

RECENTLY PATENTED INVENTIONS.

Engineering.

COMBUSTION ENGINE.—Augustus G. Pace, New York City. This engine has two cylinders in which pistons operate, and combustion chambers have port communications at the top and bottom with the cylinders, the pressure of exploded gas being exerted on the top of one piston and the bottom of the other. The gas admission valves are operated by the suction of the pistons, and the exhaust valves by a rotary part of the engine. The engine is designed to be of greatly reduced weight as compared with other combustion engines, while developing a corresponding amount of power.

Railway Appliances.

SWITCH OPERATING DEVICE.—George M. Patterson, Providence, R. I. A mechanism is provided by this invention for automatically shifting switch rails from a siding to the main track, the mechanism being under the full control of the engineer or fireman on the locomotive, and being designed to entirely obviate danger of accident by side tracking a train. It comprises switch tongues pivotally connected with a boxing in which is a spring-actuated block engaged by a spring-actuated plunger, an operating shaft being connected with the boxing, and there being devices on the locomotive cowcatcher by which the switch mechanism may be operated by means of a pull rod which extends into the cab.

Bicycles, Etc.

A NOVEL BICYCLE.—John Carlyle Raymond, Brooklyn, N. Y. On each side of the drive wheel shaft, according to this invention, is a pinion, each pinion meshing with a gear wheel on a crank shaft journaled in bearings of the frame, the shaft having two crank arms, one arm connected by a link with a treadle and the other arm connected by a link with a fulcrum lever on the forward end of which is the saddle. The construction is designed to afford exercise for the rider's whole body, the up and down motion of the rider in his seat, as well as the pressure on the pedals, assisting to propel the bicycle.

TROLLEY BICYCLE.—Robert T. Oney, Charleston, West Va. This is a wheel adapted to carry an electric motor, and having on the front portion of its frame a jointed extensible trolley pole carrying two trolley wheels to contact with two separate conducting wires, whereby the wheel may be run by the electric current on an ordinary dirt road. The bicycle is provided with the usual pedals, so that it may be propelled in the ordinary way, with the trolley pole folded down in front, or both means of propulsion may be simultaneously employed if desired.

Mining, Etc.

SEPARATING PRECIOUS METALS FROM ORE.—Gustaf M. Westman, New York City. A process for separating gold and silver from refractory ores, according to this patent, comprises the bringing of the mass of ore to a molten condition, and then subjecting the running molten mass to the action of jets of steam, air, or other fluid, to form mineral wool, thus causing the minutely divided particles of the precious metal to collect on and adhere to the mineral wool. The latter is then subjected to a leaching process, as with free chlorine gas in a solution, to separate the precious metals from the mineral wool.

Mechanical.

POWER CONVERTING MECHANISM.—Benedict J. Ross, Louisville, Ky. To convert reciprocating into rotary motion, this invention provides a device which consists essentially of bars pivoted together in one or more pairs, similarly to the two bars of a toggle joint, the outer ends of the bars being restrained within guides so that they have a reciprocating movement there-through, while short arms extend at right angles from their outer ends, these arms being connected by rods with double cranks on a shaft. The movement of the center pivot of the bars forming a toggle joint causes a reciprocating movement of the connecting rod and a rotary movement of the shaft.

WORK HOLDER.—Olof R. Johnson, Escanaba, Mich. This is a device in the nature of a bench clamp, more especially designed for the use of carpenters and other mechanics, to hold work in place, and to be itself conveniently placed in position on a bench or board or other support to form a temporary bench to facilitate doing small jobs in houses. It consists principally of a bit plate on which a dog is fitted to slide, a disk turning in an opening in the dog and formed with a spiral groove engaged by a lug or pin on the bit plate. A device is provided for securely fastening the bit plate in position on the bench or board, and auxiliary dogs for holding boards upon edge and holding work in an inclined position.

Miscellaneous.

COMPUTING SCALE.—William R. Dunn, Alton, Ind. A computing or price indicating scale is provided by this invention, a movable weight being adapted to traverse two beams, one graduated to indicate pounds and ounces and the other the price in cents of the substance being weighed. The price-indicating beam is a tubular rotative body, and has on its periphery a longitudinal series of graduations, with an index character at the end of each series, showing the price per pound in the weighing of which each particular series of graduations is to be used, such graduations running, as described, from three to thirty-five cents per pound, or to be varied as desired.

ADDING MACHINE.—William J. Ensworth, Erie, Pa. A machine which may be used for adding columns of figures, or as a cash register in mercantile concerns, is provided by this invention, the operation of the machine being indicated to the operator and others present. The operation is effected by turning arms on registering disks whose peripheries have each a hundred notches, one form of the machine being adapted to add

and register up to ninety-nine dollars and ninety-nine cents and other forms up to thousands and millions.

DRY OIL GAS BURNER.—Charles H. West, Kearney, Neb. For burning oil gases in a dry state, instead of burning the oil in the form of a mist or spray, this burner is made with an overhanging vaporizing pipe and a subjacent burner pipe, while an adjustable deflector or flame spreader with broad, flat base connects the top and bottom and receives the vaporizing pipe, there being a set screw for adjustably fixing the position of the deflector on the vaporizing pipe. An oil cut-off valve may be adjusted to regulate the amount of heat and flame.

SASH LOCK.—Charles T. Redfield, Glen Haven, N. Y. This lock brings the meeting rails of the sashes together in a manner somewhat similar to the action of a parallel ruler, drawing the rails together and alongside of each other and at the same time forcing them at their opposite ends against the opposite sides of the window frame. The device comprises a slotted link sliding and swinging on a securing stud, and an abutment stud over which the link may readily be applied and removed.

NOTE.—Copies of any of the above patents will be furnished by Munn & Co. for 10 cents each. Please send name of the patentee, title of invention, and date of this paper.

SCIENTIFIC AMERICAN
BUILDING EDITION

SEPTEMBER, 1897.—(No. 143.)

TABLE OF CONTENTS.

- No. 1. Plate in colors, also another perspective elevation and floor plans of a residence at Bensonhurst, L. I., recently erected for Mr. Walter Jones. A design treated in an attractive style of architecture, with Colonial feeling and classic detail. Architect and builder, Mr. Walter Jones.
- No. 2. A Colonial residence at Springfield, Mass., recently completed for Mr. N. N. Fowler, at a cost of \$13,000 complete. Two perspective elevations and floor plans. Mr. Guy Kirkham, architect, Springfield, Mass.
- No. 3. Residence at Scranton, Pa., recently erected for Mr. Thomas R. Brooks. A unique design. Two perspective elevations and floor plans. Mr. John A. Duckworth, architect, Scranton, Pa.
- No. 4. Elm Park Methodist Episcopal church and parsonage at Scranton, Pa. Two perspective elevations and floor plans, also two perspective elevations of the parsonage, with floor plans, Architects, Messrs. George W. Kramer & Co., New York City.
- No. 5. English dwelling at Overbrook, Pa., recently erected for Mr. Smucker. An attractive design treated in the English style, half timber and stone. Perspective elevation and floor plans, also interior view. Architect, Mr. William L. Price, Philadelphia, Pa.
- No. 6. Cottage at Binghamton, N. Y., recently erected for Mr. G. N. North, at a cost of \$3,300. Two perspective elevations and floor plans. A design with many excellent features, good elevations and well arranged plans. Mr. Alfred Bartoo, architect, Binghamton, N. Y.
- No. 7. Modern cottage at Nyack, N. Y., recently erected for the Rev. Edward Mitchell, at a cost of \$2,500 complete. Two perspective elevations and floor plans. A unique design for small cottage. Mr. George F. Morse, architect, Nyack, N. Y.
- No. 8. Modern suburban villa at Chestnut Hill, Mass., erected for Messrs. Merriam, Isenbeck & Alvord. A design well treated in the modern American style with Colonial detail. Two perspective elevations and floor plans. Architect, Mr. J. H. Morse, Boston, Mass.
- No. 9. A residence at Binghamton, N. Y., recently erected for Miss Q. M. French. Perspective elevation and floor plans. A very attractive design with excellent elevations.
- No. 10. An actress' home at Chevy Chase, Md., illustrating the residence of Miss Annie Lewis. Two perspective elevations and floor plans. Mr. Louis D. Meline, architect, Chevy Chase, Md.
- No. 11. Half page design of the New Rathapotheke in Bremen.
- No. 12. Pulpit of the Cathedral of Sainte Gudule, Brussels.
- No. 13. Miscellaneous Contents: New York as a furniture market.—Advantages of fresh air in apartments.—Exterior plaster for dwellings.—Rules for making good mortar.—Premature occupation of new homes; a test for relative humidity of habitable apartments.—Ventilation of apartments.—Does your faucet leak?—A new recording thermometer, illustrated.—Beautiful work in wood finishing.—Slate roofs.—Deco-re-o, illustrated.—Berkfeld filter, illustrated.

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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.

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Notes & Queries

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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.

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(7197) W. T. P. asks: 1. Could some one describe the most effective electro-magnet to give a lift of 5 inches at a pressure from 50 to 75 pounds? And state how much electricity it would take to work the same in volts and amperes. A. The electro-magnet best suited to your purpose, probably, is the coil and plunger. The coil would be 15 inches long and the winding would have 17,000 turns of No. 18 wire. The iron core should be a bar about 2½ inches in diameter and 20 inches long, in order to get the very long pull you specify. The type of magnet is described in S. P. Thompson's "Electro-magnet," page 54, and shown in Fig. 30, page 55. 2. And state which is the most productive of magnetism, volts or amperes? I have a generator that gives 50 volts and 3½ amperes. Shall I be able to produce enough magnetism to give me the desired lift? A. The current for the above winding is 3½ amperes. The ampere turns give the lifting power. One ampere going once around the core constitutes an ampere turn; 60,000 ampere turns are provided for in the above winding, and there is a surplus of iron in the core as an allowance for safety.

(7198) W. E. B. asks: Will you please give the process of laying water-tight cement floor over boards? A. A board floor for a water-tight cement cover should be made of very narrow thick stuff, say 2 inches wide and 1½ inches thick, on beams close enough to prevent springing. The upper corner of the flooring strips should be slightly beveled to allow of the cement pressing in between the boards to prevent cracking; bottom edge of flooring should be laid tight. Portland cement should be used and laid thick enough to prevent breaking up by the special use of the floor.

(7199) E. N. M. asks: Will you please inform me through the Notes and Queries columns of your paper how to make a selenium cell, such as is used in electrical experiments? You will find valuable articles on selenium cells in SUPPLEMENT, Nos. 246, 264, 270, 271, 281, 283, 676, and 749, which we can supply at 10 cents each.

(7200) J. E. S. asks: Can you give me any information regarding flash boilers? A. The flash boiler has been the subject of engineering experiment during the past thirty years with no practical result beyond a few horse power. On the larger scale the unequal heating of the steam-making surfaces has produced unequal expansion to such an extent as to ruin every boiler tried in a very short time. The Reid boiler went through several forms, the principal of which was two cylindrical shells, concentric, vertical, with a space of ¼ of an inch between them, with jets distributing the water upon the hot surfaces as evenly as possible with the surplus, if any, falling to the bottom. The fire box was beneath the boiler, with the heated gases rising in contact with both inside and outside of the shell. The Mitchell boiler was a revolving cylinder over the

furnace so that its entire surface became an intense heating surface. The water was fed through a stuffing box on one of the journals, with a central perforated pipe that jetted the feed water in all directions, the steam being taken from the opposite journal with a stuffing box connection. The only style of flash boiler that has done any real service is the coiled pipe form with the water injected at the bottom, which, by its foaming with the sudden heat, rises through the coil and is all converted into steam. The coiled pipe boilers have been of many forms, the most durable of which are made in a single length of extra strong iron pipe. The most successful of the pipe boilers are of the kind made by Serpollet, in Paris, France, and used on steam carriages in the recent road motor trials. The Serpollet is illustrated and described in SCIENTIFIC AMERICAN SUPPLEMENT, Nos. 684 and 732. Ten cents each, mailed.

(7201) J. L. writes: Will you kindly send me a receipt for tempering four ribbed reamer so it will harden and not curve? I have tried oil and salt water and they curve. I have given you the drawing so as to make it as clear as possible. A. The sketch of our correspondent represents an ordinary four ribbed reamer—12 inches long, taper, and of small size. The hardening of long slender tools is the most difficult operation in the machinist's hands. We can only advise the necessary precautions used by those who succeed. The steel should be annealed a second time before the last cut is made, by heating slowly in a low fire buried in an iron box or tube of clear ashes or fine sand; then finished. The heating for hardening should be done in the same way as before, with a little pulverized charcoal mixed with the ashes or sand. When the box and reamer has been heated through, to a full cherry red, the reamer should be carefully drawn out endwise so as to prevent the possibility of bending while hot; and immediately dipped vertically in oil, not too quickly. Any variation from the vertical is liable to warp the tool by cooling one side faster than the other. In drawing temper care should also be taken to heat evenly on all sides alike to the straw color, brown, or light blue, for whatever use the tool is for. The long delicate reamers of the tool trade are tried with an emery wheel and guiding machine.

(7202) L. L. S. asks how to make dry cells for faradic and galvanic batteries, e. g., as the chloride of silver dry cell batteries. A. To make the chloride of silver cell, provide a glass tube about 1 inch in diameter and 3 inches high. This is closed at the top by a cork. Through the cork passes a rod of chemically pure zinc, which may extend to within ¾ inch of the bottom of the tube. This is the positive plate. The negative plate consists of chloride of silver cast around a silver wire, and wrapped in fine parchment paper. To prepare the negative plate, melt the chloride of silver in a porcelain crucible and cast it in a hard carbon mould upon a silver wire, long enough to extend through the stopper and attach to the zinc of the next cell in series. The charging solution is made by dissolving 1 ounce of pure ammoniac chloride (sal ammoniac) in 1 quart of water. The tight fitting stopper retains the liquid in the cell. If the cell is not overworked, no gas is formed by it; so that there is usually no need of a vent. The cell is thus a watertight rather than a dry cell. Dry cells are made by mixing plaster of Paris, gelatine, or similar substances with saturated solution of sal ammoniac in water, so that the liquid will not run out of the mass. In this sense only they are dry. This is packed between and around the zinc and carbon. Much valuable information regarding dry cells and a description of many types will be found in SCIENTIFIC AMERICAN SUPPLEMENT, No. 1001, 10 cents.

(7203) J. M. W. asks for formulas for aromatic vinegar: A. 1. Henry's.—Dried leaves of rosemary; rue, wormwood, sage, mint and lavender flowers, each ¼ oz.; bruised nutmeg, cloves, angelica root and camphor, each ¼ oz.; alcohol (rectified), 4 oz.; concentrated acetic acid, 16 oz.; macerate the materials for a day in the spirit; then add the acid and digest for a week longer at a temperature of 14° or 15° C. Finally, press out the now aromatized acid and filter it. 2. Concentrated acetic acid, 8 oz.; otto of English lavender, 2 drachms; otto of English rosemary, 1 drachm; otto of cloves, 1 drachm; otto camphor, 1 oz. First dissolve the bruised camphor in the acetic acid, then add the perfumery, after remaining together for a few days, with occasional agitation, filter. All vinegars are used by pouring 3 or 4 drachms into an ornamental smelling bottle, previously filled with crystals of sulphate of potash.

NEW BOOKS, ETC.

A PRACTICAL MANUAL OF LINSEED OIL MANUFACTURE AND TREATMENT. Varnish manufacture, superior, medium and cheap grades. By John Bannan. New York and Chicago: Published by the National Provisioner Publishing Company. 1897. Pp. 217. Price \$10.

Linseed oil is a very essential constituent of a good paint or varnish, and it is strange that there should be so little literature on the subject. The present work is by a man who is thoroughly acquainted with the manufacture of linseed oil and linseed oil varnishes, and possesses great value on this ground. The subject is treated in order and the latest methods of manufacturing oil are described. Toward the end of the book the manufacture of varnishes is taken up and a number of tested formulas are given. This book is an addition to technological literature of the utmost importance, and all who are in any way interested directly or indirectly in the manufacture of linseed oil should possess a copy.

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