

ENGINEERING INVENTIONS.

A railroad switch has been patented by Mr. Manoh Miles, of Russell, Kansas. Combined with the main and siding rails, switch tongues, and a sliding bar, is a system of levers for operating the latter, arranged outside the track, with sliding locking bolts pivoted to laterally projecting arms of the levers and adapted to be operated in advance of the sliding bar, whereby the switch can be set and shifted automatically by the cars.

An apparatus for cleaning steam pipes has been patented by Messrs. Charles Kynoch and Edgar Courtwright, of St. Ignace, Mich. Combined with a boiler pump and feed water heater is a pipe connecting the boiler with the pipe leading from the tank or well to the feed pump, a three way cock uniting the pipes, whereby dry steam may be passed through the pipes to clean them and blow out all dirt, smut, and sediment.

A car coupling has been patented by Mr. William B. Foster, of Derby, Kan. This invention relates to car couplings in which a bar having hooked ends is used as a coupling bar, this bar being held in position to ride up the inclined face of the drawhead of the opposing car, at such angle as may be necessary, by an arm operated by a shaft extending from side to side of the car, and this arm then locking over the ends of the coupling bar.

A car coupling has been patented by Mr. Joseph T. Hammick, of Rhinebeck, N. Y. The drawbar is in the form of two parallel bars, one above the other, and connected at their forward ends by an oval-shaped drawhead, the coupling pin being stationary, with various novel features, to facilitate coupling with cars having other forms of couplers, and higher or lower platforms, the invention being an improvement on two former patented inventions of the same inventor.

A car coupling has been patented by Mr. John M. White, of Terre Haute, Ind. The coupling pin is a peculiar shaped flat piece of metal, pivoted in the drawhead to partly counterbalance, and a shaft extending across the end of the car above the drawhead enables the coupling hook to be raised from either side of the car, with other novel features, the coupler being also adapted to work with the ordinary drawhead and pin.

A stock car has been patented by Mr. Jonathan E. Pierce, of Deming's Bridge, Texas, and David C. Pryor, of Cucharas, Col. This invention covers an improvement on the movable transverse partitions employed for separating the animals, where the partitions are suspended from sliding loop hinges from a horizontal rod, and have at the bottom feet that enter sockets in the floor of the car, the partitions being adapted to be fastened or released by a vertical movement.

A cattle car forms the subject of two patents issued to Mr. Ferdinand E. Canda, of New York city. This invention covers especially a novel construction of gate designed to divide the car into stalls or compartments, one which is strong, durable, and easily moved, and which can be conveniently arranged just beneath the car roof when the car is to be used to transport other freight, as is frequently desired on return trips, the improvement requiring but a single length of chain attached to the upper and lower bars of the gate or partition, in connection with a peculiar arrangement of sprocket wheel and an improved form of spring connecting block.

MISCELLANEOUS INVENTIONS.

Felt articles, such as boots, shoes, and slippers with felt soles, form the subject of a patent issued to Mr. Walter P. Hyatt, of Matteawan, N. Y. This invention covers a novel method of felting a separate sole to a felt boot, etc., and of forming independent felt soles with felt heels made integral with the sole.

A combined ink eraser and burnisher has been patented by Mr. George S. Couch, of Minneapolis, Minn. It is a steel ink eraser, in the form of fine file, having special erasing surfaces, and made also to form a burnisher of the paper after the erasure has been made, the device being simple and neat and of convenient shape to handle for either purpose.

A combined feeder and cutter for toilet paper has been patented by Mr. Henry A. Harrison, of New York city. It is so constructed that a fixed amount of toilet paper will be fed out and cut off each time the machine is operated, and the mechanism, when released, will return automatically to its former position, ready to be again operated.

A micro-audiphone has been patented by Mr. Frank M. Blodgett, of New York city. It is provided with a reed, made of thin metal slotted to form narrow strips, and placed within the inner chamber, to augment the sound waves, together with other novel features, the invention being an improvement on a former patented invention of the same inventor.

A saw frame has been patented by Mr. Henry L. Pratt, of Brooklyn, N. Y. It has at one end a rectangular saw support with projecting studs for receiving the eye of the saw in either of two positions in which it may be placed, with other novel details of a simple and effective device for holding back saws, and other saws which are strained endwise in bowed frames.

A pedal cover for organs has been patented by Mr. James S. Foley, of Chicago, Ill. It is a simple mechanism for so hinging a cover to the instrument case over the pedals that it will be operated from the fall board, and opened and closed automatically therewith, whereby dust and mice may be excluded from the instrument when it is not in use.

A pump has been patented by Mr. Riley I. Knapp, of Platteville, Wis. By this invention a piston is arranged to be reciprocated in a cylinder by lifting rods arranged entirely outside of the delivery pipe, with which is a novel arrangement and construction of valves, whereby large volumes of water may be drawn from a well or cistern and forced up to a tank or other receptacle.

A process of preserving eggs has been patented by Mr. John Wm. McKee, of Stoutland, Mo. It consists in first subjecting them to the fumes of sulphurous acid and bromine, and then immersing them in a solution of lime, salt, cream of tartar, citric acid, nitrate of potash, chlorate of potash, borax, alum, and water, whereby it is claimed the eggs will be kept sweet and fresh for several years.

A refrigerator has been patented by Mr. James R. Pershall, of Lawrence, Kan. The construction is such that the refrigerated air can pass freely to the provisions, while the drippings from the ice are prevented from falling thereon, and the tank, filter, and receiver are in contact with the ice chamber, so that the water is being constantly cooled without the impurities of the ice being taken up.

A check rein holder has been patented by Mr. Robert E. King, of Warrenton, N. C. It consists of a framework mounted upon the saddle, with guide rings for the driving reins, and auxiliary check rein, and other novel features, whereby the checking device will be entirely under the control of the driver by means of the ordinary guiding reins, and the necessity of an independent check rein will be obviated.

A springless lock has been patented by Mr. Aaron Park, of Ottumwa, Iowa. It is a lock where in there are arranged a knob latch, a key-operated bolt, and a bolt operated by a cam-faced manipulating knob, intended to be cheap and durable, but depending entirely upon the force of gravity for the locking of its parts in the position in which it is desired they should remain.

A device for closing openings in pipes has been patented by Mr. Cornelius J. Phillips, of New York city. This invention consists principally of a patch plate, arched in the center and formed with a curved surrounding seat to fit over an opening in the pipe, combined with a cross piece adapted to be fitted in the opening and having a bolt for securing the patch plate in place.

A marking and furrowing machine has been patented by Mr. Jacob Flomerfelt, of Peapack, N. J. The markers or runners are composed of a main body part, and opposite face irons or cutters arranged to project below the bottoms of the bodies of the runners, the device being operative regardless of the unevenness of the ground, and a central disposition of the weight and draught being obtained.

A churn has been patented by Mr. Jas. H. Taylor, of Westfield, Mass. The body is cylindrical in form, made with staves and circular heads, and the dasher may be revolved by a crank, being so constructed as to cause counter currents of cream in churning, there being a peep glass in the cover for inspecting the progress of the butter forming, with other novel features to promote convenience and expedite the work.

A spring balance has been patented by Mr. Hugo Haerter, of New York city. This invention combines a special adjusting mechanism with the parts of an ordinary spring balance in such way that the pointer can be readily brought to the zero point should the scale pan be removed or changed for a heavier or a lighter one, or should a plate or other vessel be placed on the pan to receive the substance to be weighed.

A hand stamp has been patented by Mr. Fred C. Lidke, of Washington, D. C. The stock has a body with an opening fitted to receive a type bar, a rotatable cover plate with an opening which may be brought into and out of register with the openings in the stock, with other novel features, making a stamp especially adapted for canceling and marking postage stamps, and in which the letters may be formed separately and be self-retaining in the stock.

A combined band cutter and grain feeder for thrashers has been patented by Mr. Charles Grover, of Kansas City, Mo. While one end is connected with the receiving end of a thrasher, the other end is adjustably supported by hinged legs, and bundles can be put in the machine on both sides, while there are various novel features, the invention being an improvement on a former patented invention of the same inventor.

A machine for coating emery belts has been patented by Mr. Samuel J. Smith, of Merrimacport, Mass. The emery is contained in a pan held in an annular groove of a disk revolving in a horizontal plane, and the entire surface of the belt, passed over pulleys, is pressed on the emery in the pan, the glue or other adhesive material being applied at the same time, an evenness keeping the emery level, and the whole operation being very quickly effected.

A graphic negative film has been patented by Mr. Stephen C. Duval, of New York city. It is a transparent sheet of gelatine, rendered opaque by a coating of colored varnish, with a coating of metallic powder applied to the varnish, so that when the surface is worked upon with a suitable instrument, and the opaque coating removed in lines from the transparent sheet, the artist can see his work as it progresses without having to hold the film up to the light.

A mechanical movement has been patented by Mr. Charles Schirmmeier, of Brooklyn, N. Y. Radial arms are placed at right angles to and projecting from the axis of motion, so arranged that each arm is in a different vertical plane, and the arms being weighted at each end; some of the arms are made hollow and in-close sliding or rolling weights, and the motion is further re-enforced by springs attached to the axis by a lever and eccentric, the device furnishing a means for imparting mechanical power.

A broom attachment has been patented by Mr. Walter E. Nash, of Darlington, Wis. It is a detachable guard, made conformably to the shape of the broom head, with its side edges turned up to fit and clasp both side edges of the broom, and having a tubular handle to slip over the handle of the broom to cause the guard to support the broom below the bound portion of its splints, giving a comparatively rigid action on one side or face of the broom without restricting its elasticity on the other face, the detached guard also serving as a dust pan.

NEW BOOKS AND PUBLICATIONS.

LEHRBUCH DER MINERALOGIE. Von Max Bauer. Berlin and Leipzig, 1886: J. Guttentag. Pp. 562; 588 woodcuts.

This is a most convenient text-book in the science of mineralogy. The work commences by a definition of mineral and mineralogy, and then gives a list: 1, of the principal text and hand books on the subject, including 41 titles; 2, of works on crystallography and physical mineralogy, also 41 titles; 3, of works on microscopic mineralogy, 8 titles; 4, chemical composition of minerals, 11 titles; 5, synthetic mineralogy, 6 titles; 6, determinative mineralogy, 21 titles; 7, occurrence of minerals, 37 titles; 8, journals and periodicals, 24 titles; 9, annuals (Jahresberichte), 5 titles; 10, systems of mineralogy, 11 titles; 11, descriptions of collections, 5 titles; 12, technical and economical mineralogy, 12 titles; 13, history of mineralogy, 4 titles. The author devotes a great part of his work to crystallography and physical mineralogy, the latter embracing such a range of subjects as is indicated by cohesion, tenacity, elasticity, reflection and polarization of light, color, streak, polychroism, and electricity, all applied to minerals. Chemistry comes next, including the natural processes of formation of minerals, decomposition and pseudomorphism, and the like. The last part of the book, 322 pages, is devoted to descriptive mineralogy; the species are arranged in the following general order: Elements, haloid compounds, sulphides, oxides, borates, carbonates, and nitrates, etc., ending with minerals of organic origin. Sometimes the author is in error as to American localities, as where he attributes Franklinite to the State of New York instead of New Jersey. On the whole, the book is decidedly to be commended. The cuts are mainly crystallographic.

TRAITE PRATIQUE D'ELECTRICITE INDUSTRIELLE. Par E. Cadiat L. Dubost. Paris: Baudry et Cie, 1886. Pp. 583; 222 woodcuts.

This is the second edition of what proved a useful and acceptable addition to the literature of electricity. The theory of the subject, measurements, batteries, dynamos, and all the appliances are described, the object being to condense the practically useful part, rather than to touch upon purely theoretical ground. Among the batteries we notice an illustrated description of the famous Trouve battery, with the formula and M. Trouve's elaborate description of his method of preparing the solution. Lalande and Chaperon's oxide of copper battery, and Maiche's atmospheric battery are illustrated and described also. Ohm's law is thoroughly elucidated. Secondary batteries, dynamos and electric lamps are treated of, with practical examples of calculations. Much space is given to the subject of the transmission of force. Sections devoted to galvanoplasty, electro-metallurgy, telephony, and a short chapter on electric units, etc., close the work. The illustrations are creditable, aiming rather at utility than picturesqueness, in many cases being mere diagrams. The general proportion of parts is excellent, and enough, and not too much, mathematics for the practical engineer appear to be contained. It has no index; a full table of contents only is supplied.

THE TECHNO-CHEMICAL RECEIPT BOOK. Edited chiefly from the German. By William T. Brannt and William H. Wahl. Philadelphia: Henry Carey Baird & Co.

This is a new compilation and collection. Technical terms are avoided so far as possible, and the descriptions are plain and direct, making a book well suited for a constant assistant in the workshop or general ready reference. In regard to the use of receipts, there are always people who will make a careless trial, perhaps neglecting some important point, or not noting the precise terms of the receipt, and then complain at a failure which is only the natural result of their own carelessness. Inexperienced experimenters should make their first trials with small quantities, and repeat their attempts until it is certain that failure does not come from mistake in manipulation or error in the quantities. The value of the book is increased by an elaborate table of contents, topically arranged, and a copious index.

WARM BLAST STEAM BOILER FURNACE. By J. C. Hoadley. New York: John Wiley & Sons.

This is a report of a series of trials, begun in the summer of 1881, of "an apparatus for transferring a part of the heat of escaping fue gases to the furnace, by warming the entering air." The trials lasted nearly a year, and the apparatus has since been in uninterrupted use at the chemical works of the Pacific Mills, Lawrence, Mass., with a result, according to the author, that the warm blast experimented with "seems to afford a means of securing a net saving of 10 to 18 per cent over the best attainable practice with natural chimney draught and with air supplied to the furnace at usual external air temperatures." The boiler tests were very extended and carefully conducted, and every endeavor was made to learn the absolute limitations of economy in coal combustion, a line of investigation in which the author, who personally superintended the experiments, probably has no superior.

HYDRAULICS. THE FLOW OF WATER THROUGH ORIFICES, OVER WEIRS, AND THROUGH OPEN CONDUITS AND PIPES. By Hamilton Smith, Jr. New York: John Wiley & Sons.

In this handsome quarto, full of mathematical formulæ and the tabulated results of many investigations, and illustrated with numerous plates, an effort is made to critically examine all the recorded experiments which have been made with weirs and pipes by German, French, English, and American authorities. Many of the experiments reported upon were made directly by the author, and some of these, formerly published in the Transactions of the American Society of Civil Engineers, have been recalculated to give results slightly differing from the first figures. The work is designed to save labor and be of practical assistance to engineers in a field wherein, heretofore, they have had to make nearly all their calculations almost as if commencing an original investigation on the whole subject.

POOR'S DIRECTORY OF RAILWAY OFFICIALS AND RAILWAY DIRECTORS. New York: Poor's Railroad Manual Co.

To all who desire to do business with the railways of the United States and Canada, in the way of furnishing supplies, making contracts of any kind, negotiating for the introduction of patented improvements, or other purposes, this directory cannot fail to be a great convenience. One can thus readily see how to make applications to first hands in any department of the very extended and important interests which our great railway system represents.

STEAM HEATING PROBLEMS. The Sanitary Engineer, New York.

This volume is a republication, in convenient form for reference and preservation, of questions, answers, and descriptions touching problems in the designing and construction of steam heating apparatus, which have previously appeared in the columns of the Sanitary Engineer. The book has a good deal of practical information set forth in a very direct style.

OIL AND VARNISHES. Edited by James Cameron. Philadelphia: P. Blakiston, Son & Co.

This book is one of a series of technological handbooks, giving in convenient form a compendium of the information furnished by many larger works, in a style most suitable for use by those engaged in the industrial arts. It is an English publication, so that the classifications, statistics, prices, etc., with which the book is well provided, are those of Great Britain especially.

TOKOLOGY. By Alice B. Stockham, M.D. Chicago: Sanitary Publishing Co.

The author of this volume has had considerable experience in the practice of medicine; she has succeeded in filling its pages with much good advice and many common sense suggestions, designed especially for the benefit of women.

FIRE TABLES FOR 1886. New York: The Chronicle Company.

This is an elaborate compilation of fire statistics, showing the losses in the United States by risks, States, and causes, with other valuable information for fire underwriters and owners of warehouses and others who have insurance on property. A colored diagram, making the frontispiece, shows the causes of the most dwelling house fires in a way that is worth many pages of figures. Defective flues caused the greatest number of these fires; then come, in diminishing proportions, incendiarianism, matches, sparks, explosions of lamps, etc., tramps, firecrackers, and cigar stubs being each responsible for about the same number of fires.

THE ADVERTISER'S HANDY GUIDE. 1886. J. H. Bates, New York.

This is a neat little pocket book, containing a directory of the newspapers of the United States and Canada, with record of their circulation, alphabetically arranged, each page of the directory having a blank page opposite for memoranda. The enterprising advertising agent who furnishes this directory bought out the good will of the long-established advertising agency of S. M. Pettigill & Co., in April last.

The American Journal of Archæology and of the History of the Fine Arts for the second quarter of the year contains an excellent selection of interesting reading matter, in addition to its usual illustrations of archeological subjects. The list of contributors is a sufficient guarantee of the value of the number. W. H. Ramsey continues his notes on the antiquities of Asia Minor, and Joseph T. Clarke on a proto-ionic capital from Neandria. The first paper on the Terra Cotta Heads of Teotihuacan, by Mrs. Zelia Nuttall, is both in point of interest and length one of the most important contributions to the number. In spite of all that has been written about these curious objects, and the scholarly speculations they have excited, they still remain an unsolved mystery. But the long discussion has detracted nothing from their interest. The department devoted to current archeological news and periodicals bears witness to the activity which this branch of study now enjoys. As the literature of the subject has so increased in volume as to be quite beyond the reach of even the most persistent students, the very readable reviews of Dr. Frothingham and his editorial colleagues will be found an agreeable feature.

Transactions of Vassar Brothers Institute, Poughkeepsie, N. Y., and its Scientific Section for 1884 and 1885, contains, in addition to the minutes of the meetings, a reprint of several addresses delivered before the Institute, which possess considerable scientific value. In the "Evolution of Science," by the president, Dr. Cooley, is traced the development of that knowledge whose sum we call science, and his plea for the admission of the doctrine of evolution is put upon the ground of an overruling and supreme intelligence. "The Just Claims of Natural Science," by Professor Dwight, is of not less interest. "The Genealogy of the Vertebrata," as learned from Paleontology," by Professor E. D. Cope, is worthy of careful study as being the expression of the most distinguished of American naturalists. "An Empirical Study of Gyration Bodies," by Dr. C. B. Warring, is a very full statement of the behavior of gyration bodies, and is illustrated by more than fifty figures "from life." "The Sun Spots of the past few years," by Miss Mary Whitney, contains the results of observations made at Vassar College since the year 1874.

The Ventilation and Warming of Buildings, upon the principles designed and patented by Henry Rutan, B. R. Hawley, and Isaac D. Smead, forms the subject of a handsome illustrated volume just published by Messrs. Smead, Wills & Co., of Elmira, N. Y. The system explained is represented by companies also in Toledo, Ohio, Chicago, and Kansas City, and covers improvements upon which thirteen patents have been issued.

Patent Screw-cutting and Other Labor-saving machinery and tools are described in a recently

issued illustrated price list of the Wiley & Russell Manufacturing Co., Greenfield, Mass.

P. Prybil, of New York city, has several specialty catalogues—one of woodworking machinery, one of machinery for working brass, horn, ivory, etc., and one of shafting, giving illustrations and prices for appliances calculated to do a large variety of work.

Received.

REPORT OF THE SUPERINTENDENT OF PUBLIC INSTRUCTION. New York, 1886. Albany: Weed, Parsons & Co., State Printers.

LEVELING BY VERTICAL ANGLES, AND THE METHOD OF MEASURING DISTANCES BY TELESCOPES AND ROD. By August Paul. New York: John Wiley & Sons.

RETAINING WALLS FOR EARTH. By Malver A. Howe. New York: John Wiley & Sons.

POCKET FIRE INSURANCE CHART FOR 1886. The Insurance World, Pittsburg, Pa.

OSBORN'S TABLES OF MOMENTS OF INERTIA AND SQUARES OF RADII OF GYRATION. By Frank C. Osborn. Cleveland, O.: Engineering Era Publication Company.

Business and Personal.

The charge for insertion under this head is One Dollar a line for each insertion; about eight words to a line. Advertisements must be received at publication office as early as Thursday morning to appear in next issue.

Wanted—Parties with capital to secure patents in this and foreign countries on a very sensitive and reliable Engine Governor. Address Geo. S. Agee, Burnham (Mill), Howell Co., Md.

The Office, a practical monthly journal for business men, office managers, accountants, and bookkeepers. Subscription price, \$1. The Office Co., 205 B'way, N. Y.

Emery Wheels of unusually superior quality for wet grinding. The Tanite Co., Stroudsburg, Monroe Co., Pa.

A Catechism on the Locomotive. By M. N. Forney. With 19 plates, 227 engravings, and 600 pages. \$2.50. Sent on receipt of the price by Munn & Co., 361 Broadway, New York.

Guild & Garrison's Steam Pump Works, Brooklyn, N. Y. Pumps for liquids, air, and gases. New catalogue now ready.

Haswell's Engineer's Pocket-Book. By Charles H. Haswell, Civil, Marine, and Mechanical Engineer. Giving Tables, Rules, and Formulas pertaining to Mechanics, Mathematics, and Physics, Architecture, Masonry, Steam Vessels, Mills, Limes, Mortars, Cements, etc. 900 pages, leather, pocket-book form, \$4.00. For sale by Munn & Co., 361 Broadway, New York.

Nickel Plating.—Sole manufacturers cast nickel anodes, pure nickel salts, polishing compositions, etc. \$100 "Little Wonder." A perfect Electro Plating Machine. Sole manufacturers of the new Dip Lacquer Kristaline. Complete outfit for plating, etc. Hanson, Van Winkle & Co., Newark, N. J., and 92 and 94 Liberty St., New York.

Machinery for Light Manufacturing, on hand and built to order. E. E. Garvin & Co., 139 Center St., N. Y.

Presses & Dies. Ferracute Mach. Co., Bridgeton, N. J.

Send for catalogue of Scientific Books for sale by Munn & Co., 361 Broadway, N. Y. Free on application.

The Knowles Steam Pump Works, 44 Washington St., Boston, and 93 Liberty St., New York, have just issued a new catalogue, in which are many new and improved forms of Pumping Machinery of the single and duplex, steam and power type. This catalogue will be mailed free of charge on application.

Iron Planer, Lathe, Drill, and other machine tools of modern design. New Haven Mfg. Co., New Haven, Conn.

If an invention has not been patented in the United States for more than one year, it may still be patented in Canada. Cost for Canadian patent, \$40. Various other foreign patents may also be obtained. For instructions address Munn & Co., SCIENTIFIC AMERICAN patent agency, 361 Broadway, New York.

Grimshaw.—Steam Engine Catechism.—A series of thoroughly Practical Questions and Answers arranged so as to give to a Young Engineer just the information required to fit him for properly running an engine. By Robert Grimshaw. 18mo, cloth, \$1.00. For sale by Munn & Co., 361 Broadway, N. Y.

Supplement Catalogue.—Persons in pursuit of information of any special engineering, mechanical, or scientific subject, can have catalogue of contents of the SCIENTIFIC AMERICAN SUPPLEMENT sent to them free. The SUPPLEMENT contains lengthy articles embracing the whole range of engineering, mechanics, and physical science. Address Munn & Co., Publishers, New York.

Planing and Matching Machines. All kinds Wood Working Machinery. C. B. Rogers & Co., Norwich, Conn.

Nystrom's Mechanics.—A pocket book of mechanics and engineering, containing a memorandum of facts and connection of practice and theory, by J. W. Nystrom, C.E., 18th edition, revised and greatly enlarged, plates. 12mo, roan tuck. Price, \$3.50. For sale by Munn & Co., 361 Broadway, New York city.

Hercules Lacing and Superior Leather Belting made by Page Belting Co., Concord, N. H. See adv. page 80.

Combination Pliers, Gas Pliers, Wire Cutters, Wrench and Screwdriver combined. Billings & Spencer Co., Hartford, Conn.

Cushman's Chucks can be found in stock in all large cities. Send for catalogue. Cushman Chuck Co., Hartford, Conn.

The Improved Hydraulic Jacks, Punches, and Tube Expanders. R. Dudgeon, 24 Columbia St., New York.

Friction Clutch Pulleys. D. Frisbie & Co., N.Y. city.

Veneer Machines, with latest improvements. Farrel Fdry. & Mach. Co., Ansonia, Conn. Send for circular.

Tight and Slack Barrel Machinery a specialty. John Greenwood & Co., Rochester, N.Y. See illus. adv., p. 28.

Iron and Steel Wire, Wire Rope, Wire Rope Tramways. Trenton Iron Company, Trenton, N. J.

Brass and Iron Working Machinery, Die Sinkers, and Screw Machines. Warner & Swasey, Cleveland, O.

The Dead Cannot be Raised, nor if your lungs are badly wasted away can you be cured by the use of Dr. Pierce's "Golden Medical Discovery." It is, however, unequalled as a tonic, alterative, and nutritive, and readily cures the most obstinate cases of bronchitis, coughs, colds, and incipient consumption, far surpassing in efficacy cod liver oil. Send ten cents in stamps for Dr. Pierce's pamphlet on Consumption and kindred affections. Address World's Dispensary Medical Association, Buffalo, N. Y.

Notes & Queries

HINTS TO CORRESPONDENTS.

Names and Address must accompany all letters, or no attention will be paid thereto. This is for our information, and not for publication.

References to former articles or answers should give date of paper and page or number of question. Inquiries not answered in reasonable time should be repeated; correspondents will bear in mind that some answers require not a little research, and, though we endeavor to reply to all, either by letter or in this department, each must take his turn.

Special Written Information on matters of personal rather than general interest cannot be expected without remuneration.

Scientific American Supplements referred to may be had at the office. Price 10 cents each. Books referred to promptly supplied on receipt of price.

Minerals sent for examination should be distinctly marked or labeled.

(1) H. A. L. asks: Does the strength of an electro-magnet depend partly upon the amount of wire upon it, as well as upon the battery? A. Yes.

(2) E. A. M. asks: What is used to color lace ecru? A. Dip it in a solution of coffee.

(3) J. B. W.—Hard wood lumber should not be kiln-dried until marketed and ready for use. It is less liable to crack or become shaky after being cut to required size for use. Wagon and car builders have their own kilns, heated by steam, which is essential for perfect kiln drying. Such a plant may cost from one to two thousand dollars. We recommend you to correspond with lumber dealers in regard to establishing a trade.

(4) T. A. R.—Two to 3 inches in depth is considered a very heavy fall of water in a single storm. Instances have been known of much greater rainfalls. Have experienced a fall of 10 inches in one week in Illinois. A barrel might give a rough estimate of the depth of a heavy rainfall.

(5) S. S. desires a recipe for Worcester-shire sauce. A. Mix together 1 1/2 gallons white wine vinegar, 1 gallon walnut catsup, 1 gallon mushroom catsup, 1/2 gallon Madeira wine, 1/2 gallon Canton soy, 2 1/2 pounds moist sugar, 19 ounces salt, 3 ounces powdered capsicum, 1 1/2 ounces each of pimento and coriander, 1 1/2 ounces chutney, 1/2 ounce each of cloves, mace, and cinnamon, and 6 1/2 drachms asafoetida dissolved in 1 pint brandy 20 above proof. Boil 2 pounds hog's liver for 12 hours in 1 gallon of water, adding water as required to keep the quantity; then mix the boiled liver thoroughly with the water; strain it through a coarse sieve. Add this to the sauce.

(6) L. V. A. asks: What amount of air per minute will be displaced by a parachute falling with 100 pound weight attached? The amount of air displaced in one minute depends somewhat upon the size and weight of the parachute. If the whole weighed 100 pounds, it would descend with the velocity of the wind moving under that pressure for a given area. It is known that air moving at a velocity of 3,960 feet per minute exerts a pressure of 10 pounds per square foot. Then if your parachute weighing 100 pounds had 10 square feet area, it would fall when near the earth at the rate of 3,960 feet per minute, and would displace 39,600 cubic feet of air per minute. Increasing the area of the parachute 10 times, or equal to 100 square feet, would proportionally reduce the speed and displacement. This is for the density of air near the earth; higher up, the speed and displacement would be greater. This unequal density has been the cause of disasters in parachute descents. The velocity gained in the upper rare atmosphere, when met by the lower and denser atmosphere, has made the resistance so great as to collapse the parachute with fatal effect.

(7) W. W. S. asks: Will you inform me, through your valuable paper, of some preparation that will be cooling, to take the place of ice, that will rise as filling between two concentric boxes? A. One pound nitrate of ammonia to two or three pounds water is the best of the simple mixtures for producing cold, where no ice or snow is to be used.

(8) C. V. H. asks: Can you inform me through your Notes and Queries column the probable number of arc electric lamps in use in the United States? A. A little over a year ago the number was estimated, in an address by W. H. Preece, F.C.S., at 90,000. Since that period, assuming that estimate to be correct, they have probably passed 100,000. The American Electrical Directory for 1885 gives for isolated plants alone upward of 10,000 arc lamps.

(9) J. J. K. asks: Is there any way of removing the wrinkles from a person's forehead who has just passed his 21st birthday? A. The wrinkles are doubtless a natural formation, and cannot be removed. 2. What is the Irish population of the world? A. The Irish population of the world, native born, is probably under eight millions; many people make the figures very much larger, but it is by counting as Irish the children of Irish parents born in other countries than Ireland.

(10) C. C. C. asks: 1. How can I make a cell battery strong enough to kill a cat, not to be too expensive? A. You need an induction coil like the one shown in SUPPLEMENT, No. 160, but more powerful, or a battery of Leyden jars charged by an electric machine. 2. What is bird lime, how is it made, and about what is it worth? A. a. By boiling the innergreen bark of the holly (Ilex aquifolium), and allowing it to stand 14 days to ferment. b. By boiling and then igniting linseed oil, or by boiling down varnish until thick and rosy. Care must be taken not to cause a conflagration. 3. What is animal magnetism, and when was it first noticed? A. No one knows. It is probably a mistaken term. It came into vogue in 1775. 4. What and where is the largest cannon in the world, and how far will it shoot? A. De Bange's new gun, described in SCIENTIFIC AMERICAN, vol. liii., No. 1, has, it is said, a range of 11 miles. For comparative sizes of large guns, see SCIENTIFIC AMERICAN SUPPLEMENT, No. 510.

(11) J. H. McN. asks: Is there any known fluid capable of carbonizing paper, or converting it into a conductor of electricity, that is not dangerous to handle? A. In general terms, there is not. Dilute sulphuric acid applied to paper and the latter exposed to heat will carbonize the paper to a certain extent.

(12) L. R. L. asks: 1. What is the velocity of light per second as computed by the best authorities? A. Recent determinations give light a velocity of 185,420 miles per second (Cornu), or 186,380 miles per second (Michelson). 2. What is the velocity of electricity per second, as computed by the best authorities? A. The velocity of electricity for transmission by wire varies from 18,400 miles per second for dynamic electricity to 288,000 per second for static electricity. For submarine cable it depends on the construction, capacity, etc., of the cable, when a direct battery connection is used.

(13) A. W. B. asks whether the free use of common salt at meals is injurious to the teeth. A. No.

(14) Tilsonburg asks: How many methods are there of connecting the wires on the armature, the field magnets, and the line, and what is the object and effect of each? Where can the insulated wire be procured? Will strips of copper ribbon suit for armature and field magnets? A. In general, three methods: a. By carrying the same wire around the armature and then around the field. b. By dividing the wire as it leaves the armature, and carrying part around the field and using the rest for the line. c. Combinations of methods are sometimes used, called compound windings, which are of many kinds. In first method, resistance in the field reduces the strength of the field, and thereby reduces the current strength. In second method, reverse is the case. Insulated wire is sold by all electrical supply dealers. Wire is generally used in preference to strips.

(15) O. L.—The term "trap" is used somewhat loosely in geology to designate several varieties of basic, igneous rocks. It includes dolerite, basalt, and greenstone, rocks which are similar in appearance, and which differ little in composition. In structure they are fine grained, and crystalline to granular on fracture. The color varies from a dark gray through different shades of green to black. The first, dolerite, is a mixture of labradorite (feldspar) with angite (a variety of pyroxene), and usually contains some titaniferous iron ore. Basalt is similar, but usually contains its iron ore in the form of magnetite. Small green crystals of olivine (silicate of iron and magnesia) are also found scattered throughout the mass. The greenstones are composed of feldspar and hornblende, with generally some admixture of chlorite (a silicate of magnesia). Trap occurs as a dike breaking through the other formations, and not infrequently connected with a level overflow. It is found in a number of localities in the Rocky Mountains and the far West. Also in the East, in Pennsylvania, New Jersey, and other localities, but has never been found near Louisville.

(16) R. Z. asks: 1. Has the United States Postal Department ever offered any inducements for a stamp or method of canceling stamps on letters more efficient than the methods now in use? A. We think not. 2. Are envelopes folded and gummed at the same operation of machine in making? A. Yes.

(17) H. L. E. writes: I have a large English clock which was imported about 50 years ago. Whenever the weights get down to the pendulum, they begin to move, but not keeping regular time with the pendulum. Can you explain this? A. The weight vibrates in a sympathetic manner, but in its own time, from the action of the pendulum upon the air in the case, so that, when the weight reaches the level of the pendulum bob, the air partakes of a vortex motion, which sets the weight also in motion. If the weight was hung at exactly the same height as the pendulum, they would swing together. The phenomenon has long been observed, and is often illustrated by the synchronous vibration of musical instruments.

(18) D. F. writes: 1. A boiler is tested by cold water pressure up to 120 pounds. To what steam pressure is that equivalent? A. 75 pounds pressure allowed. 2. To what height can water be forced by a hydraulic ram, the fall from the supply to the pump being 6 feet? A. From 60 to 100 feet, delivery decreasing with increase of height. You may utilize 40 per cent of the whole flow at 60 feet.

(19) R. E. M. writes: What size overshot wheel do I need, having 4 feet fall of water, to make two horse power, said power to be transmitted 150 feet? A. You will require an overshot wheel of 4 feet in diameter, 6 feet wide, with buckets to carry the water from the spill or weir 6 inches deep by 6 feet wide, allowing for waste, and 6 inch wallow in tailrace. For friction and transmission by shafting, add 1 foot to width of wheel and weir, making it 7 feet wide.

(20) R. H. K. desires a recipe for a shaving soap which will soften the beard in cold water, and will remain for a good while on the face. A. We would advise you to try the following shaving cream.

- Take of:
- Curd soap..... 8 ounces.
- Almond oil..... 2 "
- Glycerine..... 1 "
- Spermaceti..... 1/2 "
- Carbonate of potassium..... 1/4 "
- Water..... 16 "

Cut the curd soap into shreds, and dissolve it by the aid of a water bath in 14 ounces of water. Dissolve the spermaceti in the almond oil, and while warm mix it with glycerine, potash, and remainder of the water; transfer to a warm mortar, gradually and steadily incorporate the warm soap solution, and continue to stir until a smooth paste is formed. With this incorporate a suitable perfume.

(21) M. H.—Vacuum has but one technical meaning, void space, with neither gas, air, nor solids within its boundaries. It can be produced artificially as to air to less than a millionth of its volume.

(22) J. H. S. asks the diameter of a screw for a propeller to steam 30 miles an hour, and the rule for finding the diameter of any screw to propel a vessel at any rate. A. See SCIENTIFIC AMERICAN SUPPLEMENT, Nos. 278, 181, 101, 308.

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