RECENTLY PATENTED INVENTIONS. Engineering.

FILLING BLAST FURNACES.-Thomas F. Witherbee, Port Henry, N. Y. This inventor has devised an improved charging apparatos designed to pro-perly fill the stack, even when very finely divided ore is to be treated, such as magnetically concentrated iron ores. The apparatus comprises a movable bell having a central aperture, through which is adapted to pass a spreading bell, while a fixed bell is adapted to close the central aperture of the movable bell and receive the spreading bell. A great variety of charging combinations can thereby be formed to permit of placing the materials as desired in the stack.

COAL CHUTE REGULATOR.-John F. Schmadeke, Brooklyn, N. Y. This is an apparatos adapted to operate automatically in connection with the usual elevator to throw mechanism into gear by the filling of the chute, which shall wind up a cable on a dram and open the chute doors, the mechanism being arranged so that it will work in a converse way to close the doors as the chute becomes empty. The invention relates to coal chutes filled by elevators, and from which coal is withdrawn for use, where it is desirable to keep the chutes full to prevent the breaking of the coal by dropping to the chute bottom.

Railway Appliances.

CAR COUPLING.-John Cochran, Jr., Collins, Mo. According to this invention, swinging ball are arranged, one in rear of the other, rods or bars which connect the bails being extended in advance of them and supporting an inclined link guide. The bails form swinging parallel carriers, which operate in parallel lines and swing the guide back and forth without changing its angle to the horizontal, so that it will be presented properly to receive the approaching link. The construction is simple, and by means of the improvement the cars may be coupled from the side or top, without need of the trainmen going between the cars.

Mechanical.

SAW HANDLE.-Azeil B. Van Campen, Raymond, Cal. This is an adjustable handle for long saws, such as are used for cutting up logs and timbers, being adaptable to any saw of this class, and designed to facilitate the operation of sawing by permitting of greater freedom of movement of the hands. The invention consists of a revoluble handle for the end of the saw, with a handle for the back of the saw and a hooked bolt for clamping the two handles to the saw.

METALLIC PACKING. - Frederick A. Ives, Grant's Pass, Oregon. The proper packing of piston rods, valve stems, etc., is the more especial object of this invention, which provides a packing consisting of a coil having uncut ends forming steam-tight bearing surfaces. The packing is simply made and is readily applicable to large or small stuffing boxes. On one uncut end of the coil is a pin engaging a correspondingly shaped receas in the bottom of the casing, a similar pin on the other end engaging a recess on the inner face of the gland, fitted loosely on the piston rod or valve stem.

SEWING MACHINE NEEDLE BAR. Henry A. Dodge, Boston, and William T. Richards, New ton, Mass. This invention provides the face plate with gibs so arranged as to effectually take up the wear of the needle bar and prevent it from wearing in the face of the plate. The gibs are so made that they will be inter-changeable, right or left, and the surfaces adapted for engagement with the needle bar are hardened to resist wear.

STONE CARVING MACHINE.-Antonio Zanardo, New York City. In this machine a table has movement in a bed and a tool carriage is held to revolve upon the table, there being a plate adjustably located in the bed and adjusting devices, whereby the bed plate may be set eccentric to the carriage. The tool may be given any required angle to produce a desired undercut, and may be regulated to carve various embossed or intag lio figures upon the same or different planes. The set ting of the tool is quickly and easily effected, and with the machine circles and ovals may be made as desired, as 10. "Otter Cottage," recently completed for Henry H. well as the carving of any design, even to a figure of a human being in relief.

Agricultural.

MOWING MACHINE ATTACHMENT. William L. Hay and Robert L. Johnston, Franklin, Tenn. 11. A colonial cottage at "The Bluffs," Mt. Vernon, This is agathering attachment comprising side supports detachably secured on the sickle portion of the mower frame, a receiving platform and a revolving rake, over the rear end of which is journaled a revolving discharging rake. The improvement is especially designed to facilitate the gathering and piling up of seed clover as it is cut by the mower. The attachment may be detachably connected with any of the mowing machines now in general use, and it is simple in construction and easily manipulated.

uted, while the whole is so made that the wearer may asily put it on or off.

Scientific American.

PIN FOR ATTACHING FLOWERS TO DRESSES.-Edward W. Stifel, Wheeling, West Va. This pin is made of a single piece of wire bentand twisted abont itself to form a body terminating in two closed loops through which a ribbon may be passed, there being a projecting portion adjacent to each loop, and a spring pin and hook at the ends of the projecting portions. The pin will securely hold in place flowers in spray or other shape without injnry to costumes or dreases

Designs.

CARPET.-William F. Brown, Newark, N.J. The body of this design is decorated with flow ers of the rose and daisy type, with foliage in festoon arrangement, and the border has differently arranged but corresponding festoons of flowers and foliag

HANDLE FOR SPOONS. ETC.-Charles Osborne, New York City. A foliated figure at the top of this handle represents centrally a cluster of grapes. Near the center the handle is nearly circular in cross tion, while near the bowl it is nearly rectangular, with inturned leaf-like figures on the obverse and reverse there being flowing tendrils on the back of the bowl.

Norre .-- Copies of any of the above patients will be furnished by Mnnn & Co., for 25 cents each. Please send name of the patentee, title of invention, and date of this paper.

SCIENTIFIC AMERICAN BUILDING EDITION

- 1. Elegant plate in colorsshowing a handsome residence plane. Mr. J. L. Silsbee, architect, Chicago, Ill-A very picturesque design.
- 2. Plate in colors showing a cottage at Mt. Vernon, N. Y., recently completed for E. J. Walther, Esq. Two perspective views and floor plans. Mr. L. H. Lucas, architect, Mt. Vernon, N. Y. An excellent design.
- 8. Cottage at Morgan Park, Ill., recently erected for G. F. Patterson, Esq., at a cost of \$3,000 com-plete. Two perspective views and floor plans. Mr. H. H. Waterman, architect, Chicago, Ill.
- 4. A summer house at Southampton, Long Island, N.Y. recently completed for H. M. Day, Esq. Two perspective views and floor plans. A model design. Messre. G. E. Harney & W. S. Purdy, architects, New York.
- 5. A residence at Portchester, N. Y., recently erected for Walter S. Haviland, Esq. Two perspective views and floor plans. A very pleasing design Mr. Louis Mertz, architect, Portchester, N. Y.
- 6. Floor plans, interior view, and two perspectives of a residence recently completed at Hackensack, N.J., for George A. Vroom, Eeq. An excellent design and unique plan. Cost complete \$6,950. Mr. Christopher Meyer, architect, New York City.
- The Barnum Institute of Science and History, of Bridgeport, Conn., donated by the late Phineas T. Barnum. A one-half page perspective view. Cost for building and grounds \$100,000. A fine example of the Romanesque style of architecture.
- 8. A residence at Stamford, Conn., recently erected for Oliver G. Fessenden, Esq., at a cost of \$5,199. Two perspective views and floor plans. Mr. Wm. H. Day, architect, New York City. A very pleasing design.
- 9. A cottage of moderate cost recently completed for Hiram R. Smith, Esq., at Randall Park, Freeport, Long Island, N.Y. Cost complete \$3,900. Two perspective views and floor plans. Mr. Wm. Raynor, Freeport, Long Island, N. Y., architect. A very attractive design.
 - Adams, Esq., at Belle Haven Park, Greenwich, Conu. Mr. H. W. Howard, architect, Greenwich, Conn. An attractive design in the colonial style of architecture. Two perspective views and floor plans.
 - N. Y., recently completed for E. A. Hunt, Esq. Two perspective views, an interior view and floor plans. Mr. Louis H. Lucas, architect, Mt. Vernon, N.Y.
- London dwelling.

Business and Personal.

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

For pumping engines. J. S. Mundy, Newark, N. J. "U.S." metal polish. Indianapolis. Samples free. Wood pulp machinery. Trevor Mfg. Co., Lockport, N.Y.

Microbe Killer Water Filter, McConnell Filter Co. Buffalo, N. Y. Bookbinding .- All classes of work. Magazines

cialty. Haddon & Co., 139 Center St., New York. Distance Reading Thermometers.—See illus. adver isement, page 255. Ward & Doron, Rochester, N. Y.

Steam Hammers, Improved Hydraulic Jacks, and Tube Expanders. R. Dudgeon. 24 Columbia St., New York. Cheapest Water Power.-See top of 1st column, pag

70. Also top of 2d column, page 239. Look, it will pay. Screw machines, milling machines, and drill presses The Garvin Mach. Co., Leight and Canal Sts., New York. Centrifogal Pumps, Capacity, 100 to 40,000 gala, per ninute. All sizes in stock. IrvinVan Wie, Syracu

Inventors wishing to bring their inventions to the oublic notice should confer with H. Pittock, Room 61. Beacon St., Boston, Mass.

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

Patent for Sale-Stall for comfort and cleanliness of milk cattle. Agents wanted at 50 per cent commission. M. Schembri, 336 Van Buren St., St. Paul, Minn.

The best book for electricians and beginners in elec tricity is "Experimental Science," by Geo. M. Hopkins. By mail. 34; Munn & Co., publisbers, 361 Broadway, N.Y.

For the original Bogardus Universal Eccentric Mill, Foot and Power Presses, Drills, Shears, etc., address J.S. & G. F. Simpson, 26 to 36 Rodney St., Brooklyn, N. Y.

Patent Electric Vise. What is claimed, is time saving recently erected for William H. Bartlett, Esq., at No turning of handle to bring jars to the work, simply Evanston, Ill. Two perspective views and floor one sliding movement. Capital Mach. Tool Co., Auburn, N. Y.

Wanted-Aslide valve engine of about 200 H. P. Musi be in first class condition. Address, giving maker's name, date, and full particulars, also location, J. B. J., care this office.

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HINTS TO CORRESPONDENTS.

Names and Address must accompany all letters or no attention will be paid thereto. This is for our

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.
In guirfes 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.
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. Frace 10 cante each.
Mouse referred to promptify supplied on receipt of price.

minerals sent for examination should be distinctly marked or labeled.

(6008) C. J. T. asks: I have a motor built after the Edison style, of the following dimensions: Drum armature core 6 inches long by 4% diameters, wound with No. 16 B. & S., 32 sections. 6 convolutions in each section, two layers deep. Fields wound . with 10 pounds No. 28 each. Want to rewind for a power circuit. The machine when run as a dynamo is 90 volts at 8,000 revolutions. I want to make a 110 volt machine of it and run at slower speed. Want to put in a fan circuit of about ten % horse power motors. A. You can probably use your machine safely as it is. To lower speed, see the number of turns on the armature, or weaken the field. To keep high amperage yon must use as low resistance as possible.

(0009) D. S. S. asks: 1. If a bell be rung inside a vessel exhausted of air, does it create any 12. Half-page engraving showing hall and staircase of a sound within said vessel, none being heard outside of same? A. There is no sound to be heard within the vessel, except by contact with the bell or with some object 18. Miscellaneous Contents: Clients' right of replicating tonching it. 2. If a transmitter were placed in the vesdesign .- Shop and mill construction .- Seasoning sel with the bell and connected with a telephone outside, oak.-Beautiful designs in parquetry work, illus-could we thereby hear the ringing of the bell ? Has this

6% ounces at the above elevation and would probably be weak in the blastas well as in the quantity of airsupplied to the cupola. You will need 15 ounces pressure.

(6012) F. A. M. asks: 1. How can I make a dry battery? A. It is best to buy them. A mixture of plaster of Paris and chloride of zinc with chloride of ammonium and water in a zinc vessel with carbon pole in center will answer. 2. How can I make fluid in Edison-Lalande battery? What should I dissolve caustic potach in ? A. Dissolve in water. 8. Please name a firm that manufactures batteries and supplies. A. Address Bnnnell & Co., of this city.

(6013) R. E. W. asks: 1. Would cottoncovered wire (No. 38) answer nearly as well as silk-cov-ered for a small induction coil? A. Yes. 2. I wish to nake some good permanent magnets. What kind of steel should I order, and about what will it cost per pound? A. Use good quality Stubs or tool steel. 8. Will the inclosed sample of wire give good resultson a telephone line of two miles? A. Yes. 4. What would be the objection to using a well to ground the end of a telephone line ? A. None, unless you object to having the plate immersed in the well. Some slight corrosion will take place.

(6014) J. A. McN. asks: 1. How many cells Leclanche would I need to work a telephone system overabout two miles of a circuit (transmitter and receiverbeing alike)? A. Use 4 cells. 2. Which is the bestfor such a line or shorter? A. Leclanche cells are as good as any. 8. Is a metallic circuit better than a ground circuit and does it take less battery? A. It is superior, but hardly saves battery. 4. A body weighs 100 pounds at the poles and 101 pounds at the equator. How is this computed ? A. Your figures are wrong. A body is heavier at the pole than at the equator. The relative weights are calculated by the formula for centrifugal force.

(6015) F. H. asks: Can you give me a table, or tell me how it is ascertained, what by different given current, length of wire, etc., will be the attraction. in ounces or pounds, toward the core of a magnet? In other words, how can I find out what weight a magnet of any build can sustain? A. You will have to calculate the lines of force driven out at the poles through the armature. In S. P. Thompson's work on the "Electro-Magnet," \$6, you will find excellent matter on this subject.

(6016) F. H. S. asks: Is it possible to reflectall of a ray of light from a transparent body? Will not refraction take place to some extent as long as the ray strikes the body ? A. For the rear surface of every transparent body there is an angle of total reflection within which all light is reflected. This applies to rays of light which, having passed through the body, reach the other surface. There is no such angle for the front surface.

(6017) L. F. D. asks: Do telephone, telegraph and electric light companies run their cables in the same conduits (under ground)? If not, why? A. Generally not, in order to avoid induction and possibility ofdanger from leakage. 2. Please give a solution how to clean hard rubber? A. Wash with ammonia and water, polish with kerosene and rottenstone.

(6018) R. asks if a good tennis court could be made out of coal ashes. If so, the method of operation and whether the ashes would require sifting. A. Ashes alone would hardly answer. You might by sifting them and mixing with clay get a good surface.

(6019) J. D. asks (1) what size wire to use to wind motor No. 759 for 25 volts, and about what power will it develop? A. Wind with No. 21 or 22 wire. 2. How many storage batteries like described in SCIEN-TIFIC AMERICAN, and how many plates and what size, should be to run it about 12 or 15 hours, and how long will take to charge same ? Will dynamo No. 600 charge them? A. Twelve to fifteen. The time of charging will depend on the current. The dynamo named will be larger than neces

(6020) A. B. R. asks if the simple electric motor in "Experimental Science" can be run to good advantage with the Edison-Lalande battery; if so, which type would be most advisable, and how many cells would be required to give about the same result as the plunge battery, suggested to run this motor ? A. Yes. Use ten cells type Q.

(6021) E. L. A. writes: Where can I get a history of the calendar and all its changes ? What day of the week was George Washington born? And in what year? (So recorded at that time.) Was 1700 a leap year under Julian calendar? To make my meaning plain on questions 2 and 3, I will state that I have examined different encyclopedias ou the calendar and find that they do not agree in this. Washington's birthday is now gene-rally celebrated as having occurred on February 11, 1782, and now called February 22, 1732, but the following quotation from Appleton's Encyclopedia puts a different phase on it : "The change from Julian to Gregorian reckoning was made by act of Parliament in Great Britain in September, 1752, the 3d being called the 14th. In England experiment ever been tried ? A. Yon could not hear it. from the 14th century till the change in 1752 the legal year began at March 25. After the change was adopted in 1752, events which had occurred in January, February, and before March 25 of the old legal year would, according to the new arrangement, be recorded in the next subsequent year. Thus the revolution of 1688 occurred in February of that legal year, or as we should now say in February, 1689." If the above quotation from Appleton be the correct way of computing back dates, then, since under the Gregorian calendar we celebrate Washington's birth as having occurred on February 22, 1732, at the time he was born (Julian calendar) it must have been called February 11, 1731, Friday. Or if, according to Julian calendar, he was born on February 11, 1782, we should now, under the Gregorian calendar, celebrate his birth as having occurred on February 22, 1733, Sunday. Which is correct? A. There is no special history of the calendar. It is scattered in detached details in the encyclopediae and technical works. Probably the best account is detailed in the Dictionary of Science, Literature and Art, long since out of print, under the heads of

MAY, 1894.-(No. 103.)

TABLE OF CONTENTS.

Miscellaneous,

HOUSE MAIL BOX.-Edwin F. Kinsey, Washington, D. C. This box is to be attached near the front door of a building, and is so arranged as to indicate to the carrier when mail is deposited in it, and to indicate by a signal to the occupants of the house when the carrier places any mail in the box. The box is also arranged to effect the purchase of stamps, stamped envelopes, and postal cards from the carrier, in definite quantities, and the making of change therefor, without risk of loss of money or mail.

SOLDIER'S FIELD EQUIPMENT.-George H. Palmer, U. S. army. This invention comprises a half shelter canvas tent, to be united with a like half shelter tent, and carried by being placed around the soldier's bedding and placed in a roll over the shoulders and across the body, in combination with a valise similarly carried, to hold ammunition, clothing, and toilet articles. By the novel construction and by certain strape and attachments, both the valies and half tent roll are of any Architectural Publication in the world. Sold by owing to the altitude? A. The atmospheric pressure at calendar, year, cycles, and chronology. George Washheld in place on the shoulders, the body and arms being all newsdealers. unconfined and free, and the weight being well distrib-

trated.-The effect of fire on concrete.-Water proof cellars.-Embossing wood.-Steel hutt with ball-bearing washers, illustrated .- "The Holland ' radiators, illustrated. - Graphite paint. - Sandpapering machines.-The Van Wagoner & Wil-Hams Hardware Company.-Window screens and screen doors .- Maple flooring .- The Pullman sash balance, illustrated .-- Portland cement walks .--Subterranean London.-An alloy which adheres to glass.—A saw clamp and filing guide, illustrated.

The Scientific American Architects and Bnilders 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 ARCHITEC TURE, richly adorned with elegant plates in colors and with fine engravings, illustrating the most interesting examples of Modern Architectural Construction and allied subjects.

MUNN & CO., PUBLISHERS,

We never heard of the experiment being tried.

(6010) E. A. S. says: One rule of mechanics is that a belt will always run to the highest point. What is the reason? A. The length of the belt edge on the high side as it is called, when shafts are not parallel or on the crown of pulleys, is always longer than at the low part or low side. The stretch of the belt to accommodate itself to this condition springs the straight part of the belt near its point of contact with the pulley toward the high part or crown and causes it to run in that direction ; the effect being the same as if pushed by ashipper fork.

(6011) C. M. W. writes: In supplying blast to a cupola at an altitude of 9,000 feet, where the atmosphere is so much lighter than at sea level, will a pressure of 10 ounces furnish as much oxygen to support theflame under above conditions as a similar preserve at a The Fullness, Richness, Cheapness, and Convenience ! lower altitude, or must the pressure be greater to comof this work have won for it the LABGEST CIRCULATION ; pensate for difference in the rarefled condition of the air, 8 & CO., PUBLISHERSS, 361 Brosdway, New York. 9,000 feet elevation is only about 10 pounds per square ington was born on Friday, the 11th day of February, inch; 10 dunces pressure at the sea level only represents 1732, historical time in England and the American

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colonies. The historical or business year in England began on the first da of Jannary as established by the Romans. The ecclesiastical calendar embracing the civil or legal year previous to 1752 began on the 25th of March, and events between the 1st of January and 25th of March were usually dated with both years, as February 11, 1731. The date of Washington's birth was fixed in the colonies to correspond with the new regulation; 1700 was a leap year under the Julian calendar, but not under the Gregorian.

(6022) C. B. W. asks (1) if the motor described in SUPPLEMENT, No. 641, can be run from an al-ternating current. A. No. 2. If not, how must it be wound to run from an alternating current ? A. See our SUPPLEMENT, Nos. 692, 717, 944, for alternating current motors. 3. What size wire should be used to have it run with 100 volts and 10 amperes ? A. Use No. 28 wire on field and armature. 4. If I should make the field magnet on motor 641 twice as wide, which would be five inches, and the armatore core twice as large, which would be fourfinches, and put twice the amount of wire on the machine, would it be twice as strong as described in the SUPPLEMENT? A. In general terms, doubling all the lineal dimensions gives sixty-four times the power. But as you only double a portion, you may expect four or five times the power. 5. Can the motor 641 be run from the Crowfoot gravity battery ? A. Not satisfactorily.

(6023) I. R. writes: 1. Can a storage battery be charged from an alternating circuitof 50 voltat If so, will the curent from the battery be direct ? A. A storage battery cannot be charged from an alternating circuit. 2. What is the main difference between an al- power. 3. I wish to produce Tesla currents. What is ternating and direct current motor ? A. Several kinds of alternating current motors have been invented. We ments on a small scale? A. There is no simple way. We have described several in our SUPPLEMENT, Nos. 692, 717, 944, to which we refer for their peculiarities. 3. Can a 1,200 volt continuous arc circuit be tapped in such a way as to get a current of 50 volts? A. There is no such thing as a current of 50 volts. By a shunt connection you can get such a potential difference. We advise you not to do it, as you expose yourself to great danger.

(6024) S. J. S. asks: How does the heat from the sun penetrate through the intense cold of the upper regions, and warm the surface of this planet ? A. Heat is supposed to be a state of molecular motion or vibration conveyed through space in the medium of the luminiferous ether. A medium having no effect upon the progress of planetary bodies, yet capable of transmitting the pulsations of heat, light, magnetism and electa.city. It is probable that heat does exist in space to a very low degree in its radiant form and only develops into active energy by resistance of planetary bodies to its vibratory transmission.

(6025) W. F. asks: 1. What per cent of power developed at power house is lost in transmitting for street car propulsion of the three following methods : Cable, electricity (trolley system) and compressed airs A. No exact figures can be given, except that under average conditions the electric road may be pronounced the cheaper. 2. What SUPPLEMENTS or books would furnish me with information about compressed air ? A. See SUPPLEMENT, Nos. 799, 857, 893, 510, 766, 900. Also SUPPLEMENT catalogue, sent by mail. 3. Why is compressed air not more used for street car propulsion ? A. It is too expensive and cumbersome. See SUPPLEMENT, Nos. 176, 177, 182, 553, 637, 747, 845, 866, 890, 903, 904.

(6026) H. R. C. asks: 1. Does the induc tion coil increase both the tension and quantity of current or just the tension alone? A. The regular induction coil increases the tension and lowers the current strength. It also produces a sort of alternating current. 2. I used common table salt in place of sulphur of copper in making a gravity cell. When I connect a small motor in the circuit it runs very rapidly at first and then stops. What is the cause? A. The cell rapidly polarizes, the combination is in every way a very poor one. 3. How can the Leyden jar be charged with a gravity cell ? A. Connect the knob to one pole and the outer coating to the other. The charge will be so minute as to be appreciable only by very delicate instruments. 4. Why are the magnetic poles continually changing? A. The reason is unknown.

(6027) C. L. writes : I have three storage batteries, and I would like to get some idea of what power I can get from them if attached to a proper motor. Each cell has 14 plates (7 to each pole), 61/6×9 inches (measured only the part that was supposed to be in the solution), making a total of 42 plates in the three cells. Can such cells be arranged to give small power for long time or large power for short time? A. Your battery will give about 18 amperes and 6 volts or 54 amperes and 2 volts, according to connection. The series connection (18 amp. 6 volte) is preferable. This gives $\frac{1}{746}$ horse power. cells can be used from this as a maximum down as low as desired, according to the motor used.

(6028) F. C. H. writes: We are putting in a steam heating plaut in a large hospital. The boilers, five in number, must be situated on practically the same level as the building to be heated, unless an excavation at least 18 feet deep and 40×60 is made for them. Is

tem similar to the first named gives the most satisfac tory results for both winter and summer ventilation. It partially counteracts unequal heating on different sides of the building from outside wind pressure. It prevents indraughts from the windows by the draught of the fan in the other system. The heating and ventilation of a hospital for the insane is too important a matter for a general categorical answer. The plans should be passed upon by an expert in heating and ventilating such build ings. 3. Can you give me the colors used in making different colored sidewalk tile out of a mixture of Port land cement and sand ? A. Venetian red, black oxide of manganese, and chrome yellow are the principal coloring matters of cement walks.

(6029) W. L. B. asks: In that class of heostats where change of resistance is caused by change of pressure on a carbon powder, is lampblack suitable for the powder? If not, where could I obtain carbon powder that would be? A. We advise you to use powdered battery or electric light carbon. If the latter, see that the copper plating is dissolved before powdering. Lampblack would give very high resistance.

(6030) W. W. P. asks: 1. What would the effect if I were to wind a flat iron ring with a continuous winding instead of alternating them, and place it in the fields of the Morday alternating machine? Would receive a great deal of current with low voltage, i.e., direct current? A. This might be donewith a proper commutator and connections. It is not advisable. 2. How many watts do you require for one man power? A. 746 watts=1 horse power, or 93 (about)=1 man the simplest way for reproducing some of his experirefer you to Tesla on "Alternating Currents," \$1, and Tesla's "Inventious, Researches and Writing," just published, \$4 by mail.

(6031) C. A. D. asks: Can you inform me the degree of heat necessary to transform limestone from its natural state into lime? And what length of time is required to complete the process in an ordinary fornace? Does it require a gradual heat, or would a blast fornace expedite the process ? A. 36 to 48 hours may be needed to burn a kiln of lime, and a white heat is attained in the process. The carbon of the fuel acts to facilitate the operation by its reducing action. Gradual heating is notneeded.

(6032) Reader writes: A says that a black overcoat is warmer than a light colored one of equal weight, because the dark colored cloth absorbs the rays of light, while the light colored reflects them. B gives reasons which are almost identical for saying that the light colored coat is the warmer. Which is right? A. In general terms the black coat would be warmer in the sun-the white one in the shade or at night.

(6033) M. M. asks: What is the ratio of the volume of high pressure cylinder to that of the intermediate pressure cylinder in a triple expansion engine, also the ratio of the intermediate to the low pressure cylinder ? Also, what are the cylinders' diameter and stroke of the largest triple expansion engine? A. The ratio of the volumes of the cylinders of triple expansion engines varies somewhat with different makers, and to meet the requirements of expansion for steam at various pressures, as well also the capacity of a receiver, if one is used. The usual practice for marine engines is for steam at 100 to 130 pounds pressure 1, 2:25, 5, and for 150 pounds pressure 1, 255, 690 as the relative volumes of the three cylinders. The cylinder diameters of one of our largest ocean steamers having two engines of 10,000 horse power each are 45, 71, and 113 inches with 60 inch stroke.

(6034) Inquirer, Newfoundland, asks: 1. Would an ordinary kerosene lamp, with a sheet iron drum placed just upon its chimney so that the heat from it may radiate slowly through the apartment, heat the apartment better than the lamp without the above attachment? A. The absolute heating power of a lamp will not be increased by the absorption by and radiation of a metal drum through which the heat passes, but the action of low radiant heat from such a source seems in some way to modify the susceptibility of the nerves to the sense of heat, and in that way appears to increase it. 2. Would the comparative heating value be the same whether the room had a chimney or not? A. The effect ${}^{i}C_{C}$ of a chimney opening into a room is to carry off heat, and may only be considered as a ventilator. 3. In case of feather bed on which a person with mild form of scarlet fever(scarlatina) lay till recovery, would it be sufficient disinfection to fumigate once or twice with good disinfectant, for three or four hours at a time, and then put bed in open air; or would it be necessary to take feathers out of tick, and wash case and feathers? Please state best way to disinfect in above case. A. The method of disinfecting as described may be proper and safe, if disinfectants such as carbolate of campbor or other approved methods are applied to the inside of the mattress and a quarter pound of camphor left among the ! feathers for a season. Such a bed should not be used by other children under six months. The safest way where no oth children is to di wash everything appertaining to bedding and clothing.

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May 1, 1894,

AND EACH BEARING THAT DATE

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the gravity system of such advantage that you would ad vise this excavation, at an enormous expense, or would it be better to have the return water conducted into a receiver with automatic pump attached, so that the water could be delivered into the boilers? A. The sinking of the boilers in an excavation for the convenience of a return system is not desirable, in view of the well known appliances of the present day for returning the water of condensation to the boilers. A small cellar with tank and automatic pump, below the line of return pipes, is the cheapest and most satisfactory system. 2. In ventilating a large hospital would it be better to propel by fans warm air into the rooms through registers placed near the ceiling, expecting this pressure of air, assisted by the steam heated ventilating stacks, to force the foul air out through shafts near the mop board of each room or would it be best to permit the hot air to escape through the heated basement corridor through registers placed near theceiling, and connect fans with foul air ducts, drawing the foul air out of the room through registers near the floor, this draught to cause the hot air to circulate rapidly through the room, warm it and pass out through the foul air ducts, the latter plan being the reverse of the former? A. The plenum or pressure sys- the clamp arc.

(6035) P.S., N. O., asks: What horse wer will a gasoline engine having two cylinders 41/4×6 inches stroke give at 350 revolutions? What speed will above engine drive a 21 feet long, 5 feet 6 inches beam boat, propeller 18 inches, 3 blades, 41/2 feet pitch ? A. The two-cylinder gasolene engine will have from 5 to 7 horse power, according to the perfection of the explosive E mixture of gasolene vapor and air. It will propel the boat at from 7 to 8 miles per hour. The engine will not run with the speed named when attached to the propeller. E 250 revolutions will be its speed for the above boatspeed.

(6036) R. W. S. asks if the valve of a high speed locomotive has to be changed to a shorter throw when running at a high rate? A. The throw of the valves in all locomotives and link valve gear engines is controlled by the link motion. The movement of the link from the dead point out in either direction controls thecut-off of the valve from 0 to the largest opening that is allowed by the construction, the amount of cutoff being generally designated by the check notches on

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