

side saddle the seat may be lengthened or shortened to accommodate the rider.

**TRACE CARRIER.**—William A. Mayhall, Gloster, Miss. This invention relates to buckles such as are used to connect the back band of a farm harness with the traces. The construction is simple and durable, and the buckle is very efficient in service, securely locking the traces in place and firmly holding the back band.

**RUNNING GEAR.**—Axel Warenskold and John G. Burgess, San Diego, Cal. This is an improvement upon a formerly patented invention of the same inventors, for a simple and durable gear so arranged as to permit of turning the vehicle in very short curves without binding the king bolt or other working parts. The improvement embraces a fifth wheel having two fulcrums. A fifth wheel is pivoted to one of the axles, and a second fifth wheel is connected by two pivots with the other axle, while reaches crossing each other connect the axles with each other.

**TROUSERS HANGER.**—Arthur C. Nash, Cambridge, Mass. This device consists of a looped cord furnished at opposite ends with hooks, and provided with a button cleat and rings for tightening the cord upon the legs of the trousers. By this means trousers may be suspended in the best position for retaining their shape, and so that they will take up but little room.

**SURGICAL INSTRUMENT.**—Frederick C. Thompson, East Tawas, Mich. This invention comprises a novel form of forceps, attached to the jaws or blades of which near their forward ends is a soft elastic ring for use in connection with a flexible medicine cup.

**MEDICINAL COMPOSITION.**—Otto L. Mulot, Long Island City, N. Y. This is a composition to be used for the blood, to increase the healthy tone and natural action of the body. It comprises an electrolyzed distillate from a mixture of oil of turpentine, juniper berries, white oil of amber, aloes, gum myrrh, gum mastic, flowers of sulphur, gum olibanum, and various other ingredients, combined and prepared in a specified manner.

**DESIGN FOR BOTTLE.**—Daniel O'Reardon, Jersey City, N. J. This design provides a peculiarly shaped bottle, designed to have an antique appearance, and somewhat resembling the vessels made of skins used in Oriental countries.

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.

MAY, 1893.—(No. 91.)

### TABLE OF CONTENTS.

- Elegant plate in colors, showing an elegant residence at Bridgeport, Conn. Floor plans and two perspective elevations. An excellent design. Messrs. Longstaff & Hurd, architects, Bridgeport, Conn.
- Plate in colors showing a handsome residence at Rutherford, N. J. Two perspective views and floor plans. Mr. F. W. Beal, architect, New York. An attractive design.
- A handsome dwelling at Plainfield, N. J. Perspective views and floor plans. A model design. Messrs. Hartwell & Richardson, architects, Boston, Mass.
- A dwelling at Utica, N. Y., erected at a cost of \$4,700 complete. Floor plans, perspective view, etc. Mr. W. H. Symonds, architect, New York. An Old Colonial style of architecture.
- Engravings and floor plan of the Fairfield Congregational Church at Fairfield, Conn., erected at a cost of \$52,000. Messrs. J. C. Cady & Co., architects, New York City.
- A stable erected at Plainfield, N. J. A model design. Messrs. Hartwell & Richardson, architects, Boston, Mass.
- An excellent design for a modern stable at Bridgeport, Conn. Messrs. Longstaff & Hurd, architects, Bridgeport, Conn.
- A residence at Belle Haven, Conn. A very picturesque design, perspective elevation and floor plans. Cost \$6,000 complete. Mr. Frank W. Beal, architect, New York City.
- View of a tasteful shop for a builder erected at Neuilly, Paris.
- The Fifth Avenue Theater, New York.—View of the Worthington steam fire engine pump.—View of the Hygienic Cement and Asphalt Company's watertight scene pit. View of the Edison Electric Illuminating Company's switchboard, with particulars of construction, etc.
- Miscellaneous contents: A Pacific coast bathing establishment.—An improved spring hinge, illustrated.—The Lewis open fire base burner, illustrated.—The J. A. Fay and Egan Co.—The H. W. Johns paints, etc.—An adjustable sash holder, illustrated.—A labor saving screw driver, illustrated.—A self-feed rip saw, illustrated.—Shipping a factory across the Atlantic.—Architectural wood turning.—Tunneling the Simplon.—New resawing band saw machine, illustrated.—The Wheeler wood filler.—An improved hip shingle, illustrated.

The Scientific American Architects and Builders Edition is issued monthly. \$2.50 a year. Single copies, 25 cents. Forty large quarto pages, equal to about two hundred ordinary book pages; forming, practically, a large and splendid MAGAZINE OF ARCHITECTURE, richly adorned with elegant plates in colors and with fine engravings, illustrating the most interesting examples of Modern Architectural Construction and allied subjects.

The Fullness, Richness, Cheapness, and Convenience of this work have won for it the LARGEST CIRCULATION of any Architectural Publication in the world. Sold by all newsdealers. MUNN & CO., PUBLISHERS, 361 Broadway, New York.

## Business and Personal.

The charge for insertion under this head is One Dollar a line for each insertion; about eight words to a line. Advertisements must be received at publication office as early as Thursday morning to appear in the following week's issue.

"U. S." metal polish. Indianapolis. Samples free. Kemp's Manure Spreader, Syracuse, N. Y. See Adv. Shingle machinery. Trevor Mfg. Co., Lockport, N. Y. Universal and Centrifugal Grinding Machines. Pedrick & Ayer, Philadelphia, Pa.

Skilled workmen and best materials are the basis for the deserved popularity of Jessops' steel.

Wanted to Invest—Thirty or forty thousand dollars in good mfg. business. Address P. O. box 805, Chicago.

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

Stow flexible shaft. Invented and manufactured by Stow Mfg. Co., Binghamton, N. Y. See adv., page 270.

Screw machines, milling machines, and drill presses. The Garvin Mach. Co., Laight and Canal Sts., New York.

Centrifugal Pumps for paper and pulp mills. Irrigating and sand pumping plants. Irvin Van Wie, Syracuse, N. Y.

Guild & Garrison, Brooklyn, N. Y., manufacture steam pumps, vacuum pumps, vacuum apparatus, air pumps, acid blowers, filter press pumps, etc.

Split Pulleys at Low prices, and of same strength and appearance as Whole Pulleys. Yocum & Son's Shafting Works, Drinker St., Philadelphia, Pa.

Perforated Metals of all kinds and for all purposes, general or special. Address, stating requirements, The Harrington & King Perforating Co., Chicago.

To Let—A suite of desirable offices, adjacent to the Scientific American offices, to let at moderate terms. Apply to Munn & Co., 361 Broadway, New York.

Hydrocarbon Burner (Meyer's patent) for burning crude petroleum under low pressure. See adv. page 381. Standard Oil Fuel Burner Co., Fort Plain, N. Y.

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.

Canning machinery outfits complete, oil burners for soldering, air pumps, can wipers, can testers, labeling machines. Presses and dies. Burt Mfg. Co., Rochester, N. Y.

Competent persons who desire agencies for a new popular book of ready sale, with handsome profit, may apply to Munn & Co., Scientific American office, 361 Broadway, New York.

Patent for Sale—A new specialty, all metal, for general and domestic use. Just patented in Europe and the United States. Sale established. Offered to responsible parties. Address P. O. box No. 14, Rochester, N. Y.

Engraver, die sinker, and lettercutter. Manufacturer of steel stamps for every purpose, steel letters and figures, printing dies, burning brands, stencils, rubber stamps, etc. Chas. W. Hoefig, 52 Fulton Street, New York.

Want to Purchase—A patented vapor engine, the right to manufacture and sell same, or to arrange with manufacturer of one already in the market for their exclusive use for certain purposes. Address, with particulars, Vapor Engine, P. O. box 773, 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.

(5014) W. T. asks: With a stream of water 6 inches in diameter, having a head of 10 feet, and using the best turbine wheel, what would be the available horse power? Also, what would be the best water wheel to use? A. You will have an available 5 horse power. Address James Leffel & Co., Springfield, Ohio, for a good and economical turbine.

(5015) C. H. S. asks: Is there any means by which small red ants can be exterminated from a lawn without injuring the grass? If so, I should appreciate any information thereof. Reply by Prof. C. V. Riley.—It is difficult to accomplish this result without any injury to the grass, but the use of bisulphide of carbon, which I have frequently recommended, only temporarily destroys the verdure of the grass plots immediately above the nests. It turns them yellow for a few days, but does not impair the vitality of the plant. The nests of the small red ant are very small, and it will probably suffice to pour a half teaspoonful or so of the bisulphide into the principal hole of the nest and destroy and cover up the sand-like mound. With the more extensive nests of larger ants, however, it will be desirable to pour a teaspoonful of liquid down each of the principal holes of the nests and cover them ten or fifteen minutes with a wet blanket, afterward exploding the vapor at the mouth of the holes with a torch of lighted kerosened rag at the end of a long pole.

(5016) M. A. C. asks how to grind and set razors. A. Razors that have been in use so long that the edge is rounded by strapping can be brought to a flat bevel on the edge by placing them on a perfectly flat hone or other fine grained stone, with a little thin oil, as lard oil or fine machine oil, letting the back always rest upon the stone, and with small circular motions of the hand, without pressure, grinding down the bevel until the stone marks meet on both sides in a thin feather edge.

(5017) C. W. G. asks how to make potato starch. A. Convert the potatoes into a pulp by

means of a scraping knife or an instrument similar to a nutmeg grater; throw the pulp upon a fine linen cloth in a large funnel, and allow pure cold water to run through the mass slowly for several hours. By this means all the minute starch granules may be washed through the cloth; and on allowing the water to stand for some time, these will settle to the bottom, and may be removed by decanting the water and straining.

(5018) R. H. P. says: Can you give me a formula for perfumed carbolic acid? A. Carbolic acid, 4 oz.; rectified spirit, 6 oz.; oil of bergamot, 28 min.; oil of citronella, 10 min.; water, to make 1 pint. Dissolve the oils and acid in the spirit and add the water, shaking well.

(5019) G. C. G. S. says: Will you please give a table showing the contraction of castings in different metals? A. Table by Bowen & Co., brass founders, London:

	Inch.	Inches of length.
In thin brass castings.....	$\frac{1}{8}$	in 9
In thick ".....	$\frac{1}{4}$	in 10
In zinc castings.....	$\frac{1}{8}$	in 12
In lead, according to purity.....	$\frac{1}{8}$ to $\frac{1}{4}$	in 12
In copper, ".....	$\frac{1}{8}$ to $\frac{1}{4}$	in 12
In tin, ".....	$\frac{1}{2}$ to $\frac{3}{4}$	in 12
In silver, ".....	$\frac{1}{8}$	in 12
In cast iron, according to purity, small castings.....	$\frac{1}{8}$	in 12
In cast steel, according to purity, pipes.....	$\frac{1}{8}$	in 12

The above values fluctuate with the form of pattern, amount of ramming, and temperature of metal when poured. Green sand castings contract less than loam or dry sand castings.

(5020) R. W. C. says: Will you please tell how to preserve the natural colors of plants? A. A recent improved receipt for preserving plants with their natural colors is to dissolve 1 pt. salicylic acid in 600 parts of alcohol (parts by weight), heat the solution up to boiling point in an evaporating vessel and draw the plants slowly through it. Shake them to get rid of any superfluous moisture and then dry between sheets of blotting paper under pressure in the ordinary manner. Too prolonged immersion discolors violet colored flowers, and in all cases the blotting paper must be frequently renewed. The novelty appears to be the salicylic acid.—*Art Amateur.*

(5021) A. R. C. asks how to test air for sewer gas. A. Saturate unglazed paper with a solution of 1 ounce of pure lead acetate in half a pint of rain water; let it partially dry, then expose in the room suspected of containing sewer gas. The presence of the latter in any considerable quantity soon darkens or blackens the test paper.

(5022) B. J. M. wants to know how carton pierre ornaments are made. A. The following is a formula for such a composition: Glue, previously dissolved in water, 13 parts; pulverized litharge, 4 parts; white lead, 8 parts; plaster of Paris, 1 part; very fine sawdust, 10 parts. Oil the moulds to prevent adhesion.

(5023) G. F. F. asks for a remedy for buffalo moths. A. Take strips of red or blue flannel (as these colors are particularly attractive to them), dip in solution of arsenic and lay around the edges of carpets, or wherever the pests are troublesome. Said by those who have tried it to be sure death to the insects.

(5024) E. A. J. asks for the United States government formula for whitewash. A. The following coating for rough brick walls is said to be used by the United States government for painting lighthouses, and it effectually prevents moisture from striking through: Take of fresh Rosendale cement, 3 parts, and of clean, fine sand, 1 part; mix with fresh water thoroughly. This gives a gray or granite color, dark or light, according to the color of the cement. If brick color is desired, add enough Venetian red to the mixture to produce the color. If a very light color is desired, lime may be used with the cement and sand. Care must be taken to have all the ingredients well mixed together. In applying the wash, the wall must be wet with clean, fresh water; then follow immediately with the cement wash. This prevents the bricks from absorbing the water from the wash too rapidly, and gives time for the cement to set. The wash must be well stirred during the application. The mixture is to be made as thick as can be applied conveniently with a whitewash brush. It is admirably suited for brickwork, fences, etc., but it cannot be used to advantage over paint or whitewash.

(5025) N. K. K. asks: Is the incandescent lamp used as a "Geissler tube," useless without first admitting air into it (as the description given by E. M. La Briteaux)? A. The vacuum is too high to permit of using a lamp as a Geissler tube. The vacuum of an incandescent lamp is more like that of Crooke's tubes.

(5026) G. R. C. asks: In what ratio does the amount of steam (expressed by weight of water) generated under different pressures by a fixed unit of carbon vary? A. The total heat from 32° of one pound of steam at 0 pressure is 1,146 heat units and at 100 pounds pressure is 1,184 heat units. One pound of best coal, with perfect combustion, gives out from 14,000 to 15,000 heat units, and will make from 11 to 12½ pounds of steam at 100 pounds pressure if no heat is lost.

(5027) D. W. says: 1. I want to build the simple electric motor described in "Experimental Science." It does not state whether the magnet wire used is single or double wound. Which is it? A. You can use either a single or double covered wire. There is less danger of crosses when double-covered wire is used. 2. Will the same size machine, with cast fields and wound as described for dynamo, furnish current sufficient for the motor to run two or three sewing machines? A. When the machine is used as a dynamo in the manner suggested it will not furnish current enough for running two sewing machines.

(5028) H. A. F. asks: Will you kindly give me advice on the following: I have a 16 foot boat, galvanized iron No. 18, in compartments of 3 feet, without any ribs, but well braced. As I intend to put a 1 horse power gasoline motor in it, will I need to put in any ribs, and, if so, will  $\frac{1}{2}$  + 1 angle iron do? And will I need any papers of pilot or engineer to run the same?

A. You should strengthen the shell of your boat near the engine. The 1 inch angle iron ribs will do. You will need a pilot's license if you run on waters having commercial traffic.

(5029) J. H. W.—The sawmill dogs you describe are, no doubt, steel castings, which are made by melting and pouring cast steel, and can be forged and tempered like bar steel. Steel castings are far better than malleable iron castings.

(5030) A. C. asks: Are not malleable iron tube fittings preferable to cast iron ones for steam and hot water heating purposes, and also for piping steam under ordinary pressures, provided the interior shape is the same? A. The malleable fittings are preferable when made with taper threads for steam use, wherever there is liability of accidental breakage of the fittings and danger from leakage. For ordinary steam piping, cast iron fittings are in almost universal use and considered safe.

(5031) B. W. C. asks: Is the sun motor used in this country? Could you pump water 160 feet, and cost? A. The sun motor, so far, has been only an experiment. With the ordinary force pump, water may be easily raised the height you mention.

(5032) S. H. B. asks: Is there any appliance by which sorghum juice can be evaporated by running steam pipe through the juice and applying the heat in that way? I have a friend who is raising sorghum, and he thinks there should be some way of evaporating by steam heat through pipes. He wants to make sirup or molasses, not sugar. An answer to this will be appreciated. A. Sorghum juice can be evaporated in large flat pans with a flat coil of steam pipe in the bottom of the pan.

(5033) J. B. asks: Is hemlock suitable for studs and joists in building a frame house? If not, what are the objections to it? A. Hemlock for studding and joist is liable to warp and spring out of line and is more shaky than pine; yet it is largely used now in cottage houses, on account of cheapness.

(5034) G. C. B. asks: 1. How high are the highest masts of sailing vessels, and how much canvas do they spread? A. The tallest masts are from 160 to 180 feet high, and spread from 60,000 to 100,000 square feet of canvas. 2. What is the curvature of the earth in inches per mile? A. The curvature of the earth is 8 inches per mile.

(5035) G. W. B. asks: Will a boiler built to furnish steam at 100 pounds pressure for an 18 inch cylinder, 18 inch stroke, furnish steam for a steep compound engine, 18 inch high pressure and 36 inch low pressure cylinders, 18 inch stroke, both having condensers? If not, why? A. For equal indicated horse powers the compound condensing engine uses, or should use, less steam than any single cylinder condensing engine. With the arrangement as stated, with both high pressure cylinders alike, the compound engine, with proper cut-off, may be twice the power of the single cylinder engine, and may, by the relation of cut-off on each engine, require more steam.

(5036) W. F. C. writes: Is there any high explosive, not easily fired by concussion, that could be safely used in bombs for ordinary cannons or mortars? What is supposed to be the original substance of volcanic ashes? Are these ashes considered evidence that the internal heat of the earth is produced by combustion? By analogy the heat of the sun is due to the same cause. Is this the reason why scientists claim that it will eventually expire? A. There is no high explosive as yet known that will stand the initial concussion of discharge from guns. Much experiment has been made in this direction, but without as yet practical results. Volcanic ashes are of much the same composition as pumice stone, or nearly the same as the primary rock formation of the earth—principally silica and feldspar, with a small admixture of metallic oxides. There is no evidence from volcanic eruption, or the material thrown out, that there is combustion going on within the earth. The heat held in the interior of the globe is assumed to have been nascent with its creation, and the interior heated mass to be inert, volcanic activity being the vent for the relief of the pressure upon the hot fluid mass of the interior, caused by the contraction of the earth's crust by loss of heat from radiation. The heat of the sun is reasonably assumed to have been derived in the same manner, only that its immense mass has made it slow to cool. The condensing theory of the progress of creation indicates that the sun and the solar system is a cycle in the events of eternal time. Its life existence had a beginning and will have an end.

(5037) J. W. writes: What is the most practicable way of storing power for future use, if any? I am owner of water power with limited storage for water and am obliged to operate wheels most of the time, in fact all the time, and could use in 18 hours all the power I could develop in the 24 with the amount of water available; how could I store the 6 hours power that goes to waste? I operate electric power and light plant 18 hours out of 24. A. In the absence of particulars as to the limit of water storage, the question of a higher dam, which alone will increase the power in the proportion that the additional height bears to the present height, or the addition of power by the storage of water, need not be discussed, as you say you have a limited storage. There is but one other way that may be made available directly in your line of operation, and that is electrical storage. With your present plant you may charge storage batteries during the 6 hours to the full extent and power of your electric plant, and also utilize any excess of power that you may have to spare from the present operation for power and light.

(5038) Enquirer, Va., writes: Please advise me of an approved plan of ventilating under a building where the joists are near the ground. In this flat country if we excavate more than 12 to 18 inches, water stands under the floor and the floor joists decay, first in the brick walls and then throughout. A. Buildings on wet ground should have at least 3 feet space between the ground and the joists, and if stone or brick foundations are used, holes 1 foot square should be made through the foundation close to the sills on each side near the corners and along the sides, and covered with galvanized wire netting fine enough to keep out mice. This will give the wind