

RECENTLY PATENTED INVENTIONS.

Engineering.

WIND JACKET FOR BLAST FURNACES.

—Louis B. Walker and John Murphy, Globe, Arizona. According to this invention a wind jacket surrounds the crucible, there being above the jacket a wind box from which lead tuyeres, while a blast supply pipe is so connected with the wind box that the air will be caused to travel around the crucible in the wind jacket and then pass upward to the wind box and the tuyeres, whereby the blast will be heated previous to entering the wind box and at the same time keep the crucible cool to prevent overheating and save wear and tear on the furnace.

ANGLE PLATE FOR BOILER FRONTS.—

George Fox, New York City. This is an improvement in hollow arches or fronts for steam boilers and boiler fire boxes, the hollow water front being constructed, according to this invention, in right-angular form, and arranged to cover a portion of the top of the fire box, and all of its end above the grate, save the door space. With this improved angle front it is also unnecessary to place any mason work between the front and the grate bars or furnace.

Mechanical.

WRENCH.—Herrmann Krebs, San Pedro, Cal.

This is an improvement in what are known as alligator wrenches, and is especially adapted as a pipe wrench. The fixed jaw forms a portion of the handle, which has a longitudinal channel and a transverse opening, while the second jaw has an extension turning in a recess in the fixed jaw, whereby the second jaw is fulcrumed, an adjusting screw revolving in the channel of the body having a head entering the opening in the body of the pivoted jaw, the screw being manipulated by an adjusting nut. The tool has but few parts, is strongly made and easily operated.

NUT LOCK.—Henry J. Van Nest, Florence, Col.

According to this invention a swinging key is provided with a projecting screw thread section on its face and with an attached branch spring on one side, and also with a lug adapted to enter a hole in the nut to which it is applied, to prevent or lock a nut from unscrewing on its screw bolt, stud or rod, by friction against or biting into the thread, freely allowing the nut to be turned in the other direction to screw it up.

TENSION DEVICE FOR SPINNING FRAMES.—Robert Atherton, Paterson, N. J.

This is an attachment whereby the tension between the drum and spindles is automatically adjusted, and changes in the length of the spindle driving bands is instantly compensated for. It also provides reliable means for giving a uniform speed to series of spindles on the spinning frame, avoiding excessive tension in the driving belts, and reducing to a minimum the friction of the spindles in their supporting bolsters.

Agricultural.

GRAIN SEPARATOR.—Joseph H. Cretzer, Newcomerstown, Ohio.

This is an improvement upon a formerly patented invention of the same inventor, providing guides for the driving rods or pitmen of the screen, in the location of the gearing, the shape of the valves in the various flues or ducts of the machine, and in the construction of the deflector carried by the machine, the deflector being made in sections, one section having yielding or adjustable connection with the other. The construction of an upper air flue, directing air above the screen, is such as to give the machine power, by condensation and pressure, to work with uniformity and separate any kind of grain or seed, whether light or heavy.

CHURN.—James P. Bolding, Forney, Texas.

This churn comprises a platform carried by a post which may be turned, there being on the platform a vessel in which is a dasher turned by a shaft on which is wound a band, a lever being connected at opposite sides of its fulcrum with the inclined ends of the band. By the operator swinging the lever forward and backward rotary motion is given to the shaft, turning the dasher, by which the churning is quickly effected.

SUGAR CANE TRANSFERRING DEVICE.—

Christian D. Armstrong, St. Bernard, La. To conveniently and easily transfer the cane from the field wagons to the cars running to the mill, this inventor has devised a platform with flanged extension pivoted to a post, a shaft above the platform carrying drums with ropes connecting with the side of the platform opposite the extension, while a hoisting drum on one end of the shaft is connected by a rope with a draught beam. The platform normally rests on the ground, so that field wagons may drive on it to dump the cane.

ELEVATOR.—William H. McCoy, Los Angeles, Cal.

This is a vacuum elevator, more especially designed to raise water for irrigating or other purposes. It has cylindrical water receptacles connected with a water supply, a steam cylinder connected with the receptacles, with a piston admitting steam alternately, and pipes connecting the receptacles with the ends of the steam cylinder, while the valves controlling the admission of water to the pipes are controlled by the rise and fall of the water in the receptacles, one receptacle being filled while the other discharges, and vacuums being alternately formed after the water is discharged to draw a new supply into each receptacle.

CAMERA SHUTTER.—William J. McCollom, Swaledale, Iowa.

This is a simple and inexpensive shutter to be used with an ordinary camera. It is arranged to close from around the lens tube toward the center and open in the reverse direction, thus preserving the circular shape of the lens opening and preventing the light from striking unevenly on the sensitive plate. It has but few moving parts, moving with but little friction, the parts being counterbalanced to be operated with great facility, and pneumatic means being provided for opening and closing the shutter.

CONDENSER AND DRIP FOR GAS SERVICE PIPES.—

Albert H. Gindele, Jersey City, N. J. Between the gas meter and the service pipe is a condenser which has spaced baffle plates projecting from opposite

sides, and has its upper end connected with the meter pipe, while a fitting secured to the service pipe and to the lower end of the condenser is provided with a drip chamber in its lower portion. The device is designed to arrest the water of condensation that may be in illuminating gas carried into house service pipes, and prevent the deposition of condensed water in the meter.

DATING AND STAMP CANCELING MACHINE.—

James B. McElrath, Centre, Ala. This is an inexpensive machine, adapted to be operated by foot power or other means, for rapidly dating and canceling postage stamps on letters, cards or packages. The machine will operate on letters or thin cards as effectively as on thicker packages, the mail matter operated upon being discharged from the machine in a box-like space at its rear, to be thence transferred to the assorting tables or mail bags.

PICTURE HANGING DEVICE.—

Henry Redmond, New York City. The body of this device consists of a socket attached to one end of a pole, there being at one side arms for manipulating the cord or wire of the picture frame, whereby one, without the assistance of a step ladder, may readily hang a picture or remove one from the wall. The implement may also be employed to readily place in position in the wall a picture hook, or other similar support, or readily remove such support from the wall.

SLIDING WINDOW OR DOOR.—

Carl Summermann, Munster, Germany. This invention provides a horizontally sliding and air-tight closing sash, casement or door for windows, etc., which may be readily opened without interfering with curtains or anything on the window sill. The sash is adapted to travel on an essentially horizontal guideway, having portions that deviate vertically and laterally from the main portion of the guideway, whereby the sash is brought tightly against the frame when the door or window is nearly closed.

GATE.—

John P. Van Nada, Petersburg, Ind. This is an improvement upon a formerly patented invention for swing gates, whereby levers will be dispensed with, and a simple and economic opening device provided, which may be conveniently operated from either side. In opening or closing the gate the operator is, by this improvement, relieved of considerable of the weight of the gate.

FOLDING CRIB.—

Sarah C. Neal, New York City. This crib is composed of a skeleton frame to which is attached a pendent netting of canvas or similar material. The bottom of the body is usually made in two sections connected by a hinge, the bottom of the body being upholstered, or a sectional mattress being employed if desired.

POCKETBOOK FRAME, ETC.—

Louis B. Prahar, Brooklyn, N. Y. This inventor has designed an improvement in corners or frames for pocketbooks, book covers, etc., whereby the frame or corner is made in two sections, a body section and a binding section, employing two differently colored metals at a minimum cost, but so that when the frame is in position upon the article it will have the appearance of a one-piece frame.

SCALPEL.—

Joshua W. Jones, New York City. In the construction of this implement the blade is so formed that it has a cutting surface at the heel and at the point, in addition to the ordinary cutting surface, the cutting surface at the point being carried a certain distance along the back, and there being no angles in the heel and point cutting surfaces.

NOTE.—Copies of any of the above patents will be furnished by Munn & Co., for 25 cents each. Please send name of the patentee, title of invention, and date of this paper.

NEW BOOKS AND PUBLICATIONS.

HOW TO BECOME A SUCCESSFUL ELECTRICIAN. By T. O'Connor Sloane, Ph.D. New York: N. W. Henley & Co. 1894. Pp. 159. Price \$1.

This work is designed for the numerous class of young men who desire to enter the electrical field, yet who feel unable to take a regular college course. Its object is to indicate a course of study which can be followed by the graduate of the workshop and of the public school, the point being repeatedly made that a little thoroughly learned is worth more than a great deal that is merely skimmed over. Mathematics, physics, chemistry, mechanical engineering, and drawing, each receive a chapter, in which the minimum amount that should be well learned is given, and the advisability of learning more is pointed out. Electrical work at home, factory and shop work for students, and college education are examples of other topics. The different fields of work are depicted, the art of inventing, original investigation and reading are other chapter subjects. The chapters on success and ethics give the broad view of how a professional man should regulate his conduct. The book will be warmly received, and we trust will fill what has long been an urgent need in the literature of the profession.

PHOTOGRAPHISCHES NOTIZ- UND NACHSCHLAGEBUCH FÜR DIE PRAXIS. Von Ludwig David und Charles Scolik. Mit 7 Kunstbeilagen. Vierte umgearbeitete Auflage. Halle a. S.: Druck und Verlag von Wilhelm Knapp. 1894. Pp. xvi, 221.

As we have before had occasion to say in noticing this annual publication, it is distinguished by the most beautiful examples of photographic work, in themselves enough to entitle the volume to especial consideration by the photographer. It contains numerous formulae and pages for notes, and is in very convenient shape. It is an excellent example for its type of publication.

SIMPLE EXPERIMENTS FOR SCIENCE TEACHING. By John A. Bower. London: Society for Promoting Christian Knowledge. New York: E. & J. B. Young. 1894. Pp. 164. No index.

This attractively printed little work is in one respect sad, as it is designed for one of the multifarious sharply defined English courses. It is, in other words, written to

enable students to pass a definite examination. This of course limits the treatment of the subject and to that extent impairs its value from the more enlightened standpoint of general literary value. It is divided into twenty lessons each of ten experiments, and the experiments are so simple as to be easily performed. The author in his efforts to treat the subject familiarly uses terms which would be better excluded. Nothing is gained by calling carbon dioxide chalk gas. Other minor inaccuracies may be noted, such as speaking of the action of a lime kiln or limestone as one of simple ignition, leaving out of account the reducing action of the carbon of the fuel. There is an index of cuts, but no general index.

THE GEM ENCYCLOPEDIA. Chicago: Laird & Lee. Pp. 448. Flexible cloth 25 cents, stiff cloth 50 cents. No index.

The least that can be said of this little compendium is that it gives an immense amount of information for the price and for its size. How any item is to be found without an index is one of the things that surpasses the understanding; the book however may fill many a half hour of leisure time.

THE CENTURY MAGAZINE. November, 1893, to April, 1894. The Century Company, New York.

The semi-annual volumes of this most richly illustrated of magazines are always a delight, for one hardly realizes, in looking over the current numbers, month by month, what a wealth of interesting reading matter, some of it of the highest permanent value, is accumulated, in a form to make an exceedingly attractive addition to any library. Among some of the notable features of the last volume are original papers and pictures of the great Napoleon, Bible Exploration and the Assyrian Monuments, a series of articles on Abraham Lincoln and on James Russell Lowell, Bismarck at Friedrichsruhe, Earthquakes and how to Measure them, Conkling and Garfield, a Pilgrimage to Lourdes, a number of papers on great musicians, and another series on great painters, the illustrations in each case being supplied with a lavish hand, and the printing in the exquisitely beautiful style of the De Vinne Press.

SCIENTIFIC AMERICAN BUILDING EDITION.

JUNE, 1894.—(No. 104.)

TABLE OF CONTENTS.

- Elegant plate in colors showing a cottage at Rochelle Park, recently completed for Dr. N. M. Beckwith. Floor plans and two perspective elevations. Cost complete \$11,000. Mr. G. K. Thompson, architect, New York. A very unique design in the old Dutch style of architecture.
- Plate in colors showing a handsome residence at Evanston, Ill., recently completed for H. D. Cable, Esq. Two perspective views and floor plans. Messrs. Raeder, Coffin & Crocker, architects, Chicago, Ill. An elegant design.
- An attractive residence at Hartford, Conn., recently completed for Albert S. Cook, Esq. Cost \$7,500 complete. Mr. A. U. Scoville, architect, Hartford, Conn. A pleasing and attractive design, two perspective views and floor plans.
- Perspective elevations and floor plans of a residence at Portchester, N. Y., recently erected for William Mertz, Esq. The design is severely classic in its treatment and illustrates the American progress in architecture. Mr. Carl Volz, architect, New York.
- A residence in the colonial style recently erected at Ashbourne, Pa., for Addison Foster, Esq. Perspective elevation and floor plans. Estimated cost \$5,500. Mr. Samuel Milligan, architect, Philadelphia, Pa.
- A residence at Freeport, L. I., recently completed for J. E. Brown, Esq. Perspective elevations and floor plans. Cost complete \$6,950. An attractive design.
- The dwelling of J. S. Benner, Esq., at Reading, Pa. Three perspective views and floor plans. Mr. Geo. P. Barber, architect, Knoxville, Tenn.
- A colonial cottage recently completed for Howell E. Beane, Esq., at Ashbourne, Pa. Cost \$4,000. Perspective elevation and floor plans. Mr. Horace Trumbauer, architect, Philadelphia, Pa.
- Perspective elevations and floor plans of a cottage recently erected for A. P. Dunn, Esq., at Lowere, N. Y. An elegant and attractive design. Cost complete \$3,800. Mr. R. H. Duryea, architect, New York.
- California Midwinter Fair. Half page engraving, showing a bird's eye view, the Mechanic Arts Building; also a view of the Fine Arts Building.
- Miscellaneous Contents: Damage to water pipes by electrolytic action.—Red slate.—Treating stones for construction.—Metal plated lumber.—Damage by lightning.—Gas from wood.—The steel-clad bathtub, illustrated.—An attractive greenhouse, illustrated.—The band saw.—The "Grand" fireplace heater, illustrated.—Fly screens, illustrated.—The Norris patent sash pulley, illustrated.—Glutol.—The Ivessash lock, illustrated.—Interior finish of the home.—The Peerless steam and hot water heater, illustrated.—Reproducing architects' drawings.—Corright metal roofing shingles, illustrated.—A fine metalwork arch, illustrated.

The Scientific American Architects and Builders Edition is issued monthly. \$2.50 a year. Single copies, 25 cents. Forty large quarto pages, equal to about two hundred ordinary book pages; forming, practically, a large and splendid MAGAZINE OF ARCHITECTURE, richly adorned with elegant plates in colors and with fine engravings, illustrating the most interesting examples of Modern Architectural Construction and allied subjects.

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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 the following week's issue.

"U. S." metal polish. Indianapolis. Samples free.

Heading machinery. Trevor Mfg. Co., Lockport, N. Y. Air compressors for every possible duty. Clayton Air Compressor Works, 26 Cortlandt Street, New York.

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

Nickel-in-slot machines perfected and manufactured Electrical supplies, Waite Mfg. Co., Bridgeport, Conn.

Screw machines, milling machines, and drill presses. The Garvin Mach. Co., Laight and Canal Sts., New York.

Centrifugal Pumps for paper and pulp mills. Irrigating and sand pumping plants. Irvin Van Wie, Syracuse, N. Y.

Wanted—2d-hand hand rock drilling machine cheap. Also differential blocks or hoist. Box 124, Montpelier, Vt.

Emerson, Smith & Co., Ltd., Beaver Falls, Pa., will send Sawyer's Hand Book on Circulars and Band Saws free to any address.

Split Pulleys at Low prices, and of same strength and appearance as Whole Pulleys. Yocom & Son's Shafting Works, Drinker St., Philadelphia, Pa.

The Carter Pressure Water Filter and Purifier, for hotels, factories, etc. See illustrated adv., page 335. Field Force Pump Co., Lockport, N. Y.

The best book for electricians and beginners in electricity is "Experimental Science," by Geo. M. Hopkins. By mail, \$4; Munn & Co., publishers, 361 Broadway, N. Y.

Patent Electric Vise. What is claimed, is time saving. No turning of handle to bring jaws to the work, simply one sliding movement. Capital Mach. Tool Co., Auburn, N. Y.

Patent for Sale—Electrically operated mechanism for feeding and watering live stock. Patented May 15, 1894. See Scientific American of June 2, page 341. Address A. C. Winch, Saxonville, Mass.

Competent persons who desire agencies for a new popular book of ready sale, with handsome profit, may apply to Munn & Co., Scientific American office, 361 Broadway, New York.

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.

Buyers wishing to purchase any article not advertised in our columns will be furnished with addresses of houses manufacturing or carrying the same.

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.

(6071) J. F. F. says: Can you give me a recipe for a hypo-eliminator? I would like something that I would only have to give the negative a few changes of water after using.

A. Peroxide of hydrogen (20 vol.) 1 dram.
Water 5 oz.

After washing the negative well it is immersed for a couple of minutes in the solution and again rinsed in water, when the intensification with silver can be at once proceeded with. 2. Where peroxide of hydrogen is not obtainable the following may be used as a substitute, the solution containing that substance in combination with others:

Barium dioxide 1 oz.
Glacial acetic acid 1 "
Water 4 "

Reduce the barium dioxide to a fine powder and add it gradually to the acid and water, shaking until dissolved. A few minutes' immersion in this solution will effectually remove or destroy the last traces of hypo.

(6072) F. R. S. asks for a process for making benzine or turpentine asphaltum from crude coal tar. A. Benzol or benzene is obtained as one of the products of distillation of coal tar. Benzene is a product of petroleum. Wagner's "Chemical Technology," price \$7.50, describes the process of distilling coal tar in detail, and illustrations of the stills and refining or purifying apparatus are also given. The process is too complicated to describe by letter.

(6073) B. F. D. writes: What means have been employed to demonstrate that the seven colors of the spectrum when united will produce white? A. You will find some very elegant experimental demonstrations of this fact in "Experimental Science," by George M. Hopkins, \$4 by mail.

(6074) F. M. says: Please give a receipt in Notes and Queries for an acid mixture to clean brass gas fixtures, etc. A. The government method prescribed for cleaning brass, and in use at all the United States arsenals, is claimed to be the best in the world. The plan is to make a mixture of 1 part common nitric acid and 1/2 part sulphuric acid, in a stone jar, having also ready a pail of fresh water and a box of sawdust. The articles to be treated are dipped into the acid, then removed into the water, and finally rubbed with sawdust. This immediately changes them to a brilliant color. If the brass has become greasy, it is first dipped in a strong solution of potash and soda in warm water; this cuts the grease, so that the acid has free power to act.

(6075) E. H. B. asks: What is the board measure feet of lumber in a telegraph pole 30 feet long, 8 inches square at one end, and 4x5 inches at the other? Also the later problem: A column of soldiers 25 miles

long march 25 miles, so that at the halt the rear man comes to where the front man started from. At the start a courier rides from the rear to the front, and returns to the rear, reaching it (25 miles ahead from where he started) just as the column halted, all movement being at uniform rate. How far did the courier ride? A. Rule for contents of taper timber: To the sum of areas of the two ends add four times the area of the middle section. Multiply this sum by one sixth of the length. If in inches, divide by 144 for board measure. The pole contains 100 feet board measure. The courier rode 42.67 miles to reach the head of the column and 17.68 miles returning to the foot, in all 60.35 miles.

(6076) A. E. R. asks: What must the diameters of the cylinders of a compound engine be, that the sizes of the cylinders will be as 1 is to 4, and the two to have the same horse power as a simple engine with a cylinder 26 inches in diameter, the same pressure of steam in each case? A. The high pressure cylinder should be 13 1/2 inches diameter, low pressure cylinder 36 1/4 inches diameter.

(6077) J. B. G. says: Can you tell me through the SCIENTIFIC AMERICAN the name of this insect and how to stop its work? A. Reply by Prof. C. V. Riley.—The specimens sent by your correspondent prove to be *Lyctus striatus*, which is the commonest and most widely distributed of our so-called powder post beetles. These beetles and their larvae are known to live and tunnel in the branches or trunks of dead trees, in telegraph poles, household furniture, wooden handles of tools or agricultural implements, etc. In the case of their emergence from furniture, oviposition has taken place while the boards were still in the lumber yard or while the felled tree was still on the ground. It is also pretty certain that the insects pair and multiply within furniture for several generations, and that only a portion of the beetles issue through the holes bored by them. If a large and heavy piece of furniture, e. g., a bureau, is infested, the destruction of the larvae and beetles is next to impossible without materially injuring the bureau. The only thing that can be recommended is a liberal and frequent application of common kerosene by means of a rag or a brush. A portion of the oil will penetrate into the wood, through the holes made by the issuing beetles, and will at least kill many of the larvae and beetles that are still working within the wood.

(6078) W. McC. asks: What flux should be used in soldering copper wires for electrical purposes with soft solder that will not cause the wires to corrode? A. Resin is the best flux for soft soldering for the purpose stated.

(6079) P. J. K. asks: Is there any way to harden steel? For example, plow shares, so that one side is hardened while the other remains soft. A. We call to mind no satisfactory way of hardening the face side of steel plow shares. In attempting to do so the plates are apt to warp and spring out of shape.

(6080) C. W. C.—A solid bar is stronger than a tube of the same outside diameter.

(6081) C. D. R. asks: 1. I would like to know the difference between a dynamo which gives a current of 52 volts and lights 2 sixteen candle power incandescent lamps and one of 110 volts that lights the same number of lamps? A. There is no such thing as a current of 52 volts. A dynamo of given winding may maintain this potential. To increase the potential to 110 volts the simplest plan is to use finer wire and more turns on the armature. 2. When a dynamo is charging a storage battery what prevents said battery from running dynamo as a motor when it has acquired a sufficient current? A. As long as the potential maintained by the dynamo exceeds that which the battery can produce, the battery will take current from the dynamo. If the dynamo is disconnected from the power shaft, the battery will run it as a motor. 3. How can you tell when a Leyden jar is fully charged? A. By connecting to a graduated electroscopie and charging until the potential ceases to rise. 4. Would a battery of several rods of electric light carbons and a hollow cylinder of zinc for electrodes, with an exciting solution of sal-ammoniac, give satisfactory results on open circuit work? If not, how can it be improved? A. Yes; but the better plan is to use a very large carbon surface. A single rod of zinc is enough for eight or ten carbons.

(6082) A. H. M. writes: I have three American accumulators, 150 ampere hours capacity each, giving a pressure of 2 volts each. I wish to run a 1/2 horse power 6 volt motor with them with best results as to strength of motor. Is it proper to connect cells in series? How long will cells run motor continuously at full load? A. Connect in series. They will run the motor for ten hours. 2. I wish to charge cells with arc light circuit of 10 amperes. Should cells be thrown into arc circuit in series? How long will it take to charge them? What is the formula for above question? A. You cannot do this with safety. We advise you not to attempt it. Allow 5 amperes charging current for each square foot of positive plate. 3. Is it best to charge them to their full capacity each time they are thrown into the arc circuit, or could they be thrown in and out according to convenience? A. You can work either way. It is best to charge them up to full capacity frequently.

(6083) A. L. J. asks: 1. Please state the object of placing an induction coil in circuit of long telephone lines, since as the E. M. F. increases, the current strength must decrease. A. It gives high voltage for the circuit external to the induction coil. 2. Is the temperature of the electric arc higher than that obtained with largest burning glasses? A. Yes. 3. I ran a current from battery through a short coil galvanometer with astatic needle. After stopping current, the needle did not point north. What was the cause? A. The needle was so perfectly astatic that there was not enough polarity to move it. 4. In the electrolysis of water why do not carbon electrodes succeed instead of platinum? A. Their porousness might make them retain some gas. Iron or copper electrodes in caustic alkali solution are excellent. 5. In electroplating a spoon, for instance, which are the electrodes, the spoon and the piece of metal to be deposited, or the two rods, connected to battery, from which they are suspended? A. The spoon and piece of metal. 6. What are the differences in electromotive force, current strength, and resistance of a circuit in

which a motor is included, when the motor is stopped and when running? A. The electromotive force is the same except for the armature, which generates counter electromotive force. If the armature is not allowed to rotate, the current strength increases.

(6084) G. H. S. writes: I have recently constructed a simple electric motor and large bichromate of soda battery described in your valuable book, "Experimental Science." At first 4 cells would run the motor, but after a short time the whole 8 would not work it. I used in solution a saturated solution of bichromate of soda and added sulphuric acid to one-fifth volume. If depolarization is the trouble, why should it depolarize so quick? I never used it half an hour. What is the best way to depolarize? Is it necessary to amalgamate the zincs? Mine are cast and have some blow holes which will not take the mercury. The zincs get covered with a scaly substance which prevents the action of the acid on the zinc. At first the action was so strong that it made the solution quite warm and made quite a strong smell. The solution was a little warm at first. Kindly put me on the right track. A. Your entire trouble is due to bad amalgamation of your zincs. The production of heat and of an odor shows a destructive and useless action and proves that the amalgamation is imperfect. You will have no satisfaction until you attend to this.

(6085) G. M. H. says: Will you please inform me through your Notes and Queries column how to make printing press rollers? A. To 8 pounds transparent glue add enough cold water to cover it; let it stand with occasional stirring seven or eight hours. After twenty-four hours, all the water should be absorbed. Heat it in a water bath, remove from fire, and add 7 pounds molasses that has been made quite hot. Heat, with frequent stirring, for half an hour. The moulds should be clean and greased. Pour into moulds after it has cooled a little, and allow to stand eight or ten hours in winter, longer in summer.

(6086) W. C. C. writes: Will you kindly decide the following dispute? A states that a bullet fired from a rifle straight into the air will reach on its return the point of departure with the same velocity with which it left the muzzle of the gun. B says that possibly this is true in theory, but not in practice, else why will a bullet on being fired from a gun pass through resisting bodies which it cannot penetrate if dropped from a height equal to that attained by the missile when discharged from the gun? A. The theory of the vertical projection of a bullet and its final velocity is derived from the unimpeded speed due to a vacuum and gravity. In practice the resistance of the air impedes the velocity of the bullet in both its upward and downward flight, the return impact being much less than the muzzle impact.

(6087) F. H. F. asks: 1. What is the rule for determining the number of watts necessary to produce an arc light of given candle power? I understand that experts at the World's Fair decided on 450 watts for a 2,000 candle power light, 300 watts for a 1,200 candle power light; now, how can I determine the watts for a 1,500 candle power or a 1,000 candle power light? A. The rule is partly conventional, and is based on experiment. There is no rule. You can approximate by intercalation. 2. What is the relation between candle power and watts in arc lights? A. There is no fixed relation that can be stated. You can deduce an approximation from the above. 3. What book will explain the matter in detail? A. See SUPPLEMENT, Nos. 694, 695, 696, for general articles on the subject; price 10 cents each by mail.

(6088) R. C. F. asks: 1. Will you give me a formula for preventing Dotype prints from curling up when I do not desire to mount them? A. After washing, dry off the water with blotters, then place the prints in pairs face to face between sheets of straw-board or cardboard, six pairs between each board, and put a weight on top. Let them stand for three or four hours or until dry. Each unmounted print will then remain flat. 2. How can I keep film negatives from curling up after development? A. After the negatives are washed immerse the films for five minutes in a solution of water 1 oz., glycerine 2 minims. When dry, keep under pressure as advised for Dotype print.

(6089) J. McG. asks: 1. Can a copper vessel be used as a generator in the manufacture of hydrogen gas, or is a vessel made of sheet or boiler iron lined with lead preferable, and what should be the thickness of metal to be used in either case? A. By all means use a lead-lined vessel. Burn the joints together—do not solder. No particular thickness is required. 2. Which is the better and more economical method of generating hydrogen, that by sulphuric acid and iron filings in water or by blowing steam through heated coal? A. By the action of steam on coal you produce a quantity of carbon monoxide gas with the hydrogen. By using hot iron borings in place of coal, the steam process will give reasonably pure hydrogen. On the large scale this method is cheaper than the acid generation. 3. Give names of works on subject of generating hydrogen gas for aeronautical purposes, with prices of same. A. See SUPPLEMENT, Nos. 828, 849.

(6090) S. H. Co. write: Parties here wish to procure a magnet that metal buried underground will attract. One which will locate gold or silver. They claim there is such an instrument called "the hidden treasure seeker." Is there such an instrument manufactured, and if so, can you tell us where one can be procured? A. No such thing exists. [It is surprising that any one should expect to be able to buy apparatus of this description. If there are \$10,000,000,000 worth of treasure hidden in the earth, what would be the value of an instrument that would indicate its whereabouts? And who, owning an instrument of this kind, would part with it for any consideration whatever? The fact of offering for sale an instrument purporting to be an operative instrument for this purpose is prima facie evidence of fraud or dense ignorance. The shovel and pick, the hammer and drill, are the only treasure-seeking instruments of any value. Ore finders, divining rods, and devices of that class are delusions.—Eds.]

(6091) J. M. W., Cal., writes: Would you kindly let me know if the following is correct? In the Encyclopedia Britannica (Americanized edition, Bedford-Clarke, publishers, Chicago, 1890) it states under the

heading of "weights and measures" that the United States inch=1.00049 British inches? I always thought they were identical, and that Whitworth's standard in measuring was the same in both countries. Again, in an English work I see the grain apothecaries' weight=1.0978 grains avoirdupois, in other words, 10 grains apoth. =nearly 11 grains avoird.; in the above encyclopedia there is no difference given. Is there any difference? In coming across such discrepancies as the above, it makes one ardently hope that something will soon be done toward bringing about a "universal standard system of weights and measures." Would you mind also stating the difference between the English and American pint, quart, peck, and bushel? A. The difference in length of standard measures as stated is correct. Brown & Sharp Manufacturing Co. use the American standard. The grain has but one value, 7,000 to one pound avoirdupois or troy, in England. In the United States 7,000 to one pound avoirdupois and 5,760 to one pound troy and apothecaries' weight. The American standard measure of the gallon is 231 cubic inches. The British standard gallon is 277.274 cubic inches. The United States standard bushel is 2150.42 cubic inches. The imperial or British bushel is 2218.192 cubic inches. Divisional measures in proportion. The metric system is intended to equalize international weights and measures.

(6092) G. E. K. says: Would you please give the formula and instructions for mixing same for making Portland cement walks, drives, floors, etc.? I notice some are of a fine sand and others of a coarse nature. Also of different colors. Please explain this feature. A. English Portland cement is generally preferred. Procure a sharp, light-colored sand, and wash it free from all particles of soft earth or soil; also some stone chips, gravel, and large stone. Excavate the sidewalk about 18 inches deep, and fill in the large stone to within 6 inches of the surface; prepare a concrete made of the cement 1 part, stone chips and gravel about 6 parts, and bed it in upon the stone bottom to within 2 inches of the surface; then prepare a concrete of the cement 1 part and fine sand 2 parts, and lay it in up to the surface, floating the surface with the cement at pleasure. Finish by lining off into very regular blocks. A more economical sidewalk can be made by omitting the stone bed, but it will require a good hard soil to lay it on, and then will not be so sure of being permanent. See also SUPPLEMENT, No. 539. Sometimes finely broken stone is used in place of sand. The color can be varied by the use of oxide of iron, such as is used for metallic paint.

(6093) F. L. M. says: How should whitewash be prepared to secure best permanent results on cellar walls? Painters affect entire ignorance in the matter, and the information is difficult to obtain. A. The following coating for rough brick walls is used by the United States government for painting lighthouses, and it effectually prevents moisture from striking through: Take of fresh Rosendale cement, 3 parts, and of clean, fine sand, 1 part; mix with fresh water thoroughly. This gives a gray or granite color, dark or light, according to the color of the cement. If brick color is desired, add enough Venetian red to the mixture to produce the color. If a very light color is desired, lime may be used with the cement and sand. Care must be taken to have all the ingredients well mixed together. In applying the wash, the wall must be wet with clean fresh water, then follow immediately with the cement wash. This prevents the bricks from absorbing the water from the wash too rapidly, and gives time for the cement to set. The wash must be well stirred during the application. The mixture is to be made as thick as can be applied conveniently with a whitewash brush. It is admirably suited for brickwork, fences, etc., but it cannot be used to advantage over paint or whitewash.

(6094) E. E. D. asks: I have four 1/2 inch horse shoe magnets. How can I recharge them? A. By touching the poles to the poles of an active dynamo and removing it slowly in the line of the armature axis you can recharge a magnet. Be careful to touch the right poles, i. e., north pole of magnet to south pole of field and vice versa. 2. How can I make a magneto exploder with these magnets? A. See our SUPPLEMENT, Nos. 161 and 315. 3. How can I make an atomizing petroleum burner? A. See SUPPLEMENT, No. 569.

(6095) F. R. H. says: Can you tell me through the Notes and Queries column of your paper how carbon paper is prepared? A. Melt 10 parts lard, 1 part of beeswax, and mix with a sufficient quantity of fine lampblack. Saturate unglazed paper with this, remove excess and press.

(6096) W. T. says: Would you please give me a formula for a cement that I can cement brass ornaments to glass so they will stick tight? A. A cement for such purposes as fixing metal letters to glass windows consists of copal varnish 15 parts, drying oil 5 parts, turpentine 3 parts, oil of turpentine 2 parts, liquefied marine glue 5 parts. Melt in a water bath, and add 10 parts dry slaked lime.

(6097) W. T. writes: I have built the 8 light dynamo contained in SUPPLEMENT, No. 600, and must say it is a dandy. Have not had the least trouble with it. I made all connections and started it without any batteries, and it lit three 52 volt 16 candle power lamps at once. I have also made the hand power dynamo, and had no trouble with it. Is there a SUPPLEMENT treating on volt or ampere meters? If so, what numbers? A. Ammeters, SUPPLEMENT, Nos. 440, 603, 618, 628, 734; voltmeters, SUPPLEMENT, Nos. 353, 552, 556, 668, 734, 933.

Communications Received.

- "On a Display of Aurora Polaris." By A. W. F.
"On the White Heron." By T. H.
"On Slow Beating Pendulums." By C. R. S.
"The Great Sugar Pine." By T. H.

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INDEX OF INVENTIONS

For which Letters Patent of the United States were Granted

June 5, 1894,

AND EACH BEARING THAT DATE.

(See note at end of list about copies of these patents.)

Table listing inventions with names of inventors and patent numbers. Includes items like Acid by means of heated gases, Apparatus for concentrating sulphuric acid, Advertising apparatus, Alarm, Amalgamating machine, Ammeter, Animal trap, Annunciator, Annunciator electrical, Apparatus for supporting children, Armature for dynamo-electric machines, Autographic register, Axle box, Axle sulky plow, Baling press, Baling press, A. E. Anderson, Band cutter, Barrel head, Basket fruit, Battery, Bed, folding, Bed, winding door, Bicycle, Bicycle, C. R. Mayne, Bicycle, aquatic, Bicycle attachment, Billiard counter, Block, Boat, Boiler, Boiler in vertical sections, Bolt cutters, Bolt head and nut finishing machine, Book or paper hanger, Bottles, etc., antifilting device, Bottles, jars, etc., device for closing, Box, Box blocking machine, Braiding machine, Brake, Brake shoe, Brick, tiles, etc., making enameled, Broom heads, means for attaching handles to, Brush, horse, Buckle, suspender, Burglar alarm, Burner, Butter extractor, centrifugal, A. Ponten, Button mould, Button, J. V. Pilscher, Button, C. H. H. H. H., Button drilling machine, G. Carlyle, Button machine, G. Carlyle, Button parts, mechanism for assembling, I. G. Platt, Camera, T. M. Clark, Can, See Oil can, Can for painting, lard, etc., M. A. Marzynski, Car brake, C. W. Carter, Car brake, J. Mayer, Car chair, reversible, P. Little, Car coupling, G. W. Barfield, Car coupling, D. Boyer, Car coupling, E. Bronner, Car coupling, E. Car, Car coupling, C. A. Tower, Car fender, railway, J. E. McBride, Car, freight, McClimont & Marron, Car roof, C. M. Jennings, Car seat, P. Little, Cars, lumber, for railway, C. D. Clarke, Case, See Collar and cuff case, Packing or holding case, Cash register and indicator, W. Lang, Cellulose, plastic compound of, C. F. Cross et al., Chain, drive, C. M. Pilscher, Chair, See Car chair, Dental chair, Chalking device, line, S. R. Miller, Checkrein support, J. Carter, Cherry stoner, J. W. Brown, Jr., Chopper, See Cotton chopper, Chuck, engraver's, H. Gruner, Chuck, engraver's, F. Mink, Chute, coal, J. Scully, Cigar bunching machine, F. J. Hagen, Cigar package, S. Phillips, Cigarette wrapper holder, J. R. Hernandez, Cleat, J. C. Steelman, Clock case, E. M. H. H., Clock, electric alarm, J. S. Whitehead, Clod crusher and pulverizer, Nelson & Neilsen, Cloth cutting machine, N. Rubenstein, Clothes pin, T. J. Gordon, Clutch, M. Campbell, Clutch, T. J. Thorp, Cold-chamber, J. A. Manley, Collar and cuff case, traveler's combined, L. D. Dozier (r), Collar or cuff, R. M. Hunter, Collars, device for shaping folds of linen, A. C. Vall, Concentrator, H. Rapp, Cooler, W. Linfer, Cornstalk shocking mechanism, J. W. Ogle, Cotton chopper, G. W. Murray, Cotton opener and stopping mechanism therefor, Richardson & Fidler, Coupling, See Car coupling, Flagstaff coupling, Hose coupling, Pipe coupling, Thill coupling, Crusher, See Clod crusher, Curling iron, C. F. Snyder, Current motor, alternating, O. Offrell, Current motor, multiphase, L. Bell, Current motor, method of and means for starting alternating, L. Bell, Currents, economizing the energy of alternating, C. F. Scott, Cuspidor, invalid's, J. S. Ross, Cutter, See Band cutter, Decorticating ramie, etc., machine for, P. A. Favier, Dental chair, A. W. Browne, Dental engine, R. G. Stanbrough, Dental engines, electric motor for, W. A. Crowder, Digger, See Potato digger, Direct-acting engine, P. Chouteau, Dish cleaner, C. Palmale, Display box, N. Schroder, Displaying chains, tray for, W. Stiefelhagen, Door fastener, G. F. McCombs, Dough cutting machine, E. Dewerth, Drill, See Grain drill, Dry kiln for pottery, J. C. Titus, Dust pan, J. Reniker, Dye, substantive blue, Bernthsen & Julius, Dye, substantive violet, Bernthsen & Julius, Ear protector, C. Jung, Eaves trough, T. C. Keller, Electric circuit regulator, H. F. Waite, Electric circuits, stand for controlling, Knowles & Park, Electric elevator, W. D. Lutz, Electric machine, dynamo, A. B. Herrick, Electric machines, system of circuit control for, H. E. Davis, Electric machinery, dynamo, C. Sellers, Electric meter, W. B. Thompson, Electric meter, E. Thomson, Electric motor, A. Hinman, Electric motor controller, Hopkins & Stebbins, Electric power stations, means for preventing arcing in, E. Thomson, Electric reciprocating motor, E. Thomson, Electric subway, J. E. Phillips, Electric switch box, E. R. Knowles, Electric wire connection, J. Y. DeMott, Electrical distribution by alternating currents, system of, F. Scott, Electrical distribution system of, B. G. Lamme, Electrotape block, W. T. Barnum, Elevator, See Electric elevator, Elevator, R. W. Hare, Elevator door operating device, H. Rowntree