

THE UNITED STATES ASSAY OFFICE IN NEW YORK.

We condense from one of our city cotemporaries the following in relation to the United Assay office, in this city:—

Adjoining the sub-treasury in Wall street is a granite building of modest appearance, bearing over its entrance the words "Assay office." It is fitted up in the same style as a broker's office, and three or four clerks appear to be quite able to transact all the business pertaining to this Bureau without over-exerting themselves. In fact, it would not appear at a first glance that much business is ever transacted there; yet there from \$14,000,000 to \$15,000,000 of the precious metals are received and accounted for during the year. The larger portion of this is in the form of gold dust from California, Nevada, Montana, and Idaho. Much the larger portion of all the bullion received is either in the form of dust, grains, bars, or amalgam. A comparatively small quantity comes in the shape of gold and silver plate, watch cases, foreign coin and ornaments. These are sent in by jewelers or private parties to be remelted, for plate, watch cases, and ornaments change their fashion like other things of less value, and have to be remodeled to be salable.

Few persons are aware of the actual quantity of gold produced by our mines since their first discovery. In a recent official report this amount is placed, in round numbers, at \$1,000,000,000. Since 1849 California has produced \$900,000,000. Her productive powers, however, for the last thirteen years have steadily decreased, and for 1869 the estimate is only \$25,000,000. Montana has produced \$65,000,000; Idaho, \$45,000,000; Colorado, \$25,000,000. The estimated production of Nevada in 1869 is placed at \$20,000,000; of Montana, \$12,000,000. It is believed that not more than 50,000 persons are now engaged in mining in this country—a considerable falling off from the numbers of previous years.

The deposits received having been carefully weighed and a certificate given, are numbered and sent at once to the melting room, a spacious apartment provided with furnaces, tanks, etc., and floored with iron tiles. Each deposit, or as much of it as can be conveniently handled at once, is placed in a crucible, and as soon as melted is poured into iron molds. If the deposit is of gold, two pieces are cut from the lump and set aside for the Assayer. If of silver, a small portion of the fluid metal is dropped into water, which granulates it, and these granules are used by the Assayer. The crucibles are carefully scraped after being used, so that not a particle of the metal is lost, for the Assayer, it must be understood, has to account for every grain of the metal received.

About $7\frac{1}{2}$ grains of gold are used in each assay. This small quantity, with the right proportion of silver, which is estimated by the Assayer with an accuracy attained by incessant practice, is placed in a cupel—a cup of calcined bone—and deposited in a small furnace heated to redness. A strong current of air passes over the contents of the cupel, oxidizing the lead. The oxide dissolves the oxides of the other base metals, which are absorbed by the cupel, and the result is a button of pure silver and gold. This button, after being hammered and rolled, is placed in a bottle partly filled with nitric acid, which is set in a sand bath. This acid dissolves the silver, leaving the gold untouched. When the process is finished, the pure gold left in the cupel resembles tinder. It is then annealed, rendered into a compact coil, called the "cornet," and weighed. The weight gives the exact amount of pure gold.

Two pieces were, it will be remembered, taken from the metal after it had been melted. Each of these pieces is assayed separately, and the results must, of course, agree. If they should not do so, it is evident that a mistake must have occurred somewhere, and the whole process has to be repeated.

As soon as the assays are completed the Assayer reports to the Assistant Treasurer of the United States, and, on this report, the depositor is paid. If he desires to receive gold coin, one-half of one per cent is charged. For gold bars, which are handier for shipment, he has to pay six cents for \$100. For every ounce of pure gold which his deposit has yielded, he receives \$20.672, less the charges stated above. Depositors of silver receive its full value, less what is called the "parting charge," which is about five cents per ounce. Brittle metal has, however, to be toughened, for which there is an extra charge. The private assayers of California, before the establishment of a Government Assay Office there, used to make no charge for the assay, taking their pay out of the drippings from the crucibles. The Government Assayers account for the entire weight of the deposit.

The depositor having received the full value of his deposit, the latter of course becomes the property of the Government, and it now has to undergo a process called "parting" before it is sent to the Mint, or used in any way for commercial purposes. In parting gold, silver is added in the proportion of about two parts in weight of silver to one of gold. Formerly no account was taken of the silver already in the gold, but Mr. Mason, in charge of the melting and refining department, found that a great saving might be effected if it was first ascertained how much silver the gold bullion already contained. This practice is now carried out, and instead of invariably adding two parts of silver to one of gold, only sufficient silver is added to make the proportions above stated. There is thus a saving, by Mr. Mason's method, of about 30 per cent in the material, and in one year the sum of \$22,000 was saved. The mixture of gold and silver is next melted, thoroughly mixed, and poured into water, by which it is granulated. The granules are placed in porcelain jars containing nitric acid. Heat is then applied, and as the acid boils, the yellow fumes which our readers have doubtless so often seen proceeding from the chimney of the Assay Office, are given off. This process goes on for about twenty-four hours, when the jars are emptied, and in the bottom is found a brown substance resembling mud or anything else upon

earth rather than "gold—glittering gold." It is in fact, however, pure gold, or at least, very nearly so. The silver has been dissolved by the nitric acid, and is in solution. It is carefully put aside for future treatment, for in the Assay Office nothing must be lost or wasted. The brown substance found at the bottom of the jars is placed in large wooden tubs and washed by percolation in warm water until all traces of acid have disappeared, and it is said to be "sweet."

The gold is then of .940 fineness. Formerly it was subjected to a second boiling in nitric acid, which left it about .993 fineness, but by the process at present in vogue it is treated with sulphuric acid, by which a fineness of .998 is attained. This is termed pure gold, although it is not actually so, but to deprive it of the two parts of alloy it now contains would involve an expenditure of time, money, and trouble altogether useless. After its treatment with sulphuric acid, the gold, which still looks more like red mud than a precious metal, is again washed until "sweet." It has now a reddish yellow hue. After being dried, it is taken to a hydraulic press, where it is made into "cheeses," so called from the color and shape. The cheese made in the Assay Office is richer far than the most fertile vales of Gloucester ever produced. Each "cheese" is but thirteen inches in diameter, but it is worth about \$20,000. These cheeses are baked in an oven heated by steam until all remaining moisture is expelled, when they are remelted, cast into bars or bricks, assayed and stamped with the weight, fineness, and value. And now they look like gold indeed.

The reader will remember that the nitric acid poured over the gold and silver granules, in the porcelain jars, and now containing a large quantity of silver in solution, has yet to be disposed of. A solution of chloride of sodium—common salt—is first added to the solution, and a deposit of white powder is the result. This powder is chloride of silver. The next process is to free the chlorine from the silver, and this is done by placing it in vats with granules of zinc. The chlorine and zinc readily combine, and the silver is set free in the form of a light gray powder. This like the gold, is washed, pressed, and formed into "cheeses" worth \$800 each. These are melted, weighed, stamped, and ready to be disposed of as occasion may require. The silver obtained by the above process contains but one part of alloy in 1,000. Some silver is so pure that it requires no "parting," and, after being assayed, is sent at once to the mint.

The Assay Office was established in this city in October, 1854, and since that time over \$160,000,000 have passed through the hands of its officers.

BAROMETERS AS INDICATORS OF THE WEATHER.

As indicators of weather, barometers have fallen somewhat into disrepute; and yet, when used in connection with other instruments, they are very useful in foretelling what the probable state of the weather will be within reasonable limits. In many cases they are to be found hanging by themselves, and scarcely ever referred to, on account of their supposed liability to error. The usual weather marks upon the dial of a wheel barometer very often deceive the superficial observer.

A barometer indicates only two of the conditions upon which weather changes depend, viz, weight of the air dependent upon moisture, and disturbances in the atmosphere more or less remote, according to their violence.

In certain latitudes, a sudden fluctuation of the mercury is always to be regarded as an indication of foul weather; but it is not necessarily an indication of rain, although a violent disturbance of the atmosphere is generally attended with more or less condensation of the moisture which it holds in suspension.

If a barometer were sufficiently delicate in its operation to show the disturbances which take place at a great distance from its location, and which take place in rapid succession, at from twelve to twenty-four hours previous to heavy storms, it would be far more reliable than the ordinary instruments, which, although they are sensitive to remote disturbances, do not show them with sufficient plainness to be easily observed in the ordinary method of reading the instrument. It is also so inconvenient to make such observations with sufficient frequency to take account of the rapid and slight variations dependent upon such remote causes, that they usually elude observation. Recent experiments, however, go to show that they are most important in their relations to weather phenomena.

It is frequently the case that when air is in the same hygrometrical condition, that the mercury in the barometer will move in different directions within an interval of three hours, proving that weight, or, more properly, pressure of the atmosphere, does not depend upon the moisture held in suspension solely, but also upon the waves produced at a distance and communicated through air, very much as winds at sea produce heavy swells very far from the place where they acting directly upon the water.

Changes in weather depend upon atmospheric disturbances, and the nature of the change depends upon the temperature, and the hygrometrical condition of the atmosphere. A barometer used together with a thermometer and a hygrometer, and the indications of change shown by the barometer, interpreted by the indications of the two latter instruments, will be found more reliable than is at present currently believed.

DRILLED VS. PUNCHED HOLES—A large number of specimens of steel plates were recently tested at Chatham Dockyard, to determine the difference in strength between steel plates with punched and drilled holes. Although the pieces were so prepared that they should break at the smallest part, they all, without exception, fractured at a place where two

small holes had been punched. But when the holes were drilled, and in the largest sectional area of the steel, they as uniformly broke in the smallest part, exactly the reverse of the previous trial. From this and other experiments the advantage in tensile strain, gained when the holes are drilled rather than punched, was calculated to be 22.5 per cent.

MANUFACTURING, MINING, AND RAILROAD ITEMS.

During the construction of a mountain tunnel for the Don Pedro II. railway, of Brazil, a temporary road of five feet three inches gage was laid over the mountains, having the extraordinarily short curves of 230 feet radius, on gradients 26 feet to a mile, or a little steeper than one in eighteen. The line was regularly and successfully worked for three years, with six-coupled and eight-coupled engines. The former were provided with trucks under the leading ends, the others with an arrangement for permitting the end wheels to traverse laterally.

The town of Winchendon, Mass., claims to manufacture more wooden ware than any other town in the world. Two of the largest firms turn out \$500,000 and \$400,000 worth per year, respectively, and the smaller establishments of the place make the aggregate annual product of the wooden ware interest amount up to over \$1,000,000. In addition to these factories, Winchendon contains two cotton mills, two bobbin factories, two machine shops, and two sewing machine manufactories.

The dimensions of the heavy express engines, on the Great Northern railway of England, referred to in our last week's issue, are as follows:—Driving and trailing wheels, 7ft. in diameter, and coupled together; leading and tender wheels, 4 ft. 3 in. in diameter throughout; barrel of boiler, 10 ft. 1 in. long by 3 ft. 10 in. in diameter inside, in the smallest part; fire-box casing, 6 ft. 4 in. long by 4 ft. wide outside; cylinders, 17 in. in diameter, with a stroke of 24 in.; heating surface in box, 114 $\frac{1}{2}$ square feet, and in the tubes 907 square feet, making a total heating surface of 1,021 $\frac{1}{2}$ square feet, with a grate surface of 19 $\frac{1}{2}$ square feet. The tenders hold 2,500 gallons of water, and two tons of fuel. The propelling power of each engine is equal to 12,000 lbs., and the adhesion on the rails may be taken at 11,700 lbs.

Gold prospecting in Siberia is carried on after a somewhat singular plan. The mines are an object of much attention on the part of the Russian government, and while it is opened free for any one to search for gold deposits in any part of the territory, the successful discoverer is obliged to report to the nearest government official, who appoints him a space of about four square miles, on condition that all the precious metal he obtains is to be carried to a government depot, where it is coined into money, the proceeds, less fifteen per cent for expenses, being then paid to the discoverer.

The bridge over Dale Creek, upon the highest summit of the mountains where the Union Pacific railroad crosses, is a pine timber bridge, 40 feet in length and 135 feet above the creek. The structure was all built, ready for the transit trains, in the short space of thirty-five days.

The recent report of the directors of the Pittsburg, Fort Wayne and Chicago railway, shows that the deterioration of iron rails necessitates the relaying of their whole road with new iron every four years, and that the cross ties for the entire line must be replaced every four and two thirds years. The great wear of rails is attributed to the increased weight of locomotives and cars that of late years have gradually and almost imperceptibly come into use. When steam power was first applied on railroads, the engines weighed eight, ten, or twelve tons each; now they weigh from forty to fifty tons each. As the locomotives cannot well be made lighter, the only apparent remedy is the employment of steel rails.

Work on the West Shore Hudson river railway is to commence immediately, the contract for building the road as far as Newburgh—which point can be reached without tunneling—having been awarded some weeks ago. The capital stock of the road is \$750,000, a large portion of which has been subscribed.

The Lebanon Springs railroad, connecting the Harlem with the Bennington and Ruriland road, it is expected will be completed and in running order in the month of August. The road, when finished, will constitute an important connecting link, so that passengers and freight will go directly through from New York to Montreal without change of cars.

The California Legislature has offered a premium of five dollars per ton for the first thousand tons of blast or pig iron produced in that State from native ore.

Quite a new feature in the geology of Berlin, Prussia, has lately been developed in the discovery in the immediate neighborhood of the city, of an inexhaustible bed of salt. Government having undertaken to work this deposit, a solid bed, struck at a depth of 277 feet, has proved to be an uninterrupted stratum of five hundred feet thickness. How much deeper it goes is not yet known, but orders have been given to continue the borings until the thickness of the bed is determined. This discovery is of great national importance, for it opens a supply of this article of every-day consumption sufficient to supply all of Prussia, and make the country independent of the imported article.

Recent American and Foreign Patents.

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

OYSTER DREDGE.—C. T. Belbin, Baltimore, Md.—This invention relates to the old-fashioned oyster dredge, and consists in a new method of attaching the lower draft rods to the head, whereby the instrument is made to operate to better advantage, while its cost of construction is not increased.

CIDER AND WINE MILL.—James Walton, Sunfish, Ohio.—This invention relates to that class of mills in which an endless apron carrier is employed, and consists in a new arrangement of gear for running the apron, a new adjustable bearing for the grinding rolls, another for the apron rolls, and a new arrangement of hoppers for feeding either apples or grapes.

COMPOSITION FOR DEPILETING HIDES.—Peter G. Schlosser, Middletown, Md.—The object of this invention is to produce a composition by which hides whether green or dry, can be depilated in an easy and expeditious manner, without destroying or injuring the material of the hide, and so as to produce a greater percentage, in weight, of leather, than is possible by any other process.

CARRIER FOR BRAIDING MACHINES.—Dexter Avery, Westfield, Mass.—This invention relates to a carrier for braiding machines, the object of which is to produce the required tension of the threads to protect the spring, which keeps the thread taut, from wear, and to obtain a complete and effective carrier in the simplest and least expensive manner.

VENT FOR BARRELS.—Richard C. Fleming, Philadelphia, Pa.—This invention relates to a device for preserving beer, ale, and other liquids, and consists in a novel manner of inserting in the barrel, and of inflating an expandible bag, which is to be filled with air, and which, as the liquid is being gradually withdrawn, is becoming filled, and fills the vacuum which is created in the barrel by the discharge of the contents.

TAILORS' SEAT.—Friedrich Neuhaus, Belleville, Ill.—This invention relates to a new seat for tailors, which is so arranged that it will allow its occupant to assume a convenient position, and that it will not prevent the proper circulation of the blood.

GAS MACHINE.—H. S. Maxim and John F. Lockwood, New York city.—This invention relates to a new gas-making device, which is more particularly intended for use on railroad cars. The inventor chiefly consists in heating the hydrocarbon in the reservoir by a flame produced from the contents of the reservoir, the gas thus produced operating a valve, which, when closed, prevents further escape of liquid to the flame.

APPARATUS FOR CONVEYING AND DUMPING COAL, ETC.—Henry C. Clark and Robert B. Little, Providence, R. I.—This invention consists in providing the bucket or vehicle in which the coal is transported, with a hinged gate, which, when closed, forms an inclined wall of the vehicle so as to be held

closed by the weight of the contents, and which is provided with an upward projecting lug or pin; when this pin strikes against an obstacle the gate will swing open and the load will be discharged from the vehicle.

HOP BOX.—Wm. R. Crandall, Deansville, N. Y.—The object of this invention is to facilitate the sacking of hops from the hop boxes commonly employed in hop yards during the picking season.

UTERINE SUPPORTER.—S. P. Cole, Janesville, Wis.—This invention consists in forming the pad or point of support for the neck of the uterus of a cup having stretched across its edges a thin diaphragm of soft rubber, which is perforated to permit the escape of discharges. The form of the cup is elliptical, and it is also perforated like the diaphragm.

STUMP EXTRACTOR.—Alfred Goodrich, Burnt Prairie, Ill.—This improvement consists in placing the extracting machinery upon runners and so arranging the said machinery that it shall be easily operated, simple in construction, and capable of developing much power for the purpose intended.

ORE SEPARATOR.—Robert C. Morton, West Lubeck, Me.—The nature of this invention relates to the separation of metallic ores by the pulsation or undulation of water, and consists of a series of plunger levers vibrating above a series of water cells, the plunger levers and cells being arranged to pulsate the water with different degrees of force. Other devices perfecting the whole render this separator more perfect in its action and economical in its construction than the separators heretofore made and used.

HORSESHOE.—James M. Cuykendall, Metomen, Wis.—This invention consists in the manner of securing the calks to the shoe, which is done by securing a wedge-shaped dovetail to the upper surface of the calks, said dovetails fitting into grooves, arranged on the under side of the shoe, which extend entirely across that portion of the shoe which is occupied by the calk.

BOOT CRIMPING MACHINE.—R. H. Dorn, Port Henry, N. Y.—This invention consists in the arrangement upon a suitable bench of a slide, made to move backward and forth by a pinion gearing into a rack on the under side of the same, on which rack a series of right-angled formers are carried on its upper side. These formers are caused to pass between two clamping or pressing pins, which are moved in an opposite direction by gearing, in a similar manner, and are provided with smoothing rollers, which bear against that part of the leather which is crimped in the angle of the formers, and turns in a direction so that the surfaces of the said rollers, that come in contact with the leather, move opposite to that in which the leather is being carried by the formers, so as to produce a smoothing or rubbing action. The said clamping pins are provided on the inner sides of the same with iron plates having rectangular grooves in ridges formed within them, and arranged with reference to the formers in a direction opposite to the inclination of the said formers, so that their action on the leather will be to smooth it from the angle outward in either direction.

CATEMENIAL SACK.—Andrew F. Baum, New York city.—This invention relates to an improvement in india-rubber catamenial sacks, and consists in forming the edges by rolling up the material into a solid bead or rib, and then covering it with soluble rubber to make a strong and elastic binding.

THRUST BEARING.—A. W. Case, South Manchester, Conn.—This invention has for its object to furnish an improved thrust bearing for vertical and horizontal shafts, such as water wheel shafts, propeller shafts, etc., which shall be simple in construction, and at the same time reliable and effective in operation, diminishing friction and resisting the thrust of the shaft.

CAR STOVE.—Richard O'Brien, Dalton, Ohio.—This invention has for its object to furnish an improved railroad car stove, which shall be so constructed and arranged that the stove will be always kept in a vertical position, even should the car be overturned, so that there may be no danger of fire from the stove being overturned.

FASTENING FOR GARMENTS.—Wendell Wright, Bloomfield, N. J.—This invention relates to a fastening for shirts, shawls, and other garments, and is more especially designed as a substitute for studs, buttons, shawl pins, etc. The object of the invention is to obtain a secure, economical, and neat fastening of the kind specified, and one which may be readily applied to and detached from the garment, and will not require buttonholes or perforations in the garment in order to apply or use it.

CORN CULTIVATOR.—Alexander Campbell, Oxford, Ind.—This invention relates to a corn cultivator, and it consists in a new manner of attaching the shovel standards to the frame of the machine, whereby any desired pitch may be given the standards as required. The invention also consists in a novel manner of securing the shares to the standards, whereby they may be reversed, that is to say, changed from one standard to another and also adjusted in a straight position so as to face the line of draft or be placed more or less obliquely therewith either to the right or left, as may be desired.

SPRING FOR VEHICLES.—George Douglas, Bridgeport, Conn.—This invention relates to an improvement in springs for vehicles, and more especially refers to an improvement on a spring for which Letters Patent were granted to this inventor, bearing date May 26, 1863. The present invention consists in dispensing with the usual ribs and slots which are now used to prevent the leaves from shifting laterally, and substituting for said ribs and slots taper longitudinal ribs, swaged in the leaves in such a manner that the under projecting surfaces of the ribs of one leaf will fit into the concave formed by the ribs of the leaf underneath, by which arrangement the lateral and longitudinal shifting of the leaves are entirely prevented. The invention further consists in the application of india-rubber bearings to the cast-metal seat of the spring, whereby jars and concussion are in a great measure prevented from being transmitted from the seat to the spring, and a greater yielding movement or play allowed the latter.

GANG PLOW.—Don Carlos Matteson, Stockton, Cal.—This invention relates to an improvement in gang plows; it consists in a peculiar construction of the same, whereby the difficulty hitherto attending the springing and warping of the frame is avoided. The invention also consists in a novel arrangement of the draft attachment, whereby the same may be placed at a sufficiently low point without curving the frame of the machine downward at its front part as is now required. It consists also in a novel arrangement of the caster gage wheel, whereby the same is prevented from becoming choked or clogged with weeds and trash.

MACHINE FOR BENDING CARRIAGE CIRCLES.—William Boyd, Hartford, N. Y.—The object of this invention is to perform the bending of the iron generally known as carriage circles. It consists of a bending beam pivoted in the center of a bending circle and provided with rollers to impinge on the iron rod and bend it around the circle. Other devices for adjusting the machine to different work render it effective and generally available for bending carriage circles and all other analogous work.

GATE.—Win. C. Hooker, Abingdon, Ill.—This invention consists in arranging a farm gate between the uprights, a vertically-vibrating frame, whereby the gate is lifted from the roadway and swung in between the posts to which the vibrating frame is connected by suitable rope gearing.

NAIL AND SPIKE DRAWER.—Isaac A. Pinnell, Boonville, Mo.—The object of this invention is to draw nails or spikes in a convenient and easy manner.

CONSTRUCTION OF WHEELS FOR VEHICLES.—Henry Poth, Pittsburgh, Pa.—The nature of this invention relates to the construction of metallic hubs. It consists in forming the hub flanges with correspondent wedge-shaped feathers or projections which, when the plates are wrought together, slide upon each other and form the mortises of the hub and provide the means by which the tenons of the spokes are wedged or clamped firmly in place. It consists also in the employment of a differential threaded box by which the flanges are drawn together upon the spoke tenons with great power.

FILLING FOR BEDS, CUSHIONS, ETC.—George C. Barney, Chicago, Ill.—This invention relates to a new and useful material for filling beds, cushions, and other articles requiring a light, elastic substance for the purpose. This improved filling for beds, mattresses, pillows, cushions, etc., consists in small pieces or scraps of paper cut or otherwise formed in any desired shape and possessing that elastic nature which will keep the pieces apart, when laid together in a mass and inclosed in a bed tick, pillow case, or sack covering of any suitable material for these or similar articles of domestic use.

BRIDLE BIT.—P. J. McGuiness, New York city.—This bit consists of two pieces hinged or pivoted together in the middle, one end of each piece being connected with the reins, while the other end carries a stop, which is near to the end of the other bar, and which, when on the rear side of the other bar,

prevents the two bars from turning independently around their pivot, while, when the stop is in front of the other bar, the two bars will be turned when pulled by the reins, and will act as a curb-bit in the horse's mouth.

SKAMING TOOL.—Wm. Serviss, Sidney, Ohio.—This invention relates to a method of constructing tools for grooving the seams of stovepipes, sheet iron stoves, sheet metal conductors, and for all like purposes for which grooving tools are used, whereby the seam is formed more rapidly, and upon the inside instead of the outside, as is now commonly the case.

SAW MILL.—Augustus B. Ehlers, Tamersville, Pa.—This invention relates to an improvement in the construction of machinery for driving a straight saw for sawing lumber, and consists in hanging the saw in connection with an oscillating guide and slide, in such a manner that the saw shall advance and increase the bite of the teeth in the down stroke, and recede and withdraw the teeth from the log in the up stroke, thereby working with much less power, less wear, greater steadiness, and more rapidity.

TRANSVERSE LOCK.—James E. A. Gibbs, Steel's Tavern, Va.—This invention has for its object to furnish an improved lock provided with two bars or bolts extending out upon each side so as to reach entirely across the door or shutter to be secured, and cross bar it, and which shall, at the same time, be easily operated by the proper key, but impossible to be picked or operated by any other key.

DISTILLING.—Alexander Webster, Seneca Falls, N. Y.—This invention relates to improvements in the process of distilling, and it consists in combining a perforated steam pipe with a perforated cylinder, through which the steam or vapor passes in its course from the still to the coil, and, in connection therewith, a cap by which the lighter and more volatile portion of the vapor is collected, whereby the process is greatly improved, and whereby two qualities of liquor are obtained.

BUTTER WORKER.—Hosea Willard, Vergennes, Vt.—This invention relates to a machine for working butter.

ELECTRO-PLATING FRAME OR HOLDER.—W. H. Watrous, Hartford, Conn.—This invention relates to an implement or frame for holding spoons or forks, or articles of a similar nature, suspended in the electro plating liquid.

FLOATING WATER POWER.—Albert B. Shepard, Sand Bank, N. Y.—This invention relates to a method of constructing apparatus for utilizing and economizing the power of running water upon rivers or streams which are liable to great and sudden changes in depth.

SUSPENDERS.—Wm. P. Towles, Baltimore, Md.—This invention has reference to a method of forming suspenders for gentlemen's pantaloons, whereby the stress or strain is balanced and equalized, and a free and unrestricted motion of the body allowed.

WATER WHEELS.—Joseph H. Bodine, Mount Morris, N. Y.—The object of this invention is to so construct a water wheel, and the parts connected therewith, that the greatest percentage of power may be obtained and the flow of water properly controlled, without employing any complicated or expensive apparatus.

SPARK ARRESTER.—N. L. Carpenter, Natchez, Miss.—This invention relates to a method of arresting sparks from steam-engine boiler furnaces, either locomotive or stationary, and the invention consists in sinking vertical wells or recesses in the brick or mason work beneath the boiler.

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.

J. P. G., of Vt.—Steel is successfully alloyed with other metals, improving its qualities for some purposes. One five hundredth part of silver adds immensely to the hardness of steel and yet increases its tenacity. One hundredth part of platinum, though not forming so hard an alloy as the silver and steel, gives a very great degree of toughness. Rhodium, palladium, irridium, and osmium make steel very hard, but their use, from their cost, is confined mainly to the experimental laboratory.

P. J., of Wis.—Practical men disagree as to the best time to fell timber to preserve it longest from decay; but as moisture, especially sap, is the first cause of the decay of wood, it would seem that the season is best for felling timber which produces the least sap. Therefore probably the light of summer and the middle of winter are the best periods for cutting timber. Girdling trees in early spring and felling them in the fall or winter is recommended by many as an excellent method.

C. B., of Iowa.—"How many square feet of sail or fan set at the best angle will take to develop one horse power in a twenty-mile breeze? What is the best angle with the course of the wind to set a sail to develop the most power? Will distance from the center of rotation make any difference in the actual force per square foot?" This correspondent, in asking these questions, says he has searched in vain in many mechanical works for authority on this subject. It is one that appears to have received but little attention at the hands of our mechanical writers. We know of no authority we can recommend. Possibly some of our practical correspondents can reply.

A. B., of N. Y., says: "In your 'Answers,' page 327 current volume, you say, the cause of the appearance of solidity so strikingly exhibited by the stereoscope is to a certain degree shown by a single photograph, etc. Would it not be well to say that it is mostly due to double vision, or a repetition of sight, as we see nature with two eyes, whereas all other pictures are but representations of nature as seen with one eye, only. The two pictures of a stereoscopic view are the one picture as seen with the right eye and the other as seen with the left eye. The lenses through which the pictures are seen in a stereoscope represent the two pictures as being on the same spot, therefore we see nature as it appears in our double vision of two eyes, or as seen from two points simultaneously."

A. W., of Ind.—"Will it require more power to revolve a circular metallic disk in a vessel (air tight) containing highly compressed air, than in one containing air at the ordinary conditions found in the atmosphere?" Certainly. Compressed air presents more resistance to motion than free air.

F. W. D., of Ky.—A cement peculiarly adapted to stand petroleum or any of its distillates is made by boiling three parts of resin with one of caustic soda and five of water. This forms a resin soap which is afterward mixed with half its weight of plaster of Paris, zinc white, white lead, or precipitated chalk. The plaster hardens in about forty minutes.

B. H. K., of Pa.—Liquid glass would probably not answer your purpose for a cement, but the so-called artificial denture of the dentists may. It is made by thoroughly mixing nine parts calcined oxide of lime, one part borax, and two parts of well-ground quartz; this is mixed with a saturated solution of zinc in hydrochloric acid. It sets very rapidly.

H. H. H., of Pa.—Shellac makes a very good cement to attach glass to metal, but both must be heated or it will not stick. If too brittle, mix a little wax in it. It stands warm water, acids, petroleum, but neither alcohol nor heat.

J. N., of R. I.—Steam is not decomposed by heat even at fifty atmospheres pressure. At 1,000° Fab., it will be decomposed in contact with iron, the iron oxidizing and the hydrogen being set free; only at a very high temperature, at least 3,000°, it is supposed to separate in free oxygen and hydrogen.

A. B., of Mass.—The frosted appearance of sheet tin and galvanized iron is given by a wash of bichloride of tin.

D. T., of Mass.—Prussian blue is no compound of the oxide of iron nor does it contain oxygen. It is not found as a mineral, nor is it a chemical product obtained from minerals. Notwithstanding its containing iron, it is altogether an organic substance, and exclusively prepared from old leather, blood or animal matter of any kind, fused at a red heat, with caustic potash in an iron vessel, the carbon and nitrogen of the animal substance combining with cyanogen and this with the potash to cyanide of potassium. The presence of iron changes it into the ferrocyanide, and a solution of this salt brought in contact with a solution of certain salts of iron forms different shades of blue precipitates, of which Prussian blue is the richest in color. Its formula is $C_{18}N_9Fe_7$.

F. W. P., of Ky.—A camera obscura for tracing pictures with a pencil is best made by placing a convex spectacle glass of some two or three feet focal distance on the top of a dark conical box at that height, and above this a piece of looking glass inclined at an angle of about 45°; the box is placed on a table and the paper placed on its bottom; one hole is made in the side of the box to pass the hand in, and another to look through at its bottom.

Business and Personal.

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

A master mechanic writes:—"I look upon Olmsted's improved oiler as a perfect article, and consider it the best and most durable oiler made." Sold everywhere.

A. C. N. Schulze, Bellville, Austin Co., Texas, wants a first-class machine for making brooms from broom corn, also, one for removing the seeds from the corn, and one for rounding the sawed handles. Send description and price.

The book on the watch can be obtained complete, neatly bound, of the author, H. F. Piaget, 119 Fulton st. Sent by mail for 60 cents.

N. B.—Most manufacturers of first-class steam engines are using Broughton's lubricators and oil cups. They cannot leak nor waste oil, and are in every respect the best in use. Send to Broughton & Moore, 41 Center st., for circulars.

For sale cheap—Bedell's patent adjustable heel trimmer. Inquire of John Charlton, No. 9 Gold st., New York.

I want a partner to work an invention for perfectly non-explosive boilers. No tubes or globes; of wrought iron, light and portable, and good circulation of water. Address W. Bye, Western House, Broadway, St. Louis, Mo.

We understand that the "Star Shuttle Sewing Machine Co." are manufacturing one hundred of their celebrated machines per day, at their works in Cleveland, Ohio.

To patentees and others.—Brass, tin, and iron small wares of all description made to order. Dies and tools made for metal cutting, stamping, spinning, and drawing. Tools on hand for the manufacture of kerosene burners, stationers' hardware, oilers, toys, etc., etc. J. H. White, Newark, N. J.

Wanted—the address of manufacturers of brass and malleable iron castings who have facilities for manufacturing small articles. Address Bisbee & Hearn, Yreka, California.

Universal filterwell.—Drives and works successfully in every variety of soil. Patented Dec., 1847, by Oscar C. Fox, Georgetown, D. C.

Rare chance for limited capital.—State or the entire right for sale of the "weighing and measuring cup," and the "combination funnel," six distinct uses. Two of the best patents out. Address Goodes & Co., 658 Franklin st., Philadelphia, Pa.

Prang's American chromos for sale at all respectable art stores. Catalogues mailed free by L. Prang & Co., Boston.

For breech-loading shot guns, address C. Parker, Meriden, Ct.

For sale—Road or State rights to make and use Blythe & Hayes' patent machine for turning off locomotive crank pins in the wheel. Address W. Blythe and N. Hayes, Alexandria, Va.

The surest detective of low and high water, and high steam in boilers yet invented. Springer, Hess & Co., Philadelphia, Pa.

Winans' Boiler Powder (11 Wall st., N. Y.) A positively uninjurious remedy for incrustations, 12 years' references. Beware of frauds.

EXTENSION NOTICES.

Clark Alvord, of Courtland, Wis., having petitioned for the extension of a patent granted to him the 21st day of November, 1854, for an improvement in hand brick molds, for seven years from the expiration of said patent, which takes place on the 21st day of November, 1868, it is ordered that the said petition be heard at the Patent Office on Monday, the 26th day of October next.

Horace W. Peaslee, of Malden Bridge, N. Y., having petitioned for the extension of a patent granted to him the 23d day of January, 1855, antedated September 24, 1854, reissued January 8, 1856, and again reissued March 19, 1867, for an improvement in machines for washing paper stock, for seven years from the expiration of said patent, which takes place on the 24th day of September, 1868, it is ordered that the said petition be heard at the Patent Office on Monday, the 31st day of August next.

NEW PUBLICATIONS.

COWDIN'S REPORT TO THE STATE DEPARTMENT.

We have before us the official report of Elliot C. Cowdin, United States Commissioner to the Paris Exposition. The subject is silk and silk manufactures, and it embodies, beside a succinct history of the rise and progress of the silk culture, a large amount of useful information to the silk grower and manufacturer of to-day. The subject is one which is of growing importance to the interests of this country, parts of which are excellently well adapted to this manufacture. We shall take occasion hereafter to quote from Mr. Cowdin's report.

AMERICAN ANNUAL CYCLOPEDIA FOR 1867. Vol. XII.

From the publishers, D. Appleton & Co. 90 Grand street, New York city, we have received the Annual Cyclopaedia for 1867, a compendium of important events for that year, embracing every department of the sciences, arts, politics, biography, literature, geography, etc. This volume is embellished with fine steel portraits of Peabody, Burlingame, and Chase, and an engraving of the Paris Exposition building. Among the hundreds of other subjects of interest reported is Abyssinia, illustrated by a map. The value of these annuals can hardly be overestimated. The facts collated, which before could be gathered only from periodicals, are arranged and embodied in a succinct form, available for reference and equally valuable to the student and the general reader. The paper and printing are of the first quality, and the volume in its make up, as well as its contents, is creditable to the publishers.

THE CARPENTER AND JOINER, and Elements of Hand-railling; thirty-two plates. By Robert Riddell. Philadelphia: Claxton, Remsen & Haffelfinger, 819 Market street.

The name of the author of this treatise is a sufficient guaranty of its value. The text is mainly a description of the plates, and is remarkably clear and explicit. The book seems to be well adapted to the use of the apprentice and beginner, and also valuable to the master workman. The principles of stair building—that most difficult art to acquire—appear to be so plainly explained and illustrated that the student can hardly fail to master them by the aid of this treatise.