frame which contains the train, or part of the watch movement, in such a manner that it may be adjusted so that the pinion on the 'scape wheel axle may always be adjusted properly in gear with the wheel of the train in which it is designed to work.

**MANUFACTURE OF HATS, CAPS, BONNETS, NECKTIES, AND RIBBONS.**—Treflé Garceau and Edward de la Granja, Boston, Mass.—This invention consists in combining paper pulp, india rubber, and paraffin in certain proportions, and thereby forming a composition peculiarly adapted to the manufacture of hats, caps, bonnets, neckties, ribbons, and other similar articles.

**CULTIVATOR TOOTH.**—M. F. Lowth and T. J. Howe, Owatonna, Minn.—In this invention the tooth is hinged, and provided with a brace, by which the angle of the tooth with the ground can be regulated, and which also operates to prevent the breaking of the tooth or beam by obstacles in the way of the cultivator.

**ANIMAL TRAP.**—Major B. Marshall, Draw Bridge, Md.—This improved trap is designed particularly to catch animals that travel in paths or leads, and the invention consists in so constructing it that it can be more easily sprung, and will more effectually secure the animal than will the traps hitherto in use.

**FLUID METER.**—Leicester Allen, N. Y. city.—In this invention a piston is balanced by a spring in such a manner that the piston, actuated by the flow of the water, will open a valve and give free passage to the water as long as there is no back flow, and when there is any back action will close, or partially close the valve and stop the flow. A registering apparatus records the amount that has passed through the valve.

**COTTON SEED PLANTER.**—A. J. Golig, M. U., Clinton, La.—This invention relates to a machine for planting cotton seed, and consists in a peculiar construction and arrangement of parts pertaining to the seed-distributing apparatus, whereby the seed may be sown with certainty and without the liability of the hopper becoming choked or clogged. It also consists in using in combination with the seed distributing apparatus above alluded to a furrow opener and seed-covering device.

**HOLDER FOR RAZOR STROPS.**—George Scott, Steubenville, Ohio.—This invention relates to a holder for razor stropps, and to the manner of securing the strop thereto, and consists in making the holder of a metallic spring band, curved or bent in the direction of its length, within the strop, extended between its two ends and there secured, at its full tension or thereabouts, and also in so bending the ends to the band that the strop can be secured thereto without the use of rivets or any additional fastening devices of any nature.

**KNITTING MACHINE.**—Henry Bögel, Watertown, Wis.—This invention relates to a knitting machine for making plain knit fabrics of any number of stitches. It is of very simple construction, works almost without any noise, and can be easily taken apart for the purpose of removing or replacing needles, and for repairing and cleaning the whole machine. Two sets of needles, each working independently of the other, are arranged in the machine, of which both or either one may be operated at a time, and thus one or two pieces of fabric may be knit at once.

**WIND WHEEL.**—Wm. C. Day, Mohawk, N. Y., and P. B. Day, Shelby, Mich.—This invention relates to a wind wheel of that class in which vertical wings or sails are employed, and the wheel enclosed within a box provided with doors, by opening or closing which more or less wind is admitted to the wheel, and the speed of the same regulated as desired, and by closing the doors the motion of the wheel entirely stopped. The invention consists in the application to the doors of the box which encloses the wheel, of a chain or cord connected with a windlass, and arranged in such a manner that by operating the windlass all the doors of the box may be opened and closed simultaneously, and the wheel kept running at a uniform speed, or stopped entirely, when required, with the greatest facility.

**SUBSOIL ATTACHMENT FOR PLOWS.**—Charles Hayden, Collinsville, Conn.—This invention relates to a mode of attaching a subsoil plow or share to an ordinary plow, whereby the share may be adjusted, raised, or lowered, with far greater facility than hitherto,—readily detached when not required for use, so that the plow to which it is applied may be used as an ordinary plow, be simple in construction and capable of being manufactured at a small cost, and be of light or easy draft.

**FOLDING BOW DISH FOR SPRING BALANCES.**—Richard Murdock, Baltimore, Md.—In this invention the dish or platform upon which the articles are placed to be weighed by a spring balance is supported at its four corners by arms bowed or curved outward and so arranged that they can be readily fixed in position or not, and when not in use, can be folded together upon the dish so as to occupy but little room.

**FRAME FOR HOP VINES.**—Abram Stoemaker and Wallace Phelps, Conesville, N. Y.—This invention relates to a useful improvement in the construction and arrangement of frames for training hop vines.

**HOP PICKING TOOL.**—John Dean, Baraboo, Wis.—This invention relates to a new device for picking hops from the pole, and consists in the use of a rake with curved tines and with cutters at the ends which serve to cut the vines as the tool is drawn along the pole.

**HYDRANT FIRE PLUG.**—T. R. Bailey, Jr., Lockport, N. Y.—This invention relates to a method of constructing fire plugs or hydrants, and the invention consists in operating a cylinder valve in a suitable case and in the arrangement and combination of parts connected therewith.

**MACHINE FOR COLLING SPRINGS.**—John Freeland and Daniel Ward, New York city.—This invention relates to a machine for colling patent valve and other similar springs while hot, and consists in a frame constructed with head and tail blocks like a turning lathe having suitable driving gear and an adjustable spindle or mandrill around which the spring is colled.

**BRIDGE.**—Frederick H. Smith, Baltimore, Md.—This invention has for its object to improve the construction of bridges so that any desired part of the bottom chord can be readily adjusted to tighten or loosen any desired part of the bridge or to allow any desired part of the woodwork to be removed and replaced.

**ANGULAR SHAFT COUPLING.**—John M. Case, Athens, Ohio.—This invention has for its object to furnish an improved coupling or gearing for connecting shafts to each other at any desired angle which shall be so constructed and arranged as to securely couple the shafts, run with less noise, and with less friction than the ordinary bevel gearing, and which shall at the same time require less material for its construction.

SASH BEAD FASTENER.—Daniel W. Dyer and James H. McVauzh, Philadelphia, Pa.—This invention has for its object to furnish an improved means for removably securing sash beads to the casing which shall be simple in construction, easily attached, and easily operated.

LUBRICATING BOX FOR CRANKS, ETC.—T. J. Rowley and Wm. Poland, Chillicothe, Ohio.—The object of this invention is to feed the oil for lubrication of cranks, crank pins or wrists, and journals, in stationary bearings.

ROLLING IRON, ETC.—W. P. Porter, Pittsburgh, Pa.—This invention relates to an improvement in rolling iron and other metals in the form of railroad axles and other metal bars.

ANVIL CUTTER.—Valmore A. Dunn, West Peru, Me.—This invention relates to an anvil cutter, and consists in a pair of shears one jaw of which is fixed by an arm with a block or anvil, and the shears are thrown open by a spring.

Basin Water Cock.—Robert P. Ross, Bethlehem, Pa.—This invention consists in arranging a drop valve with an elastic face which is operated by a screw whereby all leakage is prevented.

WELL BORER.—George W. Bowen, Fort Wayne, Ind.—This invention relates to an implement for the boring or sinking of wells in quicksand, or for cleaning out wells; it is of such a construction as to enable the work to be done with great rapidity, facility, and safety, and in the most satisfactory and perfect manner.

COTTON-BALE TIE OR HOOP LOCK.—E. S. Roberts, Columbus, Ga.—This invention consists of a metallic box of quadrilateral form, having an open outer side to receive the ends of the hoop, which are bent so as to form loops through which and the sides of the box metal pins pass and firmly connect the ends of the hoop together, the box, under the expansion of the bale when relieved of pressure, sinking into the bale so that the ends of the hoop, which are secured in the box, will not project out beyond the side of the bale.

IRON AND STONE RAILROAD TRACK.—Dominicus N. Clark, Eastport, Me.—This invention has for its object to furnish an improved railroad track, superior to those now in use in durability and safety.

SCHOOL DESK.—Rev. R. Cruikshank, Lawrenceville, N. J.—This invention has for its object to improve the construction of the school desk patented by the same inventor May 24, 1864, and numbered 42,859, so as to make it more convenient and satisfactory in use.

CAR MOVER.—H. B. Morrison, Le Roy, N. Y.—This invention has for its object to furnish an improved machine by means of which freight cars may be easily moved about in the freight house, for convenience in loading or unloading them.

DOVETAILING MACHINE.—Robert Wolf, Burlington, Iowa.—This invention relates to a machine for dovetailing the side pieces as well as the front and back pieces of drawers, boxes, and other articles, and consists of two parts, one for sawing the side pieces and the other for chiseling the front and back pieces.

PHOTOMETER.—H. Vogel, Berlin, Prussia.—The object of this invention is to determine with exactness the time required for copying photographic negatives.

CUTTING AND CARVING MACHINE.—Isaac Hall, New York City.—This invention has for its object to furnish an improved machine by means of which any desired design or pattern may be cut or carved upon ivory, wood, stone, metal, or other suitable substance.

PETROLEUM STOVE.—Daniel Kellogg, Jackson, Mich.—This invention relates to a stove for burning petroleum or other inflammable oils or fluids, and consists of a tripod base supporting a burner within a chamber provided with a bottom dish for adjusting the supply of air, a lateral damper and a disk of radial wings, the latter being situated immediately over the flame, for creating the same and causing the more perfect oxidation of its carbonaceous particles.

CRIBBING PREVENTER.—Ben. J. Davis and Isaac S. Cramer, Sergeantsville, N. J.—This invention relates to an attachment for bridles, for the purpose of preventing horses from indulging in the vicious and hurtful habit of cribbing, so called. It consists of a pricking point inclosed and guarded by a cylindrical cap working within a larger cylindrical base, to which it is attached by a telescopic point. The two cylindrical parts inclose the pricking point, which is firmly seated in the throat strap, and presents its point through a central hole in the cap when the latter is pressed against the tension of a spring which otherwise keeps the cap out and over the pricking point.

DREDGING SCOOP.—Harris W. Thornburg, Shelbyville, Ind.—This invention refers to a scoop which is particularly designed for cleaning out wells and sinks, but may successfully be employed for other purposes where the conditions of operation are of the same nature. It consists of a scoop formed in two equal parts hinged together and so attached to ropes or chains that the scoop can be lowered into a well or sink in such position that the lower edges of the parts will encounter the bottom of the well, and when the lifting rope is drawn these parts will be brought together, thus scooping up a portion of the bottom on which they rested.

HAT BUCKLE.—J. A. Burton, Senola, Ga.—This invention relates to a buckle for hat bands, and its object is to so arrange it that railroad or other tickets can be firmly held by the same, and can, whenever desired, be easily removed therefrom.

BEDSTEAD FASTENING.—J. E. Milliken, Bridgeton, Me.—This invention relates to a method of securing the rails to the posts of bedsteads, so that they are more easily taken apart or moved, and rendered more secure. It consists of a metallic hinge attached to the side rail of the bedstead, the pivot of which may be easily removed, and upon which the post is turned upon the side rail. It consists, also, in a hook and staple, by means of which the post is secured to the nail in an upright position.

WHIP LOCK.—Francis M. Gifford, Erie, Pa.—This invention relates to a method of constructing locks for securing the whip within the socket by an attachment independent of the socket itself, whereby the whip cannot be moved from the socket without the key. It consists of two metallic arms provided upon each end with jaws, the upper side of one of the arms having a nut, the other a socket, this socket having a nut, and the nut a thread to receive a screw by means of which the jaws are drawn or forced together the head of the screw being so constructed and concealed so that only a key of a peculiar construction will unscrew or unlock the jaws, and loose the whip from the socket.

CORN PLANTER.—William Daggert, Cordova, Ill.—This invention relates to a method of constructing hand corn planters, whereby corn is more rapidly and economically planted. It consists of a planter composed of three chambers, through which slides a plunger provided with a valve by means of which the required quantity of corn is carried from one chamber to another, and finally to the ground. Also, in the bottom of the under chamber, being formed of steel or other elastic substance, which closes the outlet of the same, until the plunger in the downward movement of the same forces the corn upon the said springing bottom through the outlet into the ground, whereby the required quantity of corn for a single hill is always in readiness to be forced into the ground at the next downward movement of the plunger.

PAPER "LINEN."—B. M. Smith, No. 4 Dey street, New York City.—The manufacture of paper collars and cuffs, scarcely yet fifteen years old, has been carried to a perfection, while the consumption has risen to a magnitude, of which few persons have any conception. These articles, every one of which, of course, is thrown away as soon as soiled, are made and used up in the United States by hundreds of millions every year. Three or four hundred manufacturers are in operation, some employing a capital of no less than \$500,000, and thirty or forty paper mills run constantly on paper of the various qualities required. The styles in which collars and cuffs are manufactured of paper, for both sexes, are as varied, and some of them as elaborate and beautiful, as those made of linen and lace. The best substitutes for linen collars and cuffs are exquisitely stitched and corded at the edges (in appearance), and are even made to imitate exactly the surface of a starched and ironed linen fabric. Their chief imperfection has been the lack of strength in the button-holes, which are often torn out in the first attempt to put them on, and still oftener fail to serve a second day. For this defect a variety of remedies have been tried one of the best of which was the combination of two thicknesses of paper with an intermediate layer of coarse linen.

combination of two thicknesses of paper with an intermediate layer of coarse linen. This gave all the strength desired, but doubled or tripled both the cost and the clumsiness of the article. A cheaper but less effective expedient is adopted by some manufacturers, who paste a small patch of linen under the place of the button-hole. Most of these goods, however, are punched without any strengthening whatever. We have just been shown a novel specimen, having a perfect button-hole, durable enough for a hundred buttonings and unbuttonings, yet not appreciably increasing the cost of manufacture. Indeed, it is said that the machinery to be employed will turn them out cheaper than ever. The improvement consists in binding the edge of the rounded end or eye of the button-hole with a delicate film of silver metal, not over one thirty-second of an inch broad, and so thin as not to increase the thickness of the paper edge, into which it is stamped with a minute bead to hold it immovably in place. The open ends of the metallic edging are each brought to a point and turned backward into the paper, so as not to catch and tear out. The button-hole works freely and flexibly; and never tears. This is a smaller invention than the wire connections for Venetian blinds, and like many a small thing, will be among the most profitable of improvements for the inventor.

Answers to Correspondents.

CORRESPONDENTS who expect to receive answers to their letters must, in all cases, sign their names. We have a right to know those who seek information from us; besides, as sometimes happens, we may prefer to address the correspondent by mail.

SPECIAL NOTE.—This column is designed for the general interest and instruction of our readers, not for gratuitous replies to questions of a purely business or personal nature. We will publish such inquiries, however, when paid for as advertisements at \$1.00 a line, under the head of "Business and Personal."

All reference to back numbers should be by volume and page.

A. G. F., of Ohio, is running a saw and grist mill combined and the end of the main shaft to which the saw gate is attached thumps everytime the gate is about half way coming down. The shaft is in line and the top box of the end journal has been screwed down until it heated but all to no avail. We think our correspondent will find, on examination, first, that the cap does not have a bearing on the box; second, that the interior of the box, as a whole, does not show a complete circle in cross section, but an ellipse. The box should be of the exact diameter of the shaft, and no box, especially one for a shaft subjected to reciprocatory motion should be left partly open.

W. L. B., of Mass., asks what is the composition of the glossy black paint used in lettering show cards. Lamplach from which the oil has been burned by roasting is the basis and may be used by mixing with the whites of eggs, which makes a very brilliant paint, or varnish, turpentine, and Japan may be the vehicle.

A. S. S., of Mich.—The information you require in relation to atmospheric currents can be obtained from Espy's "Theory of Storms" or Maury's "Physical Geography of the Sea," and other meteorological works.

S. J., of N. J.—"How many pounds of steam pressure is equal to 130 pounds cold water pressure?" 130 pounds pressure is that and nothing else whether created by steam or water. Probably, however, our correspondent wants to know how much steam may be safely carried on a boiler which has had a hydrostatic test of 130 lbs. The general practice is to reduce one fourth, which would give a steam pressure of nearly 100 lbs.

F. G. S., of Mass.—Your theory of the explosive quality of non-aerated water in a steam boiler is not new, and it has heretofore been quite extensively discussed in our columns. Devices for forcing air into the water are in use, but we more strongly approve of your advice to blow off often.

R. M., Jr., of Canada, asks for a recipe for opaque glue. Boil ordinary glue with very fine bonedust. This correspondent also says that a friend from Spain left with him, last summer, a quantity of clay, called terra de vino, used in Spain for clarifying wine, which it did excellently well also in Canada. It will also remove grease and other stains from cloths. He offers to send a sample. We shall be glad to have him. Perhaps we will analyze and test it.

P. G., of N. Y.—"Why is the sun's center on the meridian ever back of the clock?" Because of the elliptical orbit of the earth and the inclination of the earth's axis to the ecliptic.

W. P. T., of N. J.—"Is there any coating or solution which will cause brass wire to permanently resist the action of carbonic acid?" Yes; electroplating or gilding.

S. B., of Mass.—We know of no liquid solution equal to good glue for immediately and permanently uniting two pieces of cotton webbing. It will unite leather belts, subjected as they are to enormous strain, it certainly should answer for a cotton fabric.

C. W. D., of Md.—We believe there are tables of latitude and departures calculated for the quadrant in some treatises on surveying but cannot name them. Send to D. Van Nostrand, 192 Broadway or to John Wiley & Son, 585 Broadway, New York City.

W. R. W., of N. H.—This correspondent asks, "which way should a fly wheel run having curved arms, in the direction that the arms crook or the opposite?" With the letter comes a drawing representing a wheel with the ordinary curved arms so frequently used on pulleys, fly, and other wheels. We presume that it makes, practically, little difference which way the wheel turns, as the arms are usually slight and their cross section is of oval or lozenge form; but, preferably, we have always in practice presented the convex side of the curve to the line of motion, the result of which, if any, would be to direct the air impinging on the arms to slip or slide off toward the rim of the wheel.

G. S. D., of Tenn., asks how to deposit pure iron on iron or steel by the battery. In one or two of our back numbers we described or alluded to the process. We presume that there is no secret in the matter. Those who understand the deposition of metals by the battery will probably find no peculiar difficulties in the management of iron.

R. S. T., of Mass.—"I have observed that in 'blowing off,' the steam pressure, by the gate, does not lessen perceptibly until the waters are all or nearly all blown out of the boiler. Now if the steam that was in the boiler has to fill its own and also the space occupied by the water, why, as the water blows out, does not the steam pressure proportionally diminish?" Our correspondent is wrong in two of his above assumptions. For an understanding of the matter, for the details of which we have no room, we refer him to "Heat, Water and Steam," by Charles Wye Williams, published by Henry Carey Baird, Philadelphia, Pa.

E. C. J., of Conn.—"What will remove superfluous hair from the face without injuring the skin?" We know of no chemical preparation having those qualities. The razor or tweezers will do best.

R. R. M., of Cal.—"What is the recipe for Japan for iron work. That which I have tried is not so hard, smooth, and durable as I would like." We give Cooley's recipe for black Japan, which, however, may have been improved upon by practitioners, to whom our correspondent had better apply for information. Cooley says, "burnt umber, 8 oz.; pure asphaltum, 3 or 4 oz.; boiled linseed oil, 1 gallon; grind the umber in a little of the oil; add the asphaltum, previously dissolved in a small quantity of the oil by heat; mix, add the remainder of the oil, boil, cool, and thin with a sufficient quantity of the oil of turpentine. It is flexible."

R. D., of Conn.—"How are saws straightened?" Simply by judicious hammering. It requires an expert to do it, but an experienced hand can straighten the most crooked saw. All saws have to be straightened, by hammering, after being hardened.

I. L., of Ind.—"What amount of water per hour is required per horse-power to run an ordinary steam engine?" One cubic foot per hour per horse-power is the general rule, modified, of course, by the condition of engine, at what point it cuts off, etc.

J. C., of Pa.—"Our large leather drying loft is heated by steam, the pipes fed by an inch pipe with a return pipe of the same diameter discharging into our engine exhaust pipe. Can we get as much heat with the return pipe wide open as partially closed?" Have your "return" or exhaust wide open to get the full heat. Is not live steam hotter than condensed, or than warm water?

J. S., of Iowa.—Like others, this correspondent has experienced difficulty in the management of his feed pump for a steam boiler. He proposes to build an elevated water heater or tank, connecting with a supply tank at a lower elevation—the bottom of the first being on a level with the top of the latter—a steam pipe leading from the boiler to the upper part of the supply tank, and a water pipe leading from its bottom to the waterspace of the boiler. (The plan is illustrated by a diagram we do not think it necessary to reproduce.) Our correspondent thinks it would save power. In reply we would say that a boiler may be fed by this device. Several patents have been granted within the past thirty-five years for boiler feeders involving the principles in various forms. We have never investigated their practical workings; but, from the fact that none of them have come into general use we infer that they are not reliable feeders, under all circumstances.

J. A. G., of Me.—"How can I cut a piece of glass five eighths of an inch square into sections of one eighth thick?" By employing a practical glazier, skilled in the use of the diamond to do it for you.

J. O. L.—The use of sponge for mattresses is old.

Business and Personal.

The charge for insertion under this head is one dollar a line.

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Winans' Anti-incrustation Powder, (11 Wall st., N. Y.), reliable and unobjectionable in preventing scale in Boilers. 12 years in use.

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For Sale—A valuable Patent Right for the State of Kentucky. Address Lament Brothers, Milford, Pike county, Pa.

EXTENSION NOTICES.

John Brown, of New York City, having petitioned for the extension of a patent granted to him the 30th day of May, 1854, for an improvement in hot water apparatus, for seven years from the expiration of said patent, which takes place on the 30th day of May, 1868, it is ordered that the said petition be heard at the Patent Office on Monday, the 11th day of May next.

Thomas T. Jarrett, of Hershram, Pa., having petitioned for the extension of a patent granted to him the 30th day of May, 1854, for an improvement in hay elevators, for seven years from the expiration of said patent, which takes place on the 30th day of May, 1868, it is ordered that the said petition be heard at the Patent Office on Monday, the 11th day of May next.

Levi Dederick, of Albany, N. Y., having petitioned for the extension of a patent granted to him the 6th day of June, 1854, for an improvement in hay presses, for seven years from the expiration of said patent, which takes place on the 6th day of June, 1868, it is ordered that the said petition be heard at the Patent Office on Monday, the 18th day of May next.

Charles F. Martine, of Boston, Mass., having petitioned for the extension of a patent granted to him the 6th day of June, 1854, and reissued the 25th day of December, 1855, and again reissued the 27th day of August, 1867, for an improvement in sofa bedsteads for seven years from the expiration of said patent, which takes place on the 6th day of June, 1868, it is ordered that the said petition be heard at the Patent Office on Monday, the 18th day of May next.

Edward Harrison, of New Haven, Conn., having petitioned for the extension of a patent granted to him the 6th day of June, 1854, and reissued the 16th day of November, 1858, for an improvement in grinding mills, for seven years from the expiration of said patent, which takes place on the 6th day of June, 1868, it is ordered that the said petition be heard at the Patent Office on Monday, the 18th day of May next.

Jacob Sennett, of Philadelphia, Pa., having petitioned for the extension of a patent granted to him the 18th day of July, 1854, for an improvement in weavers' heddles, for seven years from the expiration of said patent, which takes place on the 18th day of July, 1868, it is ordered that the said petition be heard at the Patent Office on Monday, the 29th day of June next.

Jacob Sennett, of Philadelphia, Pa., having petitioned for the extension of a patent granted to him the 22d day of August, 1854, for an improvement in machines for casting metallic eyes, or malleable heddles for looms, for seven years from the expiration of said patent, which takes place on the 22d day of August, 1868, it is ordered that the said petition be heard at the Patent Office on Monday, the 3d day of August next.

Caleb Swan, executor of the estate of Daniel Hayward, deceased, of Easton, Mass., having petitioned for the extension of a patent granted to the said Hayward the 29th day of August, 1854, for an improvement in manufacture of India-rubber, for seven years from the expiration of said patent, which takes place on the 29th day of August, 1868, it is ordered that the said petition be heard at the Patent Office on Monday, the 3d day of August next.