

On the south end, the segmental portion of the arch above the brick wall will be faced with cast iron trimmings and plate glass.

The north end will be closed with a beautiful cast iron front highly ornamented. The east side, along the Fourth avenue, will be finished with cast iron pilasters acting as casings set in front of each truss. These pilasters are to have bases and caps, supporting a main cornice along the front, and crowned by a cast iron balustrade; a line of balconies will run along the west side and across the south end, connecting with the offices in the second story. The trusses are placed in heavy cast iron shoes, sixty-four in number. To permit free expansion and contraction of the trusses, without interference with the side walls crossed by them, there will be placed cast iron boxes or casings perforated by a series of cores, and fitted together by means of bars and angles in such a manner as to insulate entirely the mason work from the trusses.

The rafters will consist of five-inch deck beams, secured to the top chord by double angle iron studs, 3½ by 3½ inches, and stiffened by diagonal braces of same size, riveted together and fastened on the chord by means of bent lap plates one half inch thick, and riveted to the former.

The doors and windows will have cast iron trimmings, all ornamented, the windows to be glazed with rough half inch glass. The whole of the north front will be of cast iron, the width to be 203 feet 10 inches, and raised 112 feet 6 inches in extreme height. The windows and doors of the first story will have rolling shutters.

The ends of the structure will be occupied for offices on the first floor, while the ground floor will be set apart for ticket offices, passengers' rooms, baggage lockers, restaurants, news-stands, etc.

Pennsylvania iron, of the best welded quality, will be used for plates, flat or square bars. Round bars and rods for braces to be of Ulster iron: rivets and bolts, of charcoal iron. Sheet iron, best welded and refined Pennsylvania. Cast iron, mixed in the following proportions, viz.: American pig No. 1, and Scotch pig No. 1, 5 per cent of each for shoes, casings, lintels, box, angle, studs, and braces. American pig No. 1, 10 per cent, and Scotch pig No. 1, 15 per cent, for columns and pilasters. American pig, No. 1, 15 per cent, and Scotch pig No. 1, 20 per cent, for hanging cornices, friezes, and flat pannelings. American pig No. 1, 30 per cent, and Scotch pig No. 1, 30 per cent, for small moldings and ornamented work. All rolled and welded iron to be subject to a strain of 30,000 pounds per sectional inch.

BILL TO AMEND THE PATENT LAWS NOW PENDING BEFORE CONGRESS.

We have now before us the completed bill pending before Congress to amend the patent laws, to which reference was made in No. 8 of the current volume. It amounts substantially to a codification of our entire present patent system, and we feel bound to confess, that in many respects the bill is a great improvement upon the old law, reflecting credit upon the Committee, of which Hon. T. A. Jenckes is chairman.

The bill came up for discussion in the House on the 15th inst., but went over under the rules, and before the discussion was concluded. The provisions of the bill embrace patents, designs, trade-marks, and copyrights, and are too voluminous to print in our columns.

We regret to notice, however, that the provisions relating to appeals from the Commissioner to the Supreme Court of the District, have been stricken out. We trust that the House will insist upon its restoration.

In explaining the various features of the bill, Mr. Jenckes says:

"In the law with regard to patents, which appears as chapter two of the bill, there are four principal propositions of amendment. One is the requirement of a fee to be paid at the expiration of seven years from the date of the patent, and another at the end of the twelfth year as a condition of keeping the patent alive. Such a provision is found in the patent laws of almost all other countries. The proposition had met the commendation of the Commissioner and of persons doing business at the Office. Its adoption will increase the revenues of the Office, and will weed out those worthless patents which are sometimes taken hold of by speculators near the expiration of their terms for the purpose of harassing the public with ingenious reissues. One great annoyance and evil will be removed and positive good obtained in its place.

"Another source of difficulty, and which was becoming a great one, arose from the fact that there is a large number of what are called rejected applications in the Patent Office. During the past year there were over five thousand of final rejections, and the year before nearly as many, and since the constitution of the Office there are perhaps twenty thousand remaining in the Office; most of these rejections have been acquiesced in and the claims abandoned. But some of these have been rejected improperly, and contain descriptions of valuable inventions. In course of time it has been discovered in many cases the rejection was wrong and that the examiner had made a mistake, and the applicant has again made application for his patent, and pressed it, and it has sometimes been allowed and sometimes rejected. If allowed, he would go and try its validity in the courts. If refused, the further difficulty arose on the provision in the existing law for the revision of the decisions of the Commissioner.

"As the law now stands an appeal may be taken to one of the judges of the Supreme Court of the District of Columbia, or remedy be had in a suit in equity in that or any other circuit court. This led to a conflict in the jurisdiction exercised by the Commissioner and that exercised by a single judge in

this District court, and exposed behind it a further and greater cause of difficulty. That is, the law as it now stands, contains no provision absolute in itself, clearly and distinctly defining what should constitute the abandonment of an invention to the public. We heard the solicitors at great length on the question, and the conclusion the committee arrived at is expressed in two short provisions of the proposed bill. The substance of them I will state. Each and every party whose application has been refused is allowed two years to renew that application before the Commissioner, but this provision is not allowed to revive any application for an invention which has been, as a matter of fact, abandoned to the public. In other words, it says a mere lapse of time in the prosecution of an application of a patent shall not be conclusive evidence of abandonment; that the right to a patent for a first and original invention is a vested right, and can only be lost by the inventor in not proceeding in accordance with the provisions of law, or in his forfeiting that right in accordance with those provisions; and to those in this condition, not cut off by any positive existing statute of limitation a new statute of limitation is proposed, defining the time within which such new application shall be made. Thus all the rights are preserved and the mode of prosecuting them is pointed out. The field of controversy concerning these old applications, whether abandoned or not, is fully and satisfactorily provided for."

"The Committee also propose to amend and enlarge the provisions as to relief between interference patents, and to provide relief in cases where a patent has been improperly obtained or improperly reissued, or where the validity of a patent is contested by persons using the things patented.

"There is now no means provided by which a person thus injured or threatened to be injured by a suit can turn around on his prosecutor and test his right to the patent. We propose to give that remedy, so that a single suit can determine the question and avoid the extended litigation and expense now attending controversies upon patents. Heretofore it has sometimes happened that persons have obtained reissues of old patents, and then gone around the country threatening suits against persons; sometimes commencing a suit in a court, and if not liking the temper of the judge, or from some untoward circumstance connected with the trial, abandoning it and commencing another somewhere else, with the hope of obtaining a decision in their favor. And when they have succeeded in obtaining a single decision they will go around again and levy a tax upon all who do not feel able to go to the expense of contesting the validity of the patent.

"That has been a great burden and a great wrong, which has many times been sought to be amended. But the difficulty has been to do it without injuriously affecting rights conferred and established. The committee propose to do it by recommending that where any party has been sued for the infringement of a patent, and he thinks the patent is invalid for any reason or should not be enforced against him for any cause, he may commence a suit against the owners of the patent who have sued him, in order to test the validity of that patent, and the final decision in that case shall be conclusive upon the right of all parties claiming the right to use the thing claimed to be patented.

"I know one case where after a defendant had succeeded in a suit upon a patent, the patentee turned around and brought upwards of a hundred suits all over the United States upon that very patent, subjecting each of the parties sued to as much expense as the one who had defeated him, in the hope of obtaining a reversal of the former decision. That is an evil to be prevented; and we think we have provided a remedy which will reach the case, so that the expense of one suit shall be all that is required to test the validity of any patent or the right of any party under it.

"The committee have recommended also certain provisions which are entirely new concerning trade-marks. These have not heretofore been the subject of any national law. It is a subject embraced within the common law jurisdiction of all the courts of the country, and also within the general equity jurisdiction of all the State courts. This bill does not propose to interfere at all with the local and State jurisdictions. A person, standing upon his common law rights, may still go into the State courts and defend a trade-mark, exactly as he may do now; but if he chooses to register his claim at the Patent Office, pay his fee, and take his certificate of registration, it will protect him throughout the United States, in the same way as a patent for a design or a copy-right is protected.

"Concerning trade-marks, we are at present in an anomalous condition, which perhaps is not understood by the House generally. By certain treaties or conventions with Belgium, France, and Russia, we have agreed to recognize the validity of the trade-marks of those countries upon their being registered in the Patent Office of the United States, and to give them the same effect throughout the United States that they have in the country where they originated; and trade-marks recognized by the law of this country have the same effect throughout those European countries as the trade-marks secured by the citizens or subjects of those countries.

"A *fac simile* of the trade-mark is to be sent to the Patent Office. The kind of business, as well as the kind of goods, to be protected, is to be described briefly and correctly. A fee of \$25 is to be paid into the Treasury of the United States. A certificate of such registration, with a *fac simile* of what is filed in the office, is to be delivered, under the seal of the Patent Office, to the person causing such registration. It is to be in effect for thirty years from the date of registration, and if it be copied by a person not having a right to do it, or if it be copied by a person in such a manner that the imitation is calculated to deceive the public, then the party may

have his remedy in any court of the United States for the injury done him."

ELECTRIC FORCES.

There is no fact connected with the electric agencies, by which distant communication is secured, more suggestive than the minuteness of the power by which it is sustained. To project a ball at a distant ship with certainty of aim, to blast the sunken rock that impedes navigation, to impel the giant ship that splits the storm with its defiant bow, forces are presented to the eye which bear some natural comparison with the work accomplished. But when a message has to be sent thousands of miles beneath the ever fretting sea, from one continent to another, force seems ignored. We look in vain for any machine hissing with a vigor such as the mind deems necessary to eject the electric current from America to Europe quick as the sunlight comes to the earth. There is even an absence of the usual forces for communication upon the land, where nitric and sulphuric acids, zinc and mercury, are busy in numerous cells brewing the electric fire. The power employed bears more truthful comparison with the action of the brain wherein human thought is evolved. The thought may be one which shall change the destinies of a nation; it may be the sweetest idyl that ever warbled from angelic lips; but both come from within the dome of a brow notable only for its repose.

The battery which operates the Atlantic cable is composed of five cells, although for some time it used only one. Each cell is composed of a glass tumbler, a small disk of sheet copper, and a similar one of zinc, a few pellets of sulphate of copper and moist sawdust filling the tumbler. This is all. It has no smell. A spoonful of water upon the sawdust now and then is all it needs for support. It seems insignificant and powerless, yet does its work efficiently and well. The French cable uses only seven such cells, although twice as long as the other.

We have before us, as we write, a battery which was used to transmit a message by the Atlantic cable—the minutest, we presume, ever employed. It has a fascination to us inexpressible. It is composed of a simple gun cap soldered to a piece of copper wire, and a narrow strip of zinc. These, with a drop of water from the ocean, were all the forces that were needed to send a message from continent to continent. Here is a sketch of its actual size:

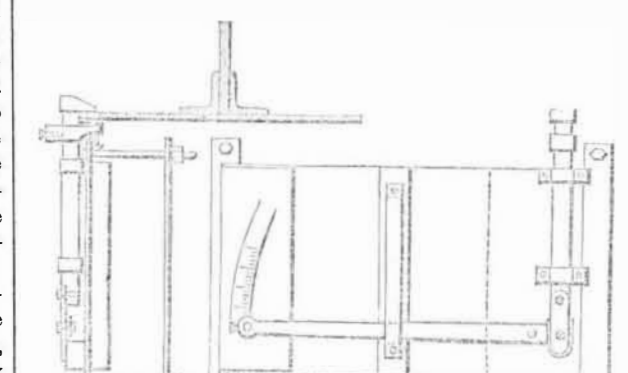
Had the ocean drop been a tear, it would have generated the same current which thus thrilled between two worlds and made them one. Were we disposed to moralize on the salt of this tiny battery and its mysterious agency, we might be excused did we regard it as typifying the power of sorrow which touches the universal heart and makes it throb. It is the alembic of the world's deepest and most omnipotent emotions, and yet may find its rise in the stopping of a single pulse, in the quenching of a single life.

This tiny battery has in it, indeed, a vast moral. We despise the lesser forces of our lives, and measure our influence by an unwise disparagement. From these, however, when true and pure, come the sunlight of the efflorescence of the earth. Let us hold our light high and honored, however small may be its flame. It may reach the radius of another light, and help the dawning of a brighter day—not to ourselves alone, but to thousands who never knew us. A single kind word has ere now planted a seed that has burst its blossoms upon the "infinite meadows of heaven."—*Journal of the Telegraph.*

The accompanying engraving represents an instrument which has been used by the Western Railway Company, of France, in testing the bridges of the new Dieppe line *via* Pontoise and Gisors.

INSTRUMENT FOR MEASURING THE DEFLECTION OF GIRDERS.

The accompanying engraving represents an instrument which has been used by the Western Railway Company, of France, in testing the bridges of the new Dieppe line *via* Pontoise and Gisors.



Wrought-iron bands together with bolts, serve to secure a plank, carrying the whole apparatus to a rigid structure independent of the girder. A clutch is then screwed on to the flange of the girder. A lever works on a pivot, and the shorter end—one tenth of the longer arm—is attached to a clutch bar. The other end carries a pencil which traces the deflection on a card. By means of the unequal division of the lever it is manifest that a small deflection will produce a comparatively large movement of the pencil. In point of fact, a deflection of 1-10,000th of a meter can be detected with this instrument.

BREAD POWDERS, EXTENSION.—The patent of Professor Horsford for pulverulent phosphoric acid, to be used in making bread, has been extended for seven years from April 22, 1870.

The Amended Patent Laws.

The bill to amend the patent laws, to which reference is made in another column, passed the House on the 21st inst. As the seventieth section caused much comment in the House, on motion of Mr. Cleveland of New Jersey, it was stricken out. The section is as follows:

On all patents hereafter granted there shall be paid the following additional fees, namely: At or before the expiration of the term of seven years from the date of the patent the sum of \$25, and at or before the expiration of the term of twelve years from the date of the patent the further sum of \$50, and in default of the payment of either of the sums aforesaid, within the periods aforesaid, the said patent shall be forfeited, and the invention so patented become public property.

In the course of Mr. Cleveland's remarks, and as a reason for his moving to strike out the section, he said it was proposed by section seventy to increase the revenues of the department at the present rate of patent issues, after seven years, nearly \$400,000, and after twelve years of more than \$500,000 more, making, after twelve years, an increase in the revenue of more than \$900,000 as a tax upon the inventors of the country because they are inventors.

Prevention of Boiler Incrustation.

A very simple mode of preventing boiler incrustation is in general use at the Darmstadt Gasworks. The engine has worked day and night since 1854 almost without interruption, and the formation of calcareous deposits has been entirely prevented by the use of crude pyroligneous acid, combined with tar; it is either introduced into the boiler or mixed with the feed water. Since this mixture has been in use they have never had a stoppage through incrustation, and have never had to use a hammer to remove scale. Each year, during the summer, when less gas is required, the boiler is opened, and perhaps a couple of handfuls of loose sediment taken from the bottom. The quantity employed is very small—just enough to redden litmus paper; consequently the iron is not attacked, as indeed is apparent from the fact that the boiler has been but twice under repair.

The Pneumatic Railway.

The use of the zircon or oxygen lights on the passenger car of the Broadway Pneumatic Underground Railway, in this city, has been discontinued, and common gas substituted. The gas is compressed in cylinders, and is made to pass through a soda-water bottle containing benzine; the brilliancy of the light is thus greatly improved owing to the carbon which the gas takes up in passing through the liquid. The Pneumatic Railway continues to be an attraction. It is visited daily by large numbers of persons.

Editorial Summary.

A SPEAKING AUTOMATON.—A German genius has invented a speaking machine, which is now on exhibition in Leipsic, and is a masterpiece of inventive art. It is in imitation of all the parts of the human organs of speech, executed in india-rubber and wood. A keyboard played like that of a piano, puts the parts in motion, while by a pedal and bellows the required air is sent through the wind pipe. The keyboard has only fourteen keys, representing the sounds of a, o, u, i, e, j, r, w, f, s, b, g, d, h; other sounds of the alphabet are produced by the same movement, and the admission of more or less air. The sounds of m and l are produced by closing the lips and pressing the tongue against the roof of the mouth, etc. The French nasal sounds are produced by a separate contrivance. The laughing, it is said, sounds truly diabolical, and the crowing of a rooster very comical.

PEARLS IN THE GULF OF CALIFORNIA.—The revenue returns for 1869 show that the catch of pearls and shell for the past year on the Gulf coast of the territory granted to the "Lower California Company" amounted to the large sum of \$78,000. This, of course, is the valuation of the pearls given by the divers and speculators, and is consequently very much below the actual value of the catch. A pearl is sold frequently for \$20, which, resold at Panama, at \$200, brings \$1,000 in Paris, and in many cases much greater profits have been made on very fine gems.

Not one-half the catch is ever reported to the Government, and the yield of the Gulf for 1869 may be safely estimated at \$300,000 in gold.

ELECTRIC TELEGRAPH WITHOUT WIRES.—It has long been known that telegraphic messages could be transmitted without the use of wires, and many years since signals were sent across the Bristol Channel by the use of the water as the conducting medium; but in that case the water through which the signals passed was enclosed in a tube, so that it was, in truth, only the substitution of a wire of water, if the term can be used, for the metallic wire usually employed. Prof. Loomis now proposes to go further; he claims to have discovered a mode of transmitting messages by electrical air currents; and is seeking an opportunity for making experiments on the summit of Mont Blanc.

AN EXTENSIVE FOUNDRY.—An iron foundry has been recently erected by the Messrs. Howard at Bedford, England, of remarkable size. There are 35,000 square feet on the ground floor. There are four cupolas, or furnaces, capable of melting 300 tons per week, and which are expected to be very shortly in full work. The internal and general arrangements were planned by Mr. James Howard, M.P., the erection being under the direction of Mr. Usher, architect, Bedford.

PROMISING experiments in coating iron with sulphur, as a protection from corrosion, have been recently instituted.

WEAR OF LOCOMOTIVE DRIVING WHEELS.—In reply to a recent correspondent's observations upon the greater wear of the tires on the front driving wheels of locomotives, two causes have been suggested by a number of correspondents. The first is, that these wheels carry greater weight, and the second that the cutting of the sand employed is greater upon them than on the others, as the sand is sprinkled directly before them. It is thought that these causes are ample to account for the fact observed.

Business and Personal.

The Charge for Insertion under this head is One Dollar a Line. If the Notices exceed Four Lines, One Dollar and a Half per line will be charged.

The paper that meets the eye of manufacturers throughout the United States—Boston Bulletin, \$4.00 a year. Advertisements 17c. a line.

\$3000 will buy a valuable improvement in manufacturing Pa Per Hangings. Address Lawrence Bellinger, Mohawk, Herkimer Co., N. Y.

Broughton's Lubricators and Oil Cups are the best. Manuf'd by H. Moore, 41 Center st. Beware of purchasing infringements on the above.

For Sale—3 patents on furniture, or on a lease in complete working order. G. Knell, 130 Market st., Philadelphia, Pa.

For Sale—Burton's patent sash and blind marker (by States, or otherwise), which will do the work of 5 men. Address G. W. Burton and Brother, Box 186, Bordentown, N. J.

Pictures for the Sitting Room—Prang's "Pompeii," "Sunset on the Coast," and "Launching the Life Boat." Sold in all Art Stores throughout the world.

\$100 a day can be made by selling Lloyd's new dollar double maps of America and Europe. See advertisement on last page.

Inventors' experimental and Patent Office models, and light machinery, of the most intricate character, manufactured to order by Goodwin & Wood, 91 Liberty st., New York.

\$300 will buy the entire Right of the best and cheapest Fruit Gatherer out. L. S. Fleckenstine, Safe Harbor, Lancaster Co., Pa.

45 Counties of West Pa. for sale, or on royalty, of Fleckenstine's Corrugated Gun Scrubber. Takes off grease, tar, etc. L. S. Fleckenstine, Safe Harbor, Lancaster Co., Pa.

Manufacturers of improved machinery for watch-case making please address J. C. Dueber, Cincinnati, Ohio.

Page's Pat. Lacing, superior quality. Address J. Sweetman, Utica, N. Y.

Dickinson's Patent Shaped Carbon Points and adjustable holder for dressing emery wheels, grindstones, etc. See Scientific American, July 24th, and Nov. 20, 1869. 64 Nassau st., New York.

Peck's patent drop press. Milo Peck & Co., New Haven, Ct.

Rivet machines wanted. John Cronin, 20 Burling Slip, N. Y.

Steel Makers' Materials—Wolfram ore, oxide manganese, Speigel iron, borax, titanium, chrome, lubricating black lead, for sale by L. & J. W. Feuchtwanger, 55 Cedar st., New York.

For the best Alarm Money Drawer, address Robbins, Froutz & Co., Hughesville, Pa. Agents wanted.

Machines for manufacturing Screw Bolts and Nuts of all kinds. Makers will please send price lists and other information to C. G. Berryman, Saint John, N. B.

An experienced mechanical and railway engineer wishes a position as Master of Machinery, or Manager. Address "Engineer," Station "G," Philadelphia, Pa., Postoffice.

Bartlett's Street Gas Lighter. Office, 569 Broadway, N. Y.

For description of the best lath and blind slat sawing machine in use, address W. B. Noyes, Gen'l Ag't, P. O. Box 558, Manchester, N. H.

Important advance on the draft and casement of carriage. See Jackson's Patent Oscillating Wagon, with tests of draft, models, etc., No. 149 High st., Newark, Essex Co., N. J. See Scientific American, Sept. 25, 1869.

Kidder's Pastilles.—A sure relief for Asthma. Price 40 cents by mail. Stowell & Co., Charlestown, Mass.

Needles for all sewing machines at Bartlett's, 569 Broadway, N. Y.

Pat. paper for buildings, inside & out, C. J. Fay, Camden, N. J.

For Sale—An old established Malleable and Gray Iron Foundry, doing a large trade in hardware. Cause of selling, failure of health of the proprietor. Address "Malleable Iron," Newark, N. J.

Brick and Tile Drain Machine—First Premium in Ohio, Indiana, and Missouri; also Fair of American Institute, New York. Address Thos. L. Cornell, Derby, Conn.

For solid wrought-iron beams, etc., see advertisement. Address Union Iron Mills, Pittsburgh, Pa., for lithograph, etc.

For first-quality new 14, 17, and 20-in. screw lathes, milling machines, and one-spindle drills, at small advance from cost, apply to Geo. S. Lincoln & Co., Hartford, Conn.

Hackle, Gill Pins, etc., at Bartlett's, 569 Broadway, New York.

Portable Pumping or Hoisting Machinery to Hire for Coffers Dams, Wells, Sewers, etc. Wm. D. Andrews & Bro., 414 Water st., N. Y.

Keuffel & Esser, 71 Nassau st., N. Y., the best place to get 1st-class Drawing Materials, Swiss Instruments, and Rubber Triangles and Curves.

For tinners' tools, presses, etc., apply to Mays & Bliss, Brooklyn, N. Y.

Glynn's Anti-Incrustator for Steam Boiler—The only reliable preventative. No foaming, and does not attack metals of boiler. Liberal terms to Agents. C. D. Fredricks, 587 Broadway, New York.

Two 60-Horse Locomotive Boilers, used 5 mos., \$1,300 each. The machinery of two 500-ton iron propellers, in good order, for sale by Wm. D. Andrews & Bro., 414 Water st., New York.

To ascertain where there will be a demand for new machinery or manufacturers' supplies read Boston Commercial Bulletin's manufacturing news of the United States. Terms \$4.00 a year.

Cold Rolled—Shafting, piston rods, pump rods, Collins pat. double compression couplings, manufactured by Jones & Laughlins, Pittsburgh, Pa.

For mining, wrecking, pumping, drainage, and irrigating machinery, see advertisement of Andrews' Patents in another column.

Parties wanting Machinery built of any description, or inventions patented, will do well to, address J. Done, Jr., 61 and 63 Hamilton street, Newark, N. J.

Facts for the Ladies.

For ten years past we have been using, in our establishment, Wheeler & Wilson's Sewing Machines, and, also, sewing machines of other manufacturers; and, after so many years, we have arrived at the conclusion that Wheeler & Wilson's Sewing Machines are greatly superior to all others. All the parts of their mechanism are so strong that the expense for repairs is merely a trifle. Besides, they can execute a larger variety of sewing than all other machines. The simplicity of their mechanism makes the repairs easy; they do not tire the operator, and make very little noise in running. In a word, they cannot fail to be of great value to persons in want of sewing machines.

SISTER DOROTHEE,
Congregation of Notre Dame, Montreal.

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 correspondents by mail.

SPECIAL NOTE.—This column is destined 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.

H. McG., of N. Y.—To find the horse power a belt of given width, moving at a given speed will transmit, divide the number of square inches of the belt in contact with the smaller pulley by two. Multiply the quotient thus found by the velocity of the belt per minute in feet, and divide the product by 36,000. The quotient will be the required horse power. To find the proper width of belt to transmit a given horse power, multiply \$6,000 by the number of horse power, divide the product by the velocity of the belt per minute in feet; divide the quotient by the number of feet in length of contact of the belt with the smaller pulley, and divide this last quotient by 6. The result is the width of the belt in inches.

G. H., of N. Y.—The genuine Babbitt metal is composed of 4 parts copper, 12 parts best Banca tin, 8 parts metallic antimony, and 12 parts more tin to be added when the first-named ingredients are in a state of fusion. First melt the copper and add 5 lbs. of the tin. Then reduce the heat to a dull red; then add the rest of the first proportion of tin, and the other ingredients in the order and quantities mentioned, waiting for each to melt before adding another. Keep the surface of the metal covered with powdered charcoal to prevent oxidation.

J. N. C., of Ill.—A burning mirror of great power might be made of wood covered with burnished tinfoil, but it would of course be liable to shrink, warp, etc., from the effect of weather. If the concavity be a portion of a sphere, not more than about eight degrees of arc should be used. The following rule would be accurate enough. Multiply the diameter of the mirror by 50, and take one sixth of the product for the radius of the concavity.

H. D., of Ohio.—The boiling point of water varies according to the height above the sea level. Altitudes may be thus ascertained. A difference in height of 543 feet makes a difference of one degree in the boiling point. The higher the elevation, the lower the temperature at which liquids boil, and vice versa.

V. C., of Wis.—The explosive used in the toy torpedoes is fulminate of mercury. A very small portion of this substance is twisted up in strong tissue paper with bits of sand, or broken glass. We consider them as dangerous playthings.

S. B. H., of R. I.—You will find full directions for finishing inland woodwork in Watson's "Manual of the Hand Lathe," published by Henry Carey Baird, 406 Walnut street, Philadelphia.

T. O. H., of Mo.—The presence of all the air that will remain in an annealing oven cannot affect the process of annealing. We don't believe in your vacuum theory.

T. E. H., of Mass.—You can use the ordinary lacquer, employed for protecting fine brass work, upon gilt. This will be better than soluble glass.

J. B., of —.—Chloride of sodium is common salt. Your proposed application of it to scaling castings will not do.

Recent American and Foreign Patents.

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

FOLDING CHAIR.—George McAleer, Worcester, Mass.—This invention has for its object to improve the construction of folding chairs with flexible seats, so as to make them better adapted to support the back of the person sitting in them, than the folding chairs constructed in the ordinary manner.

REFRIGERATOR.—Anthony B. Sweetland, Fitchburg, Mass.—This invention relates to a new and useful improvement in refrigerators, for keeping food (or articles designed for food) at a low temperature, and consequently from decay.

COMBINATION BOOT JACK.—Samuel Kenney, Rochester, Pa.—The object of this invention is to combine in a small space, a boot jack, blacking brush, and blacking box, so that the necessary apparatus for removing the boot from the foot, and blacking it, may be always together and more portable than they usually are.

LATHE SPINDLE.—James E. Boutelle, Fishersville, N. H.—This invention relates to a new and useful improvement in lathe spindles, for wood turning, whereby heating of the center is prevented, while it is made self-lubricating.

POWER LOOM FOR THE FABRICATION OF PLAIN VELVET STUFFS.—Pierre Francois Ramel and Jean Drogat, Lyons, France.—This invention relates to a new power loom for the fabrication of plain velvet stuffs, which is capable of weaving two pieces at the same time, and which is worked by hand or steam power, and able to weave every quality of velvet.

SAW MILL.—Charles Taylor, McKeesport, Pa.—This invention relates to improvements in circular saw mills, and consists in an improved arrangement of two carriages, one on each side of the saws, for operation by the same feed shaft, and the one on the side receiving the lumber being arranged for disconnecting with the driving shaft when not required for use.

STOVE.—J. L. Pfau, Jr., Quincy, Ill.—This invention relates to improvements in stoves and furnaces for burning coal, and more particularly cylindrical stoves, and consists in an air and gas mixing apparatus, arranged for resting on the top of the fire brick above the fire, and receiving the air through the side of the stove, heating it, and finally delivering it to the gas arising from the fire below, in a distributed way, calculated to facilitate the burning of the same and the smoke, more effectually than when the cold air is admitted directly to the gas, in the common arrangements.

HEAT RADIATOR.—Thomas Scantlin, Evansville, Ind.—This invention relates to a new heat radiator, which is constructed with the object of securing more extended radiating surfaces, and unobstructed draft. The invention consists chiefly in a novel arrangement of pipes and drum for obtaining the desired circulation of smoke, and also in a novel means for letting air into the stove.

THREAD GUIDE FOR BOBBIN WINDERS OF SEWING MACHINES.—Thomas Shanks, Baltimore, Md.—This invention has for its object to lay thread evenly on the bobbins of sewing machines when the same are removed from the shuttles for the purpose of being filled.