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 heretotore 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 backand 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 toe 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 concussions 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.—Wm. 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.—Issac 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.

SEAMING 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, Tannersville, 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 advertisemets 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 hight 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 it take to develope one horse power in a twenty-mile breeze? What is the best angle with the course of the wind to set a sail to develope 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° Fah., 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 ferrocyonide, 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

$$C_{18}\ N_9\ Fe_7$$

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 hight, 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.

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 Cyclopedia 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 Abysinia, 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-railing; 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.