

RECENTLY PATENTED INVENTIONS. Engineering.

CRANK SHAFT. — Martin A. Green. Altoona, Pa. This invention provides a counterbalance for the crank shafts of center crank engines...

SLIDE VALVE. — Gustav Duvinage. Pasewalk, Germany. This valve is cylindrical in form, and fitted to slide in a cylindrical steam chest...

Railway Appliances.

SLEEPER AND RAIL FASTENER. — Michael A. Glynn, Havana, Cuba. This sleeper has a depending tongue to be embedded in the earth...

CAR COUPLING. — Casper F. Phelps and Raymond A. Lucas, Kohala, Hawaii. This device has a longitudinally separable drawhead in an interior recess...

Agricultural.

HORSE HAY RAKE. — Barton W. Harmer, Avoca, Neb. This invention provides an attachment by which the hay, after being raked into windrows...

Miscellaneous.

LENS GRINDING MACHINE. — Richard B. H. Leighton, Philadelphia, Pa. The machine has a bed or which is a fixed carriage carrying the lens...

STOP WATCH. — Thomas J. Wrantham, Rutland, Vt. This invention provides an attachment for stop watches whereby the movement may be controlled by air pressure...

VENDING MACHINE. — George B. Cornell, New York City. The invention covers a novel construction of a machine, with but few parts and simply arranged...

ODOMETER. — Albert Wareham, West Charlton, N. Y. This device has a split worm wheel with overlapping ends, to permit of increasing or diminishing the size of the wheel...

THRESHOLD GAUGE. — Alexander Watson, Brookline, Mass. Rectangular plates are adjustably attached to the ends of an adjustable body...

SPRING GUN. — George W. Seebach, New York City. This is an improved toy gun of simple and durable construction...

BOAT OR CANOE CHAIR. — Thomas H. Chubb, Post Mills, Vt. This invention provides a chair with back, side arms, and clamps adapted to be readily and strongly attached to the seat...

MOISTURE PARTITION FOR CIGAR BOXES. — Fred. G. Heydt, New York City. This is a self-supporting loose-fitting partition, formed of an angled plate with perforations...

STEP FOR LADDER OR FIRE ESCAPES. David H. Rivers, Thomaston, Me. This device comprises a rung, with brackets to receive its ends...

to embrace ladder ropes, and clamping devices, making a simple and convenient step to be secured to the ropes of ships' ladders or fire escapes...

NECK YOKE. — Charles E. Davis and Charles Lewis, Neosho, Mo. This is a strong, simple and convenient device for draught animals...

ICE VELOCPEDE. — William F. Flickinger and George J. Wiatt, Orchard Park, N. Y. A driving wheel having spurs on its outer edge is mounted between runners in a suitable frame...

STONE POLISHING WHEEL. — Harry W. Whitcomb, Barry, Vt. This is a device for smoothing the rough face of a slab of stone or slate...

HEATER AND VENTILATOR. — William R. Macdonald, Allegheny, Pa. This is an improvement on a former patented invention of the same inventor in an apparatus to be used as a heater...

DEVICE FOR MEDICATING AIR. — The same inventor has obtained another patent covering a novel arrangement of air-tight cabinet in an apartment, with means for warming, cooling, purifying...

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SCIENTIFIC AMERICAN BUILDING EDITION. DECEMBER NUMBER.—(No. 62.)

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- 1. Plate in colors, illustrating a handsome residence at Plainfield, N. J., erected at a cost of \$20,000. Perspective elevation, floor plans, sheet of details, etc. Messrs. Roesiter & Wright, New York, architects.

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

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Tight and Slack Barrel Machinery a specialty. John Greenwood & Co., Rochester, N. Y. See illus. adv., p. 301.

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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.

(2632) J. T. L. asks: Will you please answer the following questions through the Notes and Queries of your valuable paper? 1. Will the large plunge battery described in "Experimental Science" do the same amount of work when it is placed on a moving vehicle as when stationary? A. Yes. 2. Can any steam engine be run by compressed air, that is, if the same amount of pressure is used in both cases, and which will be the cheaper? A. One horse power engine run by compressed air, if it can be done, or the simple electric motor described in "Experimental Science," and what per cent cheaper? A. Yes; provided the accumulation of frost in the engine is prevented by warming the air before use.

(2633) A. K. Jr. asks: 1. What is the best non-conductor of heat known to science? A. Vacuum. 2. What is the best fireproof non-conductor of heat known to science? A. Zirconia. 3. Should the object that is to be protected have a polished surface to give the best results? A. Yes. 4. Does it make any difference of what color the protected object is? A. White is the best color. 5. Is a vacuum as good a non-conductor of heat as the same space would be filled up with air? A. Yes; better. 6. Does heat radiate through solid non-conductors of heat as well as through air? A. No.

(2634) J. J. C. asks (1) for a preparation for rebronzing a bust on a lamp. The bronze has all worn off. A. Use bronze powder mixed with the varnish.

sold for the purpose. 2. Can you tell me what oil of tartar is, and where I can get some? A. It is a strong solution of potassium carbonate. If this salt is exposed to the atmosphere it absorbs water, and as the old name for the salt was salts of tartar, the solution thus formed was called oil of tartar. It may be seen by adding potassium carbonate to weak alcohol. The salt absorbs the water from the alcohol, dissolves and forms an oily layer at the bottom of the vessel. Any druggist can supply it.

(2635) T. H. asks. 1. Why will not American clay answer for crucibles as well as the German? If there are different ingredients what are they? A. It is quite possible that were the demand sufficient, clay for every variety of crucible would be mined here. The ingredients are principally silica and alumina. A very slight difference might largely affect the value of the material. Such difference might not be disclosed by analysis. 2. Why can't we hear something from the Lick Observatory, after all the noise that was made about it? A. Reports of work are published and work perfectly satisfactory to the astronomical world is being executed there. The observatory was erected for scientific uses, not merely to obtain popular fame. 3. Can illuminating gas be compressed so as to be used as a portable hand lamp? A. Practically this is impossible.

(2636) C. A. asks (1) how to curl ostrich tips. A. Draw the fibers, one at a time, over the back of a knife, pressing them against it with the finger. Skill will tell in the quality of the work. 2. How to prepare and apply a lacquer for silverware to protect it from the action of natural gas? A. A solution of shellac or seed lac in alcohol may be applied. The articles must be absolutely clean. Even a finger touch will mar the work. The best plan would be to have the work done by a japanner. The following may be tried, as it has more body than the above: Shellac 7 ounces, alcohol 1 quart. Filter and add 3 1/2 ounces gum elemi and 14 drachms Venice turpentine. Warm, stir and thoroughly filter, if necessary.

(2637) F. F. M. submits following problem: Purchased a lot for \$2,500, held it six months and sold it for \$6,300, allowing 8 per cent interest on the investment and \$315 commission. What was my gain per cent? A. \$2500 x 0.04 = \$100 interest. \$6300 - \$2500 = \$3800 gross gain. \$3800 - (\$100 + 315) = \$3385 net gain. 3385 ÷ 2500 = 135.25 per cent.

(2638) Prospector.—You will find a dynamo described in SUPPLEMENT, No. 161, which with the addition of a circuit breaker will answer for setting off blasts.

(2639) F. J. L.—Wood is sometimes coated with an imitation of marble, by covering the wood with glue and while hot applying marble dust. But this would not stand exposure to the weather very long. Imitation headstones are made of iron, covered with a white smooth enamel resembling marble, which is put on by heat, somewhat similar to the lined cooking utensils known as porcelain lined.

(2640) I. N. S.—For storage batteries, see page 22, vol. 61, SCIENTIFIC AMERICAN.

(2641) T. G. asks: 1. If there were 12,147 deaths during seven months, among a population of 850,585, how would this fact be expressed as an annual death rate per one thousand of population? A. Multiply 12,147 by 12 and divide by 7. Divide quotient by 850,585, treating the comma as a decimal point. 2. Can you prove, by the method of casting out 9s, that the following is incorrect? 73084163 x 7594 = 554270392192. Explain the rule for casting out 9s. A. Proof by excess of 9s is not absolute. An incorrect multiplication might appear correct by this proof. To apply it to your example: Excess of 9s in multiplicand = 5, in multiplier = 6; 5 x 6 = 30. Excess of 9s in grand product as given = 4; excess of 9s in 30 = 3; therefore, as the excess of 9s in the grand product is 4 and is not 3, the multiplication is wrong. The correct product is 554270292192, in which the excess of 9s is 3, indicating a correct result. The principle of casting out 9s is this: The excess of 9s is the remainder left after dividing any number by 9. If two numbers are multiplied, the excess of 9s in the minor product obtained by multiplying the excess of 9s in the one by that in the other should equal the excess of 9s in the original product. The quickest way to find the excess of 9s is to begin at the left hand and add the digits of the given number until the sum of 9 is reached or passed. Then start anew with the excess over 9 as a starting point, thus casting out the first 9s and continue until a second sum of 9 is reached or passed, and so on. The final sum less than 9 is the excess of 9s. Thus taking the correct grand product as above, the excess of 9s is thus determined:

Table showing excesses of 9s for various numbers and their products. Excesses: 1, 5, 7, 0, 1, 3 = excess of 9s. Calculations: 5+5=10 excess=1; 1+4+2+7=14 excess=5; 5+0+2+9=16 excess=7; 7+2=9 excess=0; 0+1+9=10 excess=1; 1+2=3 = excess of 9s.

3. What is Gregory's powder? A. It is compound rhubarb powder; it is made by mixing calcined magnesia 2 1/2 ounces, powdered Turkey rhubarb 1 ounce, powdered ginger 1/2 ounce. Some druggists add chamomile 1/2 ounce with magnesia 2 ounces and ginger 1/2 ounce for same quantity rhubarb. 4. What is the chemical composition of Seidlitz powders, upon mixing? A. Neutral sodium tartrate and potassium sodium tartrate, in aqueous solution charged with carbon dioxide gas.

(2642) E. N. asks how to make oiled clothing. A. To do this, without making it sticky, it must be dried at about 150° Fah. by artificial heat. The sun will do it on a hot day. Set as much boiled oil as is necessary, mix enough lampblack to blacken it, if for black work; if yellow, use ground yellow ochre instead. Then lay the fabric on a smooth surface, and put the oil on with a brush—a shoe brush is best; let the first coat get quite dry before putting on another. A little patent driers will make it dry quicker, say 1/2 pound to a gallon of oil; if the last coat remains sticky