RECENTLY PATENTED INVENTIONS. Engineering.

CRANK SHAFT. - Martin A. Green. Altoona, Pa. This invention provides a counterbalance for the crank shafts of center crank engines, which may be applied to the common center crank so as to be practically as solid as if formed integrally with the crank and the shaft, adapting the center crank thus counterbalanced for use in high speed engines without producing vibrations.

SLIDE VALVE. - Gustav Duvinage, Pasewalk, Germany. This valve is cylindrical in form. and fitted to slide in a cylindrical steam chest having near one end an inlet pipe, and connected at its bottom by ports with the cylinder, in which operates a piston in the usual way, the construction being such that the valve is counterbalanced so as to be almost entirely relieved of steam pressure.

Railway Appliances,

SLEEPER AND RAIL FASTENER.-Michael A. Glynn, Havana, Cuba. This sleeper has depending tongue to be embedded in the earth, a broad portion adapted to rest on the surface of the earth, and a longitudinal rib having slots to receive the chains which carry the rails, with other novel features designed to produce a sleeper with the necessary elasticity, which is inexpensive and easily placed in position, and with means for so fastening the rails that they cannot get out of place.

CAR COUPLING. - Casper F. Phelps and Raymond A. Lucas, Kohala, Hawaii. This device has a longitudinally separable drawhead in an interior recess of which is pivoted a slotted disk having an integral locking tongue, a latch dog below which is a cam block being adapted to interlock with notches in the disk, while a hook bar pivoted to the cam block is adapted to engage a toe on the slotted disk, a rock shaft supporting the cam block, with means for rocking it, whereby cars may be automatically coupled and uncoupled without going between the cars.

Agricultural.

HORSE HAY RAKE. - Barton W. Harmer, Avoca, Neb. This invention provides an attachment by which the hay, after being raked into windrows, may be easily dragged, slid or swept to the place where the stack is to be formed a system of levers being also employed by which the rake teeth and cocking attachment may be simultaneously operated, the parts being held in proper position by the weight of the driver.

Miscellaneous.

LENS GRINDING MACHINE. - Richard B. H. Leighton, Philadelphia, Pa. The machine has a bed on which is a fixed carriage carrying the lens, a radius bar being pivoted on the bed, while a second carriage movable on the bed carries a grinding tool, the second carriage being secured to the radius bar, with other novel features, whereby the machine will grind a lens of any reasonable size, being readily and accurately adjustable to various sized lenses, to grind them per fectly true, and so that the focus may be changed and regulated to a nicety.

STOP WATCH.-Thomas J. Wrangham, Rutland, Vt. This invention provides an attachment for stop watches whereby the movement may be controlled by air pressure, a flexible tube extending from the watch and terminating in a bull to be operated by the hand, or a mouthpiece, so that the watch need not be removed from the pocket of the wearer in timing a horse or the movements of athletes.

VENDING MACHINE. - George B. Cornell, New York City. The invention covers a novel construction of a machine, with but few parts and simply arranged, whereby a package may be withdrawn from the machine only after a genuine coin of a certain denomination has been properly introduced, other coins or imitations not interfering with the mechanism

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 according to the size of the vehicle wheel, and is designed to be quickly applied to any vehicle to measure the revolutions of a wheel.

THRESHOLD GAUGE. - Alexander Watson, Brookline, Mass. Rectangular plates are adjustably attached to the ends of an adjustable body, second plates having one beveled end being also attached to the ends of the body, the opposed plates being adapted to extend laterally in opposite directions, while third plates are also adjustably atlached to the first named plates, forming a simple tool whereby threshold plates may be readily and accurately fitted to

to embrace ladder ropes, and clamping devices, making a simple and convenient step to be secured to the rope of ships' ladders or fire escapes, and which when attached will not encumber the ropes, but permit their being rolled up into small compass.

NECK YOKE. - Charles E. Davis and Charles Lewis, Neosho, Mo. This is a strong, simple and convenient device for draught animals, to permit one or both of a pair of horses connected by it to a vehicle pole to move laterally and avoid obstructions in the [roadbed, and then resume a normal position with regard to the vehicle and its pole.

ICE VELOCIPEDE. - William F. Flickinger and George J. Wiett, Orchard Park, N. Y. A driving wheel having spurs on its outer edge is mounted between runners in a suitable frame provided with a seat and means for revolving the wheel and steering the device, which is simple and strong in construction and adapted to be easily and rapidly propelled over snow or ice.

STONE POLISHING WHEEL - Harry W. Whitcomb, Barry, Vt. This is a device for smoothing the rough face of a slab of stone or slate, and consists of a metal disk with detachable scroll-shaped flanges and having connections for a vertical pendent shaft, whereby the disk is rotated horizontally on the upper face of the stone to be dressed, acting thereor through the agency of sand or small pellets of hard cast iron.

HEATER AND VENTILATOR.-William R. Macdonald, Allegheny, Pa. This is an unprovement on a former patented invention of the same inventor in an apparatus to be used as a heater, or as a heater and ventilator, or as a ventilator alone in warm weather, to drawoff vitiated air from apartments and supply pure air, the arrangement being such that no mingling can take place of the escaping vitiated air with the fresh air entering from the outside.

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, or charging the incoming air with antiseptics or medicaments for any particular ailment, these cabinets to be separately applied to a series of apartments in a building, so that each apartment may be isolated from the other, although all the apartments may have a general outlet and means for drawing off the vitiated air.

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.

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

TABLE OF CONTENTS.

- 1. Plate in colore, illustrating a handsome residence at Plainfield, N. J., erected at a cost of \$20,000. Perspective elevation, floor plans, sheet of details, etc. Messrs. Rossiter & Wright, New York, architects.
- 2. Handsome colored plate showing a summer cottage recently erected at Grand Point, Mich., from plans furnished by Munn & Co., New York, Floor plans, perspective view, sheet of details, etc. Cost complete \$1,200.
- 3. The Hackley Public Library Building at Muskegon, Mich.
- An attractive and economical church for a country 4. village. Cost \$5,000, perspective view and ground plan.
- 5. A cottage at West Brooklyn, N. Y. Floor plans and photographic view. Estimated cost \$2,500. Country house at Wayne, Pa. Cost complete
- \$9,000. Perspective elevation and two floor plans. 7. An attractive cottage in Buena Park, Chicago,
- Estimated cost \$4,500. Photographic view and two floor plans. 8. Residence at Graceland, Chicago. Estimated cost
- \$4,000. Photographic view and two floor plans. 9. Photographic view and two floor plans of a hand-
- some residence at Auburn Park, Chicage. Estimated cost \$7,000. 10. A picturesque example of a bungalow at Bellagio.
- Cost £900. R. A. Brigge, London, architect. Plans and elevation.
- Attractive country house at Narberth Park, Pa 11. Cost complete \$18,000. Two photographic views and floor plans.
- Miscellaneous contents : Some of the merits of the 12. ARCHITECT AND BUILDERS EDITION of the SCIENTIFIC AMERICAN. -How to catch contracts. -Improve your property. -- The education of customers .- The SCIENTIFIC AMERICAN a help to Setting back h

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

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price. **Wimerals** sent for examination should be distinctly marked or labeled.

(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" afterdividing anynumber by 9. If two numbers are 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. A compressed air engine would be more economical than an electric motor driven by battery power. 3. Is there any way of getting a description of all the air ships which have been invented all over the earth ? A. We refer you to May's "Ballooning," \$1, and to back numbers of the SUPPLE-MENT. 4. We have a tauk here, and would like to know

how many cubic feet of water there are in it, what pres sure is there at the bottom, and how high should it throw a stream 1 inch in diameter, the tank being 100 feet high and 45 inches circumference ? A. The pressure at the bottom of your tank is 41'88 pounds per square inch. The tank contains 16,200 cubic feet. The distance the above pressure would project a jet would depend upon the length, diameter, and straightness of the pipe. Under the most favorable circumstances you could probably throw a jet 60 feet. (2633) A. K. Jr. asks: 1. What is the best non-conductor of heatknown 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 nonconductor 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.

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 saits 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 tel, 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 shell lac 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% ounces gum elemi and 14 drachms Venice turpentine. Warm, stir and thoroughly filter, if necessary.

(2637) F. F. M. submits following problem : Purchaseda 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. \$2500×0.4=\$100 interest. \$6300-\$2500= \$3800 gross gain. \$3800-(100+315)=\$3385 net gain. 3385+2500=135 2-5 per cent.

(2638) Prospector.-You will find a dyamo 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? 73084163×7584=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; $5 \times 6 = 30$. 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 afterdividing anynumber 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 asecond 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 :

55 42 70 29 21 92 Excesses 1 5 7 0 1 3=excess of 9s. or developed as follo ws : 5+5 =10 excess = 1

door frames.

SPRING GUN. - George W. Seebach, New York City. This is an improved toy gun of simple and durable construction, in which the follower is actuated by means of springs, the recoil of which and of the follower is taken up so as to prevent breakage and wear of the parts.

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 of a canoe or boat, the device when not in use being foldable into a small package.

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 and a broad supporting foot, the plate being movable in the cigar box, for supplying moisture to the cigars, the device being so formed that it may be packed with the cigars and not take up much room.

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

uses in new Plumbers' materials .- "Adamant" wall plaster, -Inside window blinds, illustrated, -Employers' liability and accident insurance.-An improved scroll saw, illustrated.-Embellishments of subur ban stationgrounds.-Repeated building from the sameplans.-Mortar colors for builders.-Builders' ornamental iron work. - Improved spring hinges, illustrated,-Improved two-speed boring machine, illustrated .- Oil and wax in painting .-Mineral wool in house construction, illustrated.

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(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.

1+4+2+	7 = 14 exc	cess=o	
5+0+2+	9=16 exc	cess=7	
7+2	=9 exc	cess=0	
0+1+9	=10 exe	cess=1	
1+2	=3	= excess of 9s	5,

3. What is Gregory's powder? A. It is compound rhubarb powder: it is 'made by mixing calcined magnesia 21/2 ounces, powdered Turkey rhubarb 1 ounce, powdered ginger 1/2 ounce. Some druggists add chamomile 16 ounce with magnesia 2 ounces and ginger 16 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° Fab, 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 ocher 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