

Correspondence.

The Lever in the Bicycle.

To the Editor of the Scientific American:

In your paper of November 19 Mr. Hatcher gives a very nice explanation of how the lever is used in a bicycle.

I would like to add, that with one season's experience I find that a well constructed bicycle will automatically move this lever itself, and that after a limited amount of practice one can, at a moderate rate of speed, ride almost any pace desired without the use of the handle bar.

This I explain as follows, and if any one has a different explanation I would be glad to hear it: Nearly all bicycles are constructed so that the point of the front wheel that touches the ground is in direct line with the pivot on which the front fork and wheel are hung. This brings the greater part of the wheel above and in front of the line above mentioned. When the machine begins to tip, this excess of weight will turn the wheel, and thus right the machine. When the rider wishes to turn he has but to throw himself out of balance in the direction he wishes to go.

A. W. HARROUN.

Mason City, Iowa, November 28, 1892.

Engineers in the Navy.

The annual report of the engineer in chief, G. W. Melville, just submitted to Congress, contains some important suggestions as to the need of an enlarged force of engineers to man our new war ships, and the necessity of their being more efficiently aided by engine room petty officers composed of machinists, blacksmiths, boiler-makers, coppersmiths, etc. Without entering directly into the long-standing differences between the "line" and "staff" officers, the report throws a strong side light upon such disagreements between the two classes of officers as resulted in the Danforth case, noticed in our issue of December 10, saying on this subject: "Whether or not it is good policy to intrust the full control of sailless ships, every function of which is performed by a machine, to officers who, by education and training, are ignorant of the operation, care, and management of machinery, is a question that is worthy of very serious consideration.

"It has been claimed that the possession of rank and the right to exercise command in their own department is merely a matter of sentiment on the part of the engineer officers. When officers find themselves charged with the maintenance of all the vital parts of

a huge and costly war ship, and when the exercise of their prescribed duties involves the direction and superintendence of the labors of one-third or one-half of the ship's crew, they very naturally expect to be clothed with the legal right to perform their duties—a right that is now denied by Section 1,488 of the Revised Statutes of the United States. There is not much sentiment in this, but merely an effort on the part of a class of officials who have to perform military duties involving command and obedience to have their exercise of authority made lawful."

Engineer Melville furnishes a vivid description of the arduous task of an engineer officer who is unfortunate enough to be detailed for duty on the largeships, those of from 5,000 to 10,000 horse power, on which usually there are only one chief engineer and three assistants: "The latter are obliged to stand watch in three watches at sea and often in port—a duty so exhausting that no officer can long perform it efficiently; for he never has a whole night's rest, and when on duty has to withstand a constant, merciless assault upon his physical and mental powers. His post of duty is one of intense heat and villainous atmosphere; to get from one part of his station to another, which he must do very frequently, he must climb up and down narrow ladders, crawl through air locks, explore coal bunkers, etc., all the time in a state of mental anxiety on account of the innumerable casualties, great and small, that are constantly occurring, and for the prompt remedying of which he is strictly accountable; in one watertight compartment some boiler tubes are leaking and the men are in a panic; in another, 100 feet or more away, a feed pump is refusing to work or a thrust bearing is hot; and while hurrying from one scene of danger to another the engineer is liable to receive tidings of trouble in some remote coal pocket, or even be summoned to appear on deck, where he must calmly answer questions regarding the amount of smoke escaping from the smoke pipes, or the necessity for hoisting ashes, wholly unmindful of the disasters which he knows are impending below. So it goes, watch after watch and day after day, until in the course of a week or two the engineer is a nervous wreck, fit for nothing but the hospital; and all because the lack of numbers imposes upon him the work of at least two men."

Mr. Melville thinks the membership of the corps should be increased to not less than 300, and says the only opposition thus far to a bill before Congress providing for such increase has come from some of the officers of the navy, who seem to view with jealous

distrust the growing importance of the engineering branch of the service, and see in it an imaginary menace to the supremacy of the positions which they have inherited from naval conditions now obsolete.

Speaking of the difficulty now experienced in obtaining a desirable class of enlisted men for the engineer's force, Chief Melville complains that the machinists have a pretty hard time on shipboard, there being nothing to induce respectable and ambitious men to take such positions. "If a machinist or fireman crawls out of the hellhole where he is on duty to get a breath of fresh air, he may be promptly driven below again or even punished for appearing on deck 'out of uniform,' while the discovery of a speck of dirt anywhere on deck subjects any member of the engineer's force who may have the rashness to be above the fire room gratings to abuse from the boatswain's mates and probable punishment at the mast. That the decks of a man-of-war should be of spotless purity is a tradition handed down from the days of wooden ships and bare-footed crews, and is so impossible a condition in these days of coal and iron and steel that it seems a little intelligent consideration would lead to its abandonment. All these unhappy details are different on different ships, but the general results are the same. The useful and self-respecting man, when he finds himself so unfortunately circumstanced, will, in sheer self-defense, leave the service forever."

Sugar in Boilers.

Some two or three years ago a mining engineer in the Yorkshire district, anxious to prevent the incrustation in the boilers at the collieries in which he was interested, tried a mixture of sugar and soda. The proportions were as follows:

	Sugar,	Soda,
	lb.	lb.
Egg-end boilers, 30 ft. x 4 ft. 6 in. diam.....	5	2
Lancashire " 30 ft. x 7 ft. 6 in. diam.....	7½	3
" " 30 ft. x 8 ft. 0 in. diam.....	9	4

He writes recently that he is still using it, and finds it is giving good results. His method is as follows: When the boiler has been cleaned and is ready for filling with water, dissolve the sugar and soda in a bucket and pour it through the manhole. Clean every three weeks. Cane sugar only must be used. Many collieries in Durham have tried it with equal success.—*Markets Review*.

PLATINUM can now be drawn into wire strands so fine that twenty-seven twisted together can be inserted into the hollow of a hair.

RECENTLY PATENTED INVENTIONS.
Engineering.

ENGINE.—James Smith, Dresden, N. Y. This invention is for a device to be applied to the cylinder of a steam engine, consisting preferably of a valve to connect the two ends of a cylinder at a time when the pressure of the live steam on the driving side of the piston is about equal to the pressure on the exhaust side, the exhaust pressure then opening the valve to establish communication between the two ends of the cylinder, whereby the pressure of the live steam after expansion has taken place will never fall below the pressure in the exhaust end of the cylinder. The device is actuated only when the live steam and the exhaust are thus of relatively unequal pressure.

ENGINE REVERSING GEAR.—Joseph O. Des Chapelles, Havana, Cuba. An eccentric disk with a diametrical groove fits in a block on the main driving shaft, there being inclined apertures on opposite sides of the groove, while a sleeve sliding on and turning with the shaft has inclined rods projecting through the inclined apertures of the eccentric disk. By shifting the sleeve, more or less throw can be given to the disk, and thus to the slide valve. The device is simple and not liable to get out of order, and but little power is required to accomplish the shifting of the valve.

UPRIGHT TUBULAR BOILER.—Truckson S. La France, Elmira, N. Y. This boiler has an overflow feed-water jacket to and inclosing the group of upright smoke flues open above, a boiler feed connection supplying the jacket with water, while an outer jacket within the steam space of the boiler incloses the overflow jacket for a portion of its depth, and is open below to supply the water overflowing from the first jacket down to the lower portion of the outer steam chamber of the boiler. The upright fire or smoke flues are thus kept mainly or wholly submerged in the feed water, to protect them without choking the steam space with water, while the circulating and heating capacities of the boiler are improved, and the crown sheet is prevented from injurious exposure should the feed water supply be interfered with.

Mechanical Appliances.

COG WHEEL.—Frank Saxon, Worthington, Minn. This is a compensating cog wheel made in two sections, having spring cushions intervening between them, so that when the wheel is employed to communicate motion suddenly to any portion of the machinery, it will not give to the parts any sudden or injurious shock. When the outer section of the wheel is turned the inner section is not moved until the springs are compressed, after which the force is exerted through the spring cushions. The improvement is especially adapted for use in connection with agricultural or road engines.

BIT BRACE.—Andrew Knudsen, Tucson, Arizona Ter. In this brace the knob is so attach-

ed as to exclude dust or dirt, the bearing being made very easy, and means provided for easily attaching and detaching the knob. It has an extensible and adjustable crank, so that a single brace may take the place of several braces of different sizes, and a convenient, nicely finished, and easy handle. The ratchet connection between the brace crank and the bit shank is improved, efficient means being provided for fastening bits of various sizes to the brace, together with an improved construction of the bit-holding jaws. It has been the design of the inventor to improve the entire construction of the brace, that it may be easily adjusted, readily operated, and nicely and strongly finished.

Railway Appliances.

CAR BRAKE.—John W. Neumann and John R. Pfanz, Louisville, Ky. This improvement embraces a drawbar designed to operate the brakes automatically under certain conditions, and one which can also be locked to form a perfectly rigid drawbar, while a combined drawbar and brake-operating rod can be operated while the cars are rounding curves. The brake-operating mechanism can be actuated by hand or automatically, or by both at the same time, compensation being provided for the wear of the brakeshoes and wheels, and means of avoiding jerks when the cars are started.

Agricultural.

PLOW SHARE ATTACHMENT.—James Gilbert, Crystal Brook, South Australia. This invention relates to plows in which movable shares are attached by slipping them onto a foot, the shares being removable as desired, and being made with a shoe or socket, into which the foot is inserted. The shares used with this invention do not contain any such shoe or socket, but are formed of a combination of a flat share or plate and a separate preferably detachable loop, which together form the required shoe or socket. The improvement is to be used with plows in which the foot is projected in the line of progression.

INSECT POWDER DISTRIBUTER.—Christian H. Joosten, New York City. This is a light and simple hand device for blowing the powder upon plants, one portion of the device consisting of a bellows, against a stationary side of which is held the powder receptacle. The amount of powder delivered is regulated by a damper or slide, the knob operating which carries a pointer on a scale indicating the quantity of powder the implement is set to deliver. An agitator is provided to keep the powder in circulation and prevent the formation of lumps in the receptacle.

Miscellaneous.

COMBINATION LOCK.—Edwin Vanwart, Port Madison, Washington. This is a simple lock, designed to be cheaply made, its parts being readily stamped out, and is especially adapted for use on a house door, although it may be used with other articles.

Within the case is a sliding locking plate, having transverse recesses with connecting slots and the usual spring and knob operating mechanism, while recessed stationary plates are arranged opposite the locking plate, tumblers having flanges at right angles to their bodies being held in the recesses of the several plates, and a plurality of latches being pivoted on one side of the lock to engage the tumblers. It is not necessary to work the combination to open the door from the inside.

FIRE ESCAPE.—Jonathan B. Stott, Aurora, South Dakota. A rope is suspended on the outside of a building, within convenient reach of those at the windows, the rope passing through a casing in which is pivoted a clamping plate, and attached to the casing is a supporting device consisting of a belt and straps, to be secured around a person desiring to descend. A handle extends outward from the casing, by taking hold of which a person who has attached the supporting device to his body may easily clamp the rope in the casing with sufficient force to absolutely control the speed of descent, increasing or diminishing it as desired.

BURGLAR ALARM.—Harry W. Reynolds, Long Branch, N. J. This is a simple device to be arranged adjacent to a door or window, the opening of which automatically closes an electric circuit and causes a bell to ring, the circuit being closed only momentarily, and not being closed at all when the open door or window may be closed.

REVERSIBLE WINDOW.—James Farquharson, Tacoma, Washington. The window frame has on the side of its stiles beads, oppositely located hinges being connected by one member to the beads at the middle of the stiles, and sliding stiles being connected with the other members of the hinges, while a bead fixed to the sliding stile at the front extends downward from the hinges. Shoulders are formed on the stiles to form abutments for the rear edges of the beads, and semicircular recesses are formed on the sides of the stiles to form air passages when the windows are closed. By means of this improvement the window may be conveniently raised or lowered, or reversed for cleaning the outside, glazing or painting from the inside.

SASH HOLDER.—Irvin A. Shaw, Kinsley, Kansas. This improvement consists of a stop bead mounted to slide transversely in specially constructed bearings secured on the window frame, springs being concealed in the bearings and pressing the bead to hold the latter in contact with the side rail of the window sash or door. The bead not only forms a guide for the side rail, but also forms a guard for it, as the springs hold the bead firmly in contact with the side rail, preventing the ingress of cold air, or holding the sash in any desired position.

REPEATING AIR GUN.—Elmer E. Bailey, Sinnamahoning, Pa. This is an improvement in guns whose magazine tube is traversed by a small firing tube through which large shot or small bullets are projected by an air blast from a chamber in which air is compressed by a spring-actuated sliding piston.

The magazine has a capacity to contain at least one thousand B B shot, and the breech of the small firing tube within the magazine is secured by novel means to a lock frame made in longitudinal recessed halves to hold the loading and air charging and discharging mechanism.

CARTRIDGE.—Jacques A. C. de La Touche, Paris, France. This cartridge has an explosive body to be filled with loose powder, and gas check for the cartridge, comprising a series of washers separated by layers of wax, which when the projectile is fired will lubricate the gun and then fall apart and be thrown out of the gun's trajectory. The bore of the gas check is coated with collodion before the projectile is seated, and when the cartridge is fired the projectile slips readily from its seat and the wax which issues from between the washers serves to lubricate the gun.

HORSE DETACHER.—Henry Leeman, Louisiana, Mo. This is an attachment applicable to any vehicle, whereby a fractious or runaway animal may be readily freed from the vehicle. According to this invention the thills are so connected with the forward axle that they may be readily released therefrom, a vertical shaft actuating racks for the release of the thills, and there being at the top of the shaft a handwheel within easy reach from the driver's seat.

WHIFFLETREE.—Henry McF. Wright, Aspen, Col. This invention provides a singletree and support of simple and durable construction, readily applied, and arranged to prevent detachment of the tree in case the bolt breaks. The improvement embraces various novel parts and details and combinations thereof.

NECK YOKE.—James S. Brown, Eureka, Cal. On the forward end of the tongue is a clevis-like projection, with an upper and lower member and an aligning bolt hole through each, while a central rigidly attached sleeve on the neck yoke has a lug fit in a cut, with a flat projection fitting in between the members of the clevis-like projection on the end of the pole ferrule, thus forming a special construction and combination of parts covering the pivotal connections uniting the neck yoke with the pole.

HORSESHOEING RACK.—Samuel M. Martin, Sidney, Ohio. This invention covers an improvement on former patented inventions of the same inventor, simplifying the construction and providing a rack that can be quickly and conveniently folded up when not in use. It has forward and rear sections detachably united by pivotal bolts and locking pins, a cross bar connected to the sections where they join, while a locking bar holds the suspending bars in place. The rails can be adjusted to suit various sized animals, and a harness and means of using it are provided for.

VEHICLE POLE.—Thomas B. Cultra, Omaha, Neb. This invention provides a simple and economical construction conveniently adjustable for two or three horses abreast, the center draught being preserved in either case. The device consists of a circle or plate, preferably of steel and with side arms piv-

ated at their rear ends to the axle, and provided centrally and to one side of its center with points for the attachment of the pole, which is detachably connected with the circle or plate, being connected centrally for a two horse team and at one side of the center for a three horse team.

GATE LATCH.—Philip T. Rapson, Bad Axe, Mich. This is a self-locking latch which permits the gate to be swung toward either side of the fence, and when in closed adjustment relieves the hinges from strain. On a back plate secured to the end rail of the gate is pivoted a lock plate with projecting detent pins, the locking plate having an arched top edge with a center notch, and two oppositely curved limbs at its lower edge formed with a center notch, while a check stud at its rear engages the pins on the back plate and an ear on its front face, a bolt tripped by a spring-pressed lever being mounted to slide above the locking plate. The device is of a simple, novel, and efficient character.

LITHOGRAPHIC PLATE.—Franklin F. Hagenmuller, New York City. This is a plate made of zinc, type metal, aluminum, or other metal, or of celluloid, gelatine, etc., and subjected to an embossing process to form on one side a printing stipple ready for the artist to work on, the stipple being uniform, to be readily worked on with the lithographic crayon to produce the desired picture. The improved plate may be very cheaply manufactured, and is intended to take the place of the lithographic stone now generally used.

GLOVE PACKAGE HOLDER.—Richard H. Moore, Great Barrington, Mass. This holder consists of two independent or detached strips or splints to receive the gloves, a spring jaw clamp or clip being placed on across the splints to hold the gloves between them. The improvement is designed to do away with the present inconvenient bindings for glove packages, affording spring binders or cases to hold the gloves in good condition and prevent their becoming shop-worn.

WICK RAISER FOR LAMP BURNERS.—Charles Pabst, Philadelphia, Pa. This is an improvement on a former patented invention of the same inventor, providing a simple and cheap attachment for elevating and depressing a lampwick in a reliable manner. It consists of two parallel limbs, on the ends of which are picker points passing through slots in the wick tube, a pivoted dog on one of the limbs having a hook shoulder interlocking with the edge of an aperture in the burner body through which the limbs and dog are inserted.

METALLIC RIPRAP.—Duncan T. McIntyre, Mattoon, Ill. A practical sheet piling, to protect the banks, shores, and beaches of rivers and other bodies of water from washing or being cut out, is provided by this invention. It consists of inclined metallic sheets resting against the face of the bank, the sheets having rearwardly extending lips punched through from the outer side of the plates, their vertical meeting edges interlocking and being formed into posts at the rear of the structure, the posts being embedded in the bank and thereby avoiding the use of separate posts.

URINAL ATTACHMENT.—George Schoen, New York City. This device comprises a frame to be received in the bowl and a strainer movably held to the frame, facilitating cleaning and providing for properly holding soap or other disinfectant or detergent.

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.

THE ROYAL ROAD TO BEAUTY, HEALTH, AND HIGHER DEVELOPMENT. By Carria Le Favre. New York: Fowler, Wells & Co. 1892. Pp. 85. Price 25 cents.

This is a little tract devoted to vegetarianism, a subject of interest. Many of us, on ethical principles, would desire to be vegetarians, and this plea for it is perhaps something which should be welcomed by us on general principles.

MANNERS AND MONUMENTS OF PREHISTORIC PEOPLES. By the Marquis de Nadaillac. Translated by Nancy Bell (N. D'Anvers). New York and London: G. P. Putnam's Sons. 1892. Pp. xi, 412. Price \$3.

This very elegant work brings the subject of anthropology well up to date, as regards its applications to extinct nations. The many finds recently made in different countries of the world are described, with numerous illustrations, some very curious, such as the illustration of the trepanned historic skull in which the appearance of the bone reveals the fact that one trepanning had been done during life and others, presumably for the obtaining of amulets, had been done after death. Fishes and fishing and efforts in navigation find adequate treatment, as well as the other subjects more generally written of.

REPORT OF THE COMMISSIONERS OF FISH AND FISHERIES FOR 1888. Washington, D. C. 1892. Svo. Pp. 128.

This report contains some very interesting details of the work of the department for the year. The total distribution of eggs, fry and yearlings for the year ending June 30, 1889, amounted to 322,795,830, which is a very creditable showing considering that the appropriations only aggregated \$257,000, and this money supports all the stations and the vessels of the department, the Albatross, Fish Hawk and Grampus. The department is a very useful one and has a world-wide reputation.

SHORT TALKS ON CHARACTER BUILDING. By G. T. Howerton, M.S. Illustrated. New York: Fowler & Wells Company. 1892. Pp. iv, 227. Price \$1. No index.

This contribution to practical life, with numerous illustrations and short pithy chapters certainly abounds

in good advice—advice which, whatever our individual opinions may be, would, if followed, in many cases be productive of much good. The style of illustration, in many cases, presents, on the same page, contrasting pictures of life, with considerable effect in some instances.

LEAVES AND FLOWERS; OR, PLANT STUDIES FOR YOUNG READERS. By Mary A. Spear. Boston, U. S. A.: D. C. Heath & Co. 1892. Pp. ix, 103. Price 30 cents. No index.

This charming work is designed to make the study of botany pleasant to the young. The work, with numerous illustrations and exact botanical information, is written throughout, as nearly as possible, in the form of a story, and, although it is termed plant studies, it really takes the aspect of being rather play than work. It shows how pleasant the path of learning is for the rising generation.

THE FLOOD, THE FACT OF HISTORY. A chronological vindication, and a guarantee of the second advent. By Charles A. L. Totten. New Haven, Conn.: The Our Race Publishing Company. 1892. Pp. xxii, 315. Price 75 cents.

Professor Totten, of Yale College, in this work at last has his say at full length as to bibliographical chronology. To say the least, the work is a curious expression of the author's beliefs, and puts into the form of a book the ideas which won for him such notoriety during the last year.

SIMPLE LESSONS IN DRAWING FOR THE SHOP. By Orville H. Reynolds. Published by Debs Publishing Company, Terre Haute, Indiana. Pp. 83. Price \$1.

This little work is for the practical draughtsman and gives very good elementary hints as to simple drawing. The practical aspect of the subject is well preserved, and the book will, no doubt, be welcomed by many who are beginning their way to acquire the draughtsman's art.

Any of the above books may be purchased through this office. Send for new book catalogue just published. MUNN & Co., 361 Broadway, New York.

SCIENTIFIC AMERICAN BUILDING EDITION.

DECEMBER NUMBER.—(No. 86.)

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- 1. Elegant plate in colors, showing a very attractive dwelling at Warberth Park, Pa., erected at a cost of \$4,150 complete. Floor plans and two perspective elevations. John Robinson, architect, Germantown, Pa.
2. Plate in colors showing a residence at Springfield, Mass. Perspective views and floor plans. Cost \$12,000 complete. Mr. Guy Kirkham, architect, Springfield, Mass. An excellent design.
3. A colonial residence at Newton Highlands, Mass. Perspective view and floor plans. J. W. Beak, architect, Boston. A picturesque design.
4. A pretty cottage erected at Bridgeport, Conn., at a cost of \$1,600. Floor plans, perspective, etc. A. M. Jenks, architect, Bridgeport, Conn.
5. A dwelling house erected at Warberth Park, Pa., at a cost of \$4,478 complete. Mr. C. W. Macfarlane, architect, same place. A model design. Floor plans and perspective.
6. A "Queen Anne" cottage erected at St. David's, Pa., at a cost of \$5,500 complete. A unique design. Perspective elevation and floor plans. F. L. & W. L. Price, architects, Philadelphia.
7. A residence in the "Colonial" style of architecture, erected at St. David's, Pa. Perspective view and floor plans. Cost complete \$5,800. F. L. & W. L. Price, Philadelphia, architects.
8. A residence on Golden Hill, at Bridgeport, Conn. Perspective elevation and floor plans. D. R. Brown, architect, New Haven, Conn. An excellent design.
9. A residence recently erected at Springfield, Mass. Floor plans and perspective elevation. Cost \$2,490 complete. Mr. A. B. Root, architect, same place. A pleasing design.
10. Picture of Aldworth, Sussex, the home of Lord Tennyson. Portrait of Lord Tennyson.
11. Sketch for a cottage at Saucello, Cal.
12. Design for a thirty-story building.
13. Sketch of residence of Mr. Howard Bell, Atlanta, Ga.
14. Miscellaneous contents: Some of the merits.—Water tight cellars.—Read this with care.—Improve your property.—How to catch contracts.—The education of customers.—Erection of additional buildings.—Concave sounding boards.—A high railway bridge.—A complete steel house front, illustrated.—An improved woodworking machine.—Finely carved woodwork, illustrated.—Steam and hot water radiators, illustrated.—Plaster of Paris.—Disinfection by means of sulphur.—A novel newspaper building.—Fine steel ceiling in an art gallery.

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Business and Personal.

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THE ENGINEERING RECORD (Prior to 1887, the Sanitary Engineer). Published Saturdays. 277 Pearl Street, New York. 12 cents a copy.

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Wanted—Engineers and pilots. Twenty licensed engineers and pilots to run small passenger steamers for the summer months of 1893, in connection with the World's Fair. Sober, steady men are invited to write us for further information. Cbas. P. Willard & Co., Clybourn and Southport Aves., Chicago, Ill.

The Engineering Record, the recognized authority on municipal and building engineering, has recently been enlarged by the addition of a department in which notable industrial plants are regularly described and illustrated, the steam and power plants being a conspicuous feature. Recent publications include the great Ivorydale plant of Messrs. Proctor & Gamble, described in 23 columns and illustrated by 57 drawings. The steam plant at Ivorydale is separately treated in 13 columns and 31 drawings. The new foundry of Henry R. Worthington, at Elizabethport, N. J., 16 columns, 26 illustrations. National Meter Company's foundry and brass finishing shop, Brooklyn, 13 columns, 29 illustrations. Niagara Power Plant (now in process of publication), 6 columns, 6 illustrations. Steam power plant of the Dwight Manufacturing Co., Chicopee, Mass., 9 columns, 7 illustrations. Machinery Hall steam power plant, 8 columns, 6 illustrations. Published Saturdays. 12 cents a copy. The Engineering Record, 277 Pearl St., 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.
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.

(4609) I. H. F. asks: What glue, cement or paste is used in covering iron pulleys with paper to prevent the belt from slipping? A. Pulleys that have been in use that are to be papered should be made clean and free from grease by scratching with a file over their entire surface, cleaning with a caustic soda wash and then pickle the surface with hydrochloric acid and water equal parts. Wash with hot water and dry. When its surface will be in the best condition to receive the glue. Use the best light brown glue, which may be tested by its great strength and elasticity when breaking a piece in the hands. Make up the glue in the usual way and when ready mix a tablespoonful of strong decoction of oak bark or tannic acid, hot, to the glue and thoroughly mix. The strongest hardware paper should be used, cut and prepared by previously moistening, so as to allow of it drawing to fit the crown of the pulley. The pulley being slightly warmed, so as not to chill the glue, and temporarily hung, proceed

to brush the glue on its surface, putting the paper on at once, drawing it tightly to expel any air and overlapping with glue and paper, until the proper thickness is obtained. To make the best job requires three persons. Upon stretching the paper on firmly depends its best service.

(4610) J. B. asks: What kind and how large a battery is necessary to heat a No. 36 platinum wire? I want to explode a cannon with it. A. One cell of Grenet battery will answer your purpose.

(4611) A. J. W.—Stamp ink is very difficult to remove. Alcohol is the best medium.

(4612) E. R.—In the case of a perpetual motion the Patent Office requires that a working example shall be produced.

(4613) W. R. asks: In the making of the large plunge battery in "Experimental Science" it calls for paraffine. Would beeswax answer as well? A. Yes.

(4614) C. E. L.—As to bringing your matter before the government, we cannot advise without knowing what it is.

(4615) W. G. T. asks for the composition of a cement for incandescent lamp filaments. A. The following is from "Scientific American Cyclopaedia of Receipts, Notes and Queries." Take 100 grains carburet of iron (Dixon's stove polish), grind dry to a fine powder, add 10 grains lump sugar, mix well in a mortar, then add 40 grains gold bronze, mix again, then add sufficient water to make a thick paste, and apply it to the junction between the carbon and the platinum wire, allow it to stand for twenty minutes or so, then burn the joint to a cherry red heat by a fine gas flame.

(4616) C. B. A. asks: What is the reaction when oxalic acid (C2H2O4) is made by the action of nitric acid (HNO3) on sugar (C12H22O11)? A. C12H22O11 + O18 = 6C2H2O4 + 5H2O. The O18 is derived from the HNO3; thus 12HNO3 = 12NO + 6H2O + 18O. Thus we may write the reaction as follows: C12H22O11 + 12HNO3 = 6C2H2O4 + 11H2O + 12NO.

TO INVENTORS.

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INDEX OF INVENTIONS

For which Letters Patent of the United States were Granted

December 6, 1892,

AND EACH BEARING THAT DATE.

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

Table listing inventions and their patent numbers. Includes items like: Advertising device, automatic, T. B. Hafertep... 487,563; Aerator, milk, T. W. & B. T. Wood... 487,413; Alloys, mixing, W. R. Thomas... 487,338; Animal trap, R. T. Williams... 487,593; Ankle supporter, J. G. Fugleley... 487,492; Automatic brake, J. H. Wilson... 487,412; Bale tie, E. W. Wickey... 487,504; Baling press, A. Wickey... 487,506; Band cutter and feeder, J. E. Boles... 487,363; Barrel filler, K. Kiefer... 487,531; Battery... 487,699; Bearing, roller, J. Gibbons... 487,530; Bearings, spring roll for roller, J. W. Hyatt... 487,430; Bed bottom, W. H. Scott... 487,685; Bed, folding, W. D. Snyder... 487,685; Bed spring, J. Monzel... 487,288; Beer cooler, J. F. Duffy... 487,406; Bell, electric, P. Wagner... 487,487; Belt fastener, G. H. Avery... 487,681; Belts, idler for driving, Hall & Holmes... 487,564; Bending press, S. Swartz... 487,435; Beverages, carbonating fermented, J. F. Wittemann... 487,342; Bicycle attachment, A. Martbens... 487,577; Bicycle stand, C. S. Crosby... 487,473; Blotter, S. Axtell... 487,239; Blotter pad and ruler, combined, C. W. Chandler... 487,364; Boiler... 487,535; Boiler, W. B. Mack... 487,535; Boiler cleaner, steam, G. E. Truax... 487,651; Boiler feeder, C. E. Van Anken... 487,686; Boiler furnace, steam, J. V. Burke... 487,632; Boiler indicator, steam, G. L. McDermott... 487,634; Boring and screw driving machine, E. Finn... 487,441; Boring machine, S. A. Gould... 487,407; Book, bank account, H. J. Stirn... 487,566; Book or copy holder, B. Gardner... 487,561; Book or sale slip, duplicating memorandum, W. Morton... 487,680; Bottle corking machine, E. Ermold... 487,387; Bottle mould, T. W. Synnot... 487,488; Bottles, attachment for varnish or similar, T. G. Watson... 487,502; Bottles, corking, C. Schroeder... 487,451; Bottles or similar vessels, device for closing, J. E. Clerc... 487,365; Box... 487,667; Box lid holder, A. D. Hoffman... 487,566; Brake... 487,566; Brake adjuster, automatic, M. E. McKee... 487,636; Brake beam, J. W. Baker (r)... 11,292; Branding tool, J. R. Todd... 487,304; Breach mechanism, rapid-fire, A. Mercer... 487,316; Brick, paving, L. C. Turley... 487,652; Bridle, A. & L. Hasselbauer... 487,565; Broom or brush drilling apparatus, H. Besson... 487,362; Brush bristles, machine for the manufacture of... 487,369; Buckle attachment, combined, G. D. Hayes... 487,619; Buckle, harness, T. M. Guthrie... 487,415; Buckle, hitching, S. B. Burwell... 487,474; Buckle, rein, W. C. Edge... 487,585; Building covering, M. P. Schetzel... 487,455; Burner fastening, B. T. Steber... 487,316; Butter extractor, centrifugal, G. M. Anderson... 487,345; Button, G. J. Canewell... 487,289; Button setting machine, Merwin & Strickler... 487,678; Camera tripod, J. Rodas... 487,285; Can... 487,571; Can lacquering machine, R. D. Hume... 487,562; Cap attachment, G. H. Griffin... 487,681; Car brake, P. McMullen... 487,391; Car brake, W. N. Haring... 487,243; Car coupling, J. Bradford... 487,684; Car coupling, T. B. Brower... 487,261; Car coupling, Coffman & Denney... 487,261