—E. Z. SMITHPETER, Bogard, Mo. The usual means for attaching harness with the neck-yoke of a [illegible] wagon is a breast-strap which passes through a ring on the yoke, its ends being attached to the collar hames, the strap being thus bent at an acute angle where it passes through the yoke ring, so that it is subject to great strain and rapid wear at that point. Advantages are obtained in respect to wear and ease and rapidity of hitching and unhitching the team.

POLISHING COMPOUND.—G. SHAMBECK, Salt Lake City, Utah. The object of this invention is to provide a polish for use on any article of furniture, vehicles, and woodwork in general, whether previously varnished or not, the polish imparting a bright and fresh appearance, so that the article treated will look as though it had recently been renovated or was entirely a new article. The compound acts the same either on a wet or dry surface.

HOSE-COUPLING.—H. E. SMITH, Roslyn, Wash. The purpose of this improvement is to provide details of construction for hose-couplings which are simple and practical, affording means for connecting two sections of the hose-coupling in a reliable manner and permitting the sections to be manually disconnected with ease, and which may be employed to couple onto a fire-hydrant as well as an ordinary hose.

TRUSS-PAD.—I. B. SEELEY, New York, N. Y. In this case the invention refers to improvements in support and retention hernial pads, the object being to provide a pad adapted to the various constructions of hernia-trusses for the requisite mechanical support, and designed more especially for use in the mechanical treatment of inguinal hernia as located at the lower abdominal body-section.

COMBINED ASH-RECEIVER AND PAPER-WEIGHT.—P. A. ROBSON, Westminster, S. W., London, England. This article serves both as an ash-receiver and as a paper-weight, and is so constructed that it may be used as a pipe-cleaner. It has extending centrally upward from the ash-receiving well a tapered spike, which may be used as a means for cleaning or removing burned particles of tobacco or ashes which cling to the interior wall of the bowl of the pipe.

GAME-BOARD.—H. A. ROAT, JR., Harrisburg, Pa. The principal object in this instance is to provide a board which may be readily manipulated by one person, acting as a scorer, to present certain apertures or orifices therein to one of the players, so that should such player shoot or send a marble through one of the apertures he will receive credit for a certain number of points, indicated by numerals placed over or adjacent to the apertures.

GARMENT-SUPPORTER.—FRANCES C. MCDONALD, P. O. Box 399, Chicago, Ill. The present invention is in the nature of an improvement upon the device forming the subject matter of a former patent granted to this inventor. The purpose of the present improvement is to devise a supporter particularly designed for use in retaining and securing hosiery and the like, which will embody the features of durability, simplicity, and convenience. Means are so adjusted that a stud or similar article may be locked by the supporter, the button being adapted to engage with articles of clothing.

HORSESHOEING-STOCK.—M. M. MAY, Rulo, Neb. Among other things this invention has for its object the provision of a stock which may be readily opened for the introduction of the animal and easily and securely closed, to provide means for securing either foot in a raised position convenient for the operator, and to provide means for sustaining a part of the animal's weight when standing on three of its feet during the shoeing operation.

PROTECTING HEAD-GEAR OR HAT.—ANNA MIEROSLAWSKI, New York, N. Y. The object of the invention is to provide a head-gear protector, more especially designed for protecting ladies' hats and other head-gear against rain, dust, and the like, to prevent the hat from being injured, the protector being very simple in construction, and easily applied to properly fit the hat without danger of injuring the trimmings thereof.

CARD GAME.—H. E. GAVITT, Topeka, Kan. The cards used in this game bear indicia of different money values. The cards of a pack are divided into groups of eight, all of one group being alike in name of stock and its assumed money value per share, also in the amount of the capital stock. A telegram-card is used on occasions. Cards are dealt equally, and players attempt to fill their broken groups by trading with neighbors a number of cards exchanged for a like number. The cards and manner of playing illustrate the transactions of the world's great stock-exchanges.

CESSPOOL.—H. D. GARDNER, New York, N. Y. This cesspool is constructed of cement, or the like, and is adapted for draining surface water. Its shape is the frustum of a cone. The sides are provided with a series of slots wider at the outer than inner end portions, so that solid dirt packed against the cesspool's exterior will enter the outer portions of the openings, so as to prevent mud being driven into openings from the interior, while means are provided to prevent the earth around the cesspool falling into it, yet permitting drainage of water from the earth into the cesspool's interior.

CONDUIT FOR HOSE, CABLES, ELECTRIC WIRES, OR THE LIKE.—J. BURNSEN, West Superior, Wis. The invention pertains to improvements to be placed across a street below the surface, so that fire-hose may be passed through it and not interfere with traffic and not be damaged by vehicles. The conduit may also be placed on the bed of a body of water, through which electric wires or other devices may be carried across the water.

FISH-HOOK.—W. E. KOCH, Whitehall, N. Y. In this patent the invention has reference to improvements in fish-hooks, an object being to provide a hook with a sliding weight whereby the weight will not only serve as a sinker, but will serve to hold live bait in natural position—that is, with back up.

BOTTLE-CLOSURE.—J. F. PERRY, Dec'd, Chicago, Ill. In this patent the invention is an improvement in that class of bottle-closures in which a seal of some form engages a fillet or shoulder of a bottle-neck, so that its dislodgement is prevented, save by the use of a tool suitable for the purpose.

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

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AUTOS.—Duryea Power Co., Reading, Pa.

Inquiry No. 4927.—For manufacturers of small leather washers ⅜ inch inside and 9-16 outside.

Handle & Spoke Mchy. Ober Mfg. Co., 10 Bell St., Chagrin Falls, O.

Inquiry No. 4928.—For manufacturers of chain adders.

Sawmill machinery and outfits manufactured by the Lane Mfg. Co., Box 13, Montpelier, Vt.

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American inventions negotiated in Europe, Felix Hamburger, Equitable Building, Berlin, Germany.

Inquiry No. 4930.—For manufacturers of a movable drag saw operated by horse power, with hollow shaft, made in several sections and telescopes, so that the saw can make several cuts from a tree or log at one setting.

Gear Cutting of every description accurately done. The Garvin Machine Co., 149 Varick, cor. Spring Sts., N. Y.

Inquiry No. 4931.—For makers of gage wire stitching or stapling machines.

I would like to furnish new and interesting games to some company to make a place on the market. Wm Eick, Franklin, Neb.

Inquiry No. 4932.—For makers of machines for making shot.

Edmonds-Met el Mfg. Co., Chicago. Contract manufacturers of hardware specialties, dies, stampings, patented devices, etc.

Inquiry No. 4933.—For a machine for making cement bricks, of capacity of 5,000 bricks daily.

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Inquiry No. 4934.—For makers of drop forgings for dental forceps.

The largest manufacturer in the world of merry-go-rounds, shooting galleries and hand organs. For prices and terms write to C. W. Parker, Abilene, Kan.

Inquiry No. 4935.—For dealers in Indian seed beads, and all classes of fancy olive, spar, jet, pearl and Venetian beads, at wholesale.

We manufacture anything in metal. Patented articles, metal stamping, dies, screw mach. work, etc., Metal Novelty Works, 43 Canal Street, Chicago.

Inquiry No. 4936.—For makers of 2, 3 and 4 inch terra cotta drain and water pipe and fittings for same, also plumbers' tools, books and material.

Empire Brass Works, 106 E. 129th Street, New York. N. Y., have exceptional facilities for manufacuring any article requiring machine shop and plating room.

Inquiry No. 4937.—For manufacturers of laundry machinery.

The celebrated "Hornsby-Akroyd" Patent Safety Oil Engine is built by the De La Vergne Refrigerating Machine Company. Foot of East 138th Street, New York.

Inquiry No. 4938.—For manufacturers of watchman clocks.

Manufacturers of patent articles, dies, metal stamping, screw machine work, hardware specialties, machinery and tools. Quadriga Manufacturing Company, 18 South Canal Street, Chicago.

Inquiry No. 4939.—For makers of steam log skidders.

$12,000 will buy controlling interest in foundry and machine business in Los Angeles, Cal. Paying, and can be worked up without limit. About $35,000 per year business. Foundry, Box 773, New York.

Inquiry No. 4940.—For machinery for stamping metal souvenirs of soft metal.

Inquiry No. 4941.—For manufacturers of farm and dairy machinery.

Inquiry No. 4942.—For machines for threading cast iron pipe fittings.

Inquiry No. 4943.—For machines for cutting sheet iron washers of special dimensions of No. 12 gage iron and lighter.

Inquiry No. 4944.—For makers of novelties suitable for the mail order business.

Inquiry No. 4945.—For machinery for making lead pipe for plumbers' use, from ⅜ in size upward.

Inquiry No. 4946.—For manufacturers of painting and whitewashing machinery.

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.

Buyers wishing to purchase any article not advertised in our columns will be furnished with addresses of houses manufacturing or carrying the same.

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Scientific American Supplements referred to may be had at the office. Price 10 cents each.

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Minerals sent for examination should be distinctly marked or labeled.

(9259) A. S. says: Kindly inform me of the best place to take a mechanical engineering course in the city of New York; and also where the State University is situated, and whether they have a course like the above. A. The course in mechanical engineering at Columbia University, New York city, is one of the best in the country. The requirements for admission to this course are high. The Pratt Institute, of Brooklyn, N. Y., has a two years' course in steam and machine design, which is an excellent mechanical course, with lower requirements for admission than the one referred to above. The State University of New York is Cornell University, situated at Ithaca, N. Y., in the central part of the State. This is one of the best engineering schools in the country.

(9260) G. E. P. says: Is Manhattan Island sinking? A and B both claim that it is. I claim that it is not. A says it is sinking from the great weight of buildings, etc. B says it is because it is being undermined by the sea, East River and North River. A. Geologists think the seashore in the vicinity of New York city and along the New Jersey coast is sinking slowly. The rate is believed to be a few feet in a century. The weight of buildings in the city has no influence in the matter, as that is as nothing in comparison with the weight of the earth on which the buildings stand. These buildings have their foundations upon the solid rock below, and are as firm as the earth itself. The sinking is due to motions in the crust of the earth itself. Such motions are known to exist in many parts of the earth. 2. I have a sal-ammoniac battery, the carbon of which became covered with crystals of sal-ammoniac. I burnt the carbon, and then paraffined the top and put it back. In a little while the crystals came on top, but did not collect on the carbon below the paraffine. How can I fix it? I also noticed a thick layer of carbon in the bottom of the jar. A. When the liquid in a sal-ammoniac cell becomes too strong, a crystal forms. It is not sal-ammoniac, but a more complicated substance, which can be dissolved with difficulty in water, and this has made the trouble for you. The burning which you gave the carbon caused some of the carbon to become powdery and fall off in the water. It should not have been done. The carbons are not as good for it. 3. Please send directions for making blue vitriol battery. A. You require for a gravity battery a star-shaped arrangement of thin sheet copper to be placed in the bottom of the glass jar. In the top of the jar is hung a star, or crowfoot-shaped piece of zinc, weighing 3 to 4 pounds. These you should buy from some dealer. Put in copper sulphate enough nearly to cover the copper. Then fill the jar with water to cover the zinc. Connect the wire from the copper to the zinc, and let the cell stand for several hours till the liquid at the top becomes clear like water. The cell is then ready for use.

(9261) M. & M. say: We are in need of a paper, white preferably, which will after being dampened with water or some other fluid, turn color when an electric current is passed through it. Any information that you can give us on this subject will be gladly paid for and appreciated. A. There are several ways to prepare a paper which changes color when an electric current is passed through it. The simplest is to make a solution of potassium iodide in water and boil some starch in this solution. With the liquid wet some paper. When the wet paper comes into an electric circuit the paper turns dark blue around the positive pole. Another mode of preparing paper is to make two solutions, one of sodium sulphate in water and of phenolphthalein in alcohol. The latter solution may be very weak. Mix them together and wet paper with the liquid. In this case the negative pole turns the paper pink.

(9262) T. C. R. says: This town (Russell) of 1,200 inhabitants is situated high and dry on the watershed between two rivers (Smoky Hill and Saline), each of which is about 200 to 250 feet lower than the town. The Smoky is 7 miles distant, and the Saline 4 miles, at nearest point. Water is not accessible in wells in towns nearer than about 250 to 400 feet in depth, except surface wells in some parts at 20 to 30 feet, which will not furnish large enough supply for any but limited domestic use. The deep wells are practically useless, because of the great amount of salt and other minerals in the water. No one here seems to be informed on the subject, and least of all the workmen who make cisterns. Are there back numbers of the SCIENTIFIC AMERICAN or SUPPLEMENT on this? Can you give any suggestions that would be useful in establishing public municipal water supply for this town? Any literature to help, or any makers of machinery who would make useful suggestions, or any engineers who can be appealed to for preliminary ideas. Can you make any suggestions along the lines first indicated above? Some persons have made guesses that $35,000 to $50,000 would be necessary to install a plant with sufficient capacity for this town. A. In reply to your recent inquiry about the water supply of the town of Russell, we would say that good quality sand, of a sufficient depth, makes a most satisfactory filter. We cannot recommend any literature which would be useful in this matter to one not technically versed in the subject. The question of water supply is a most vital and important one. At the same time, it is an extremely difficult one, and without having thorough investigations made by a competent water-supply engineer, we are unwilling to make any suggestions. If your town has not a satisfactory supply, it would probably be the best investment it could make to get expert advice as to the best method of improving its supply, and then to follow this advice. If you wish us to recommend an expert for this purpose, we should be glad to do so.

(9263) W. H. says: I want to make a square glass fish aquarium. Will you please tell me how to make a cement to be water-tight and stick to the glass? A. 1. Dissolve 1 part finely shredded India rubber in 64 parts of chloroform; then add 14 to 24 parts of powdered mastic and digest with frequent shaking until dissolved. 2. Melt together 2 parts of shellac and 1 part of Venice turpentine. Use warm.

(9264) J. E. D. says: To what height will a siphon pull water? Please answer this and put several hundred people at ease in our town. A. A siphon would lift water to a height equal to the height of a water column exerting the same pressure as the atmospheric pressure (which would be for the standard pressure of the atmosphere 33.9 feet), if it were not for the fact that water contains some air in solution, and at ordinary temperatures gives off enough vapor to make a perfect vacuum above a water column impossible. The amount that this action will decrease the height to which a siphon can lift water will depend upon the temperature of the water. If the water is at 212 deg. F., the siphon will not lift it at all; if it is at 700 deg. F., it will lift it 33 feet.

(9265) W. G. asks: Would you kindly inform me how many cubic feet of air one cubic foot of kerosene oil requires for complete combustion? A. One pound of kerosene oil requires for its combustion about 17 pounds of air, or approximately 225 cubic feet of air. The specific gravity of kerosene is about 0.75; therefore one cubic foot of kerosene would require approximately 10,500 cubic feet for its perfect combustion. From 30 per cent to 50 per cent excess air is usually allowed, however.

(9266) C. K. T. says: I desire to learn how carmine is manufactured. A. The preparation of carmine is little understood, but success in its manufacture depends less on any mystery connected with the process than on the employment of the purest water and the best materials, and the exercise of moderate care, dexterity, and patience. The following formula will produce carmine of the richest hues down to ordinary and common, according to the skill possessed by the manipulator: Madame Cenette's process. Cochineal (in powder), 2 pounds, is boiled in pure river water, 15 gallons, for 2 hours, when refined saltpeter (bruised), 3 ounces, is added to the decoction, and the whole boiled for 3 or 4 minutes longer: oxalic acid, 4 ounces, is next added, and the boiling again renewed for 10 or 12 minutes; the heat is now removed, and the liquid allowed to settle for about 4 hours, after which time it is decanted with a siphon into shallow plate-like vessels, and set aside for three weeks. At the end of this time the film of mold which has formed on the surface is dexterously and carefully removed, without breaking it or disturbing the liquid beneath it. The remaining fluid is next very carefully removed with a siphon, and the adhering moisture, as far as possible, drained off, or sucked up with a pipette. The residuum, which is the carmine, is dried in the shade, and possesses extraordinary luster and beauty.

(9267) A. H. F. says: 1. I would like to know the height of a locomotive from rails to top of cab roof. Of course I know that there is a great deal of difference in the different locomotives, but what I would like to know is of the average locomotive built at present. A. The height of locomotive cab roofs varies with the size of wheels, between 10 and 12 feet. 2. I would also like to know the side motion of the cab top from one side to the other while at its full working capacity