board is automatically released to prevent the escape of the load.

GRIP BLOCK.—George S. Fouts, Aberdeen, Washington. This device is designed to operate as well on a rod or chain as on a cable, and also for drawing bridge rods, etc., together, or for hauling. It has a recess with converging walls, in which fit keys having racks, there being roller bearings between the keys and the walls, and pinions, each meshing with one of the racks of the keys and connected to turn together.

SHOE POLISHER. — Herman Parsons, Savannah, Ga. This device consists of a bail-shaped handle having square-sided loops formed on its ends to facilitate retaining a strap under tension. The device is designed to facilitate the polishing of russet, patent leather and enamel shoes.

WATER HEATER AND RANGE.—Isaac N. Hall, Mediapolis, Iowa. This improvement consists of an upper water-distributing chamber, pendent feed pipes bent to form a fuel-holding pot, their ends extending inward to form a grate portion, while a centrally disposed water-heating chamber connects the ends of the grate portions of the pipes. The construction is such that a large quantity of water can be heated and forced up through the pipes with but a small outlay of fuel.

DAMPER FOR STOVES.—Ernest C. Cole, Council Bluffs, Iowa. This invention has especial reference to "air tight" stoves, where the draught openings are to be closed as tightly as possible, and the damper consists of two concentric pipes arranged to form an annular tapering space between them, and having coincident air holes in combination with an adjustable tube section closed at one end and adapted to pass between the concentric pipes to cut off communication between their coincident holes.

DESIGN FOR A CARPET.—Walter B. Brown, Newark, N. J. The body and border of this carpet are decorated with connected leaf scrolls, reversely curved, rosettes and leaf figures.

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.

AUGUST, 1894.—(No. 106.)

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1. An elegant plate in colors showing a residence at Plainfield, N. J., recently erected for George H. Babcock, Esq. Perspective views and floor plans. A picturesque design. Mr. E. L. Hyde, architect, New York City.
2. A residence at Edgewater, Ill., recently erected for Mrs. Eva L. Prescott. Perspective elevations and plate in colors, together with floor plans. An excellent design. M. J. L. Silsbee, architect, Chicago, Ill.
3. A residence recently completed for J. P. Clarendon, Esq., at Hackensack, N. J. Two perspective elevations and floor plans. Mr. J. E. Turhune, architect, Hackensack, N. J. An attractive design.
4. A dwelling at Erie, Pa., erected for William J. Sell, Esq., at a cost of $4,500 complete. Two perspective elevations and floor plans. Mr. C. F. Dean, architect, Erie, Pa.
5. A beautiful residence recently erected at Belle Haven, Conn. Three perspective elevations, one interior view, together with floor and ground plans. Mr. C. P. H. Gilbert, architect, New York City. A model design.
6. The beautiful residence of E. Einstin, Esq., at Pompton, N. J. Perspective elevation and floor plans. Cost complete about $20,000. Architect, Mr. Manly N. Cutter, New York City.
7. A conveniently and economically arranged suburban cottage recently erected for George W. Payne, Esq., at Carthage, Ill. An attractive and picturesque design. Perspective elevation and floor plans. Cost $3,000 complete. Architects, Messrs. G. W. Payne & Son, Carthage, Ill.
8. Perspective elevation and floor plans of a well arranged dwelling, recently erected for A. N. O'Harra, Esq., at Carthage, Ill. A pleasing design. Cost complete, $5,500. Architects, Messrs. G. W. Payne & Son, Carthage, Ill.
9. A stable at Belle Haven, Conn. Perspective view and ground plan. A unique design. Mr. C. P. H. Gilbert, architect, New York City.
10. The Club House of the Knickerbocker Field Club, recently erected at Flatbush, L. I., N. Y. Engravings and floor plans. Messrs. Parsett Bros., architects, Brooklyn, N. Y. A neat design in the Colonial style.
11. An elegant residence of A. B. Bigelow, Esq., at Cranford, N. J. Perspective elevation and floor plans. Estimated cost, $6,000. Mr. Manly N. Cutter, architect, New York City.
12. Miscellaneous Contents: The Hayes metallic lathing, illustrated.—Nonsuch Palace.—The Joseph Dixon Crucible Co.—The slate business.—New and old styles of eaves troughs, illustrated.—The Weathered hot water heaters.—Design for mantel and fireplace, illustrated.—The "P. & B." sheathing and insulating papers.—An improved vise, illustrated.—What becomes of all the lumber.—Globe ventilator, illustrated.—An improved sadiron, illustrated.

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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.

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(6169) F. M. S. writes: Will you please give me the best method of putting fire brick lining in an arch? I have a 48 inch tubular boiler 14 feet long, and find it hard to keep the lining in, especially in the front. Is it best to put salt in the fire clay? I also have a 10×15 slide valve engine. It is set about 250 feet from boiler. The valve as it is set at present has no lead. The eccentric stands at 90 inches. Would I save any steam or lose any power by advancing the eccentric enough to give a little lead? A. For lining a boiler furnace use the best fire brick that can be procured, free from warp and with a sharp mould. Lay the brick as stretchers as close as possible, and breaking joints. Use pulverized fire brick, which can be purchased from the fire brick makers, or the old brick can be pulverized in a mortar or iron pot as fine as ordinary mortar sand. Sift, to remove all lumps, mix to a mortar with ¼ good fire clay and water. Use no salt or other flux, press and rub the bricks as close as possible; the least thickness of mortar joint makes the most durable lining. If there are any old headers running into the outer wall, they should be used, if in good order, or others inserted at 2 to 3 feet above the grate. The closing in at one or two courses below the lugs should be done by uncovering the top of the wall each side of the lugs, so as to make a good bearing weight on the lining wall at the top. This is much better than to wedge in the upper course.

(6170) G. M. B. says: Two dynamos with the same size pulleys are run by two belts from the same engine pulley, one belt being run over the other; do the two dynamos run at exactly the same speed? If not, which runs faster? A. The dynamo with the outside belt runs the faster by the difference in the circumference of the pulley and the circumference of the enlargement of the pulley due to the thickness of the inner belt.

(6171) W. J. C., Queensland, writes: I have a 100 feet head of water which I wish to utilize to drive a 10 head stamper battery, requiring say 45 actual horse power. The water to be conveyed through pipes a distance of one thousand yards. What size Pelton wheel and pipes would be suitable? The smallness of pipes being greatest consideration. Would I lose power by reducing size of pipes near discharge end? What size pipes and wheel would develop 25 actual horse power under same circumstances? A. For 45 horse power, a wheel 6 feet diameter of the Pelton or other good hurdy-gurdy type should be used; 398 cubic feet of water will be required per minute giving a wheel velocity of 125 revolutions per minute. With 3,000 feet of 24 inch pipe the water velocity will be 2·2 feet per second, with a loss of head by friction of five feet, making the working head 95 feet. Pipe may be tapered for a short distance from the nozzles to advantage. The nozzles should be two, each of 2¾ inch diameter. For 25 horse power, same head and distance, a 4 foot wheel, using 176 cubic feet of water per minute, will be required. Will run at 180 revolutions per minute. The pipe should be 16 inches in diameter, giving a velocity of 2·2 feet per second, with a friction loss of head of 5½ feet, making the working head 94½ feet. For this wheel and power one nozzle of 2⅝ inches diameter or two nozzles of 1⅞ inches diameter will be required. Smaller pipe than above stated will largely reduce the working head and power.

(6172) Denver Club asks: Will you please state in your columns what the chances are of throwing a given two numbers with two dice, for instance a 5-4? A. The chances of throwing two specified numbers with dice are a multiple of the total numbers, or 6×6=36, one chance in 36.

(6173) J. B. J. says: Cannot phosphorescent light and sunlight be stored or absorbed by some material that will give it out again, and cannot this fact be made of practical use? Did not your paper publish some facts of the kind? If so, in what issue? A. Barium sulphide, calcium chloride, calcium sulphide, strontium sulphide, and phosphureted oil are all phosphorescent substances. Luminous paint is of some practical value; it is described in SUPPLEMENT, No. 497. Our "Scientific American Cyclopedia of Receipts, Notes and Queries" contains information on this subject.

(6174) J. E. S. asks if white plaster images, statuettes, or busts can be made washable without destroying or affecting the absolute whiteness of same, and if so, how? A. Heat and dip in melted paraffine, polish with a woolen cloth.

(6175) D. H. B. asks: What preparation will remove japan from finished work after it is baked and leave the metal clean and in good condition to be again coated with japan? A. Try using a saturated solution of caustic potash in water.

TO INVENTORS.

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