RECENTLY PATENTED INVENTIONS.

Apparatus for Special Purposes.

MEANS FOR UTILIZING OIL OR GAS IN ORE-REDUCING FURNACES.—W. KEMP, Tucson, Ariz. The objects in this invention are, to equalize the flow and pressure of air around and to the flame at that part of the burner in a combustion-chamber; to provide for the circulation of the air-blast around the shell of the chamber, to protect the shell against heat in the furnace; to provide means for regulating the inflow of air and the liquid or gaseous fuel independently of each other, to the end that intense or modified heat may be produced.

LOADING OR UNLOADING APPARATUS.—J. A. PASTUREAU, Laplace, La. To render this apparatus capable of transportation the inventor has mounted it upon a suitable wheeled truck. The apparatus comprises a frame-work as well as hoisting mechanism of special embodiment, combined with a trackway, whereby a load may be elevated from one point and transferred to another, where it may be deposited. The apparatus is capable of withstanding considerable strain and can be easily and readily manipulated.

Electrical Devices.

COMBINED TELEPHONE TRANSMITTER AND RECEIVER.—C. YEACK, Akron, Ohio. The more particular object of this inventor is to produce a combination instrument which may be used as a transmitter or as a receiver and also in other relations more or less analogous. When used either as a transmitter or receiver, the currents produced in the windings should be in phase with each other, and the windings should be of proper direction to attain this end rather than to cause the currents to destroy each other.

WIRE-SUSPENDING DEVICE.—H. E. STEVENS, Windber, and B. GELLATLY, Pittsburg, Pa. This improvement relates to means for suspending wires, especially electric trolley or feeder wires. The aim is to devise a suspending means which shall obviate many former difficulties, such means being so constructed and placed in the roof of the mine or building that it is very difficult for the same to be forced or pulled therefrom. The device may be readily placed, and on deciding to abandon a passage-way in the mine it may be quickly removed from the roof and used in a new passage-way.

Engineering Improvements.

MARINE VESSEL.—C. H. LEE, Southampton, N. Y. The broad features of this invention consist in the arrangement outside of the hull, of the fuel-pipe which conveys liquid fuel from a storage-tank to the engine, in connection with devices by which an upstanding branch of the pipe is surrounded by a standpipe open to the water and serving to discharge leaking fuel into the water without any possibility of the fuel escaping into the vessel's interior.

ROTARY ENGINE.—L. VAN D. SUTTON, West Newton, Pa. In this engine two cylinders are used, which have the form of hollow rings, and the pistons are in the form of curved cylindrical bodies. Motion of first one piston and then the other is communicated to the main shaft by means of an ingenious construction, comprising a disk mounted on the shaft and having flanges which alternately engage the pistons by projecting through slots in the lower halves of the cylinders. The feed-valves are operated by means of cams on the shaft and the abutment-heads are operated by eccentrics.

FURNACE.—G. C. CANNON, New York, N. Y. This furnace is adapted for burning gaseous fuel, and is primarily for use in connection with boilers of steam automobile vehicles. In operation the gas-tubes will thoroughly distribute the gaseous fuel, and as the vehicle gathers way the scoop will increase the draft through the tubes, thus increasing the intensity of the combustion at the upper surface of the top plate. The boiler is located above the furnace.

BOILER-FEEDER.—M. CASTELNAU, 8 Rue Richepanse, Paris, France. To avoid many inconveniences very prejudicial to instantaneous-vaporization boilers in preventing them from becoming general, the inventor has devised to feed the same by means of compressed air or gas, which is inclosed with the feed-water in a closed receptacle and which yieldingly forces the water into the boiler through a pipe. He can use either an air-pump, or a water-pump, or preferably a double pump, which forces simultaneously the water and air under pressure into the reservoir.

Machines and Mechanical Devices.

PUMP-ROD LIFTER.—T. H. TREGELLAS, Iuka, Kan. In the present case the invention is an improvement in devices for lifting or pulling pump-rods; and it consists in certain novel constructions and combinations of parts whereby the rods may be readily lifted, devices being supplied for securing such lifting action by an operation similar to that of pumping.

FLESHING AND SHAVING MACHINE.—E. SCHROEDER, New York, N. Y. The object of this invention is to provide a new and improved machine for quickly and accurately removing the surplus flesh from the under or flesh side of raw furs or skins and for paring or shaving the under or flesh side of dressed furs or skins to reduce them to a desired uniform thickness.

COIN VENDING-MACHINE.—C. R. SMITH, Montpelier, Vt. This apparatus is operated by the weight of a coin and is adapted to deliver goods of values which differ according to the position of a distributer wheel which is concealed from the view of the customer. This introduces an element of chance which adds greatly to the interest which the machine would attract. However, goods of one-value or another are always delivered, there being no blanks.

GAGING AND COUNTING ATTACHMENT FOR WOODWORKING-MACHINES.—H. O. FRY, Cosmopolis, Wash. Mr. Fry's invention has particular application to a mechanism adapted to be used in conjunction with sawing-machines for cutting off different lengths of stock used in the manufacture of boxes, blinds, furniture and the like. Primarily the inventor has in view the provision of a mechanism which may be applied to any sawing-machine and shall gage each and every piece of stock cut to the exact length desired and at the same time will keep an accurate account of the number of pieces so cut. The machine is a money and a labor saving contrivance and is entirely automatic.

WINDMILL.—T. W. LOWE, Stockton, Cal. In this case the inventor seeks to produce a construction wherein the wings normally present a large area to the pressure of the wind, which pressure-surface is of increasing effectiveness from the larger to the smaller ends thereof. The wings or vanes automatically adjust themselves. Through certain means the pressure of the wind on the vanes will throw them edgewise to the wind, and thus permit the wind to pass with freedom through the wheel. The windmill belongs to structures of the class disclosed in a prior patent of Mr. Lowe's.

SPRING-MOTOR.—E. L. GARVEY, Asheville, N. C. In this case the invention is in the nature of an improvement in spring-motors for furnishing motive power for such light uses as the running of sewing-machines, the driving of fans, the operation of churns, etc. The motor may be stopped at any time by simply pressing the brake-shoe into contact with the disk.

SAFETY DEVICE FOR ELEVATORS.—W. S. FULWIDER, Diamond, Indiana. Primarily the invention in the present instance provides the car or cage of the elevator with means which, should the cable supporting the car be accidentally severed or broken, will engage with the standards or vertical supports of the walls of the well and will check the descent of the car to the bottom of such well.

TOOL-HOLDER FOR LATHES OR PLANERS.—J. BRANDSTETTER, Salem, Ohio. The purpose of the improvement is the provision of details of construction for a tool-holder that may be employed for the support of a cutting-tool used on a lathe, planer, shaper, or slotting-machine and enable the proper adjustment of the cutting-tool for height and also adapt the holder to afford resilience or render the support rigid, as the work may require.

WASHING-MACHINE.—L. E. POLLARD, Denison, Texas. This invention utilizes a vessel or boiler having corner spray-tubes formed of an angular rear plate and an attached front oval plate, the latter having its lower edge bent outwardly forming a ledge, located above the lower end of the rear angular plate. Adapted to rest upon the ledges at the lower end of the oval plates is a false perforated boiler bottom, a packing is fixed to the edges of the false bottom, flanges are formed on the lower side of the bottom, and means are adapted for securing the spray-tubes.

Of Interest to Farmers.

HARROW.—H. HAILEY, Great Wymondley, Herts, England. In this patent the invention refers to harrows, and the more particular object is to produce a device which is flexible relatively to the ground and provided with bush-teeth of different lengths and with adjustments for governing the relative positions of different parts of the framework of the machine.

GRAIN-STORAGE TANK.—G. H. WARREN and S. FONTAIN, Minneapolis, Minn. In this patent the invention refers to improvements in the construction of grain-storage tanks, silos, and the like. In this connection the inventors have particularly in view a storage-tank which will be fireproof and the parts of which are composed of such material that all danger of the contents being ruined or damaged by dampness will be obviated.

Miscellaneous.

KEEPER-RING FOR BUTTONS.—A. H. BRYANT, East Hartford, Conn. The improvement refers to means for detachably holding shanked buttons upon garments, and has for its aim the provision of a keeper-ring which is shapely, very convenient to apply and remove, and that may be manufactured readily at low cost. The device is formed from a single piece of resilient metal.

HORSESHOE.—A. G. JENNINGS, New York, N. Y. This shoe is particularly adapted for use when the surface over which the horse is to travel is slippery or where heavy loads are to be drawn over undulating ground or surfaces of uncertain footing. The shoe to that end is provided with metallic points extending below the tread of the shoe, as usage, or conditions may require, which points may be round, square, or of other shape in cross-section and blunt or sharpened at their lower ends.

HAND-MEASURE FOR GLOVES.—J. J. SUMMERSBY and J. GRIEVE, Dodge City, Kan. The present invention refers to improvements in measuring devices, and has particular application to an article of this type for measuring the hand to determine the size of the glove to be worn. It is simple in construction, accurate in its measurement, and will be much more convenient than the ordinary spring-tape now in use. It may be readily adjusted to fit any size of hand.

CORSET.—E. SAVOYE, 35 Rue du Caire, Paris, France. The invention made by Mr. Savoye refers to improvements in corsets; and it consists, essentially, in a new way of cutting out the component parts of a corset for the purpose of obtaining by the mere design of the parts a more stylish appearance, more suppleness, and greater comfortableness than heretofore. The parts may be provided with gussets, plaits, and the like.

BELT-BUCKLE.—L. SANDERS, New York, N. Y. The purpose of the invention is to provide a construction of belt-buckle comprising a frame or a body of skeleton construction and a central-cross-bar offset from the rear of the frame, upon which the tongue is mounted in such manner that its inner end will have a cam action upon the end of the belt passed beneath the bar and over teeth on a second rearwardly-offset bar more or less close to the tongue-carrying bar.

FIRE-ESCAPE.—J. R. PROUTY, Chicago, Ill. One of the principal objects of this invention is the provision of effective means for facilitating the escape of persons from burning structures without liability to injury and also to provide means whereby firemen and others may ascend to any desired height of the structure for the purpose of directing streams of water upon the flames to extinguish them.

SUN-BLIND FASCIA.—S. PREBBLE, 67 Atlantic Road, Brixton, England. Mr. Prebble's invention relates to an improvement in connection with awnings for shops and other business premises; and it consists in the combination, with a roller-awning adapted to be distended in front of the window by means of hinged arms in the usual manner, of what may be termed a "fascia" or "name-plate," hinged to the awning-lath, and so weighted as to maintain a vertical position in all positions of the awning, so as to always present its face to public view.

HAT.—R. PLATO, New York, N. Y. In this patent the invention has reference to summer or outing hats made of canvas or like fabric material, and its object is to provide a hat arranged to allow free circulation of air through the crown to keep the wearer's head cool and to greatly strengthen and reinforce the rim to prevent the latter from losing its shape.

NOZZLE.—W. C. OBERWALDER, New York, N. Y. The object of the present invention is principally to provide means for completely shutting off the flow of water through the nozzle, and this the inventor effects by providing an interior bead located inward of the mouth of the nozzle and arranged to be engaged by the conical divider-block when the block is drawn inward, thus closing the nozzle and attaining the end desired. It is an improvement on a nozzle disclosed in a prior patent granted to Mr. Oberwalder.

DEVICE FOR OPERATING THE VENTILATING-DOORS OF TOBACCO-BARNS.—W. D. CASE, Granby, Conn. The purpose of the invention is to provide a simple and easily manipulated means whereby to simultaneously open and close a vertical tier of ventilating-doors, particularly such doors as are used in the construction of tobacco-barns, and to provide means for holding the doors in a fully-open or a partially-open position.

BELT-PULLEY.—G. A. ENSIGN, Defiance, Ohio. The inventor claims as his object the provision of a belt-pulley arranged to prevent lateral shifting of the belt by keeping the latter in a central position on the belt-surface, to furnish a ready escape for the air between the belt and the peripheral face of the pulley, to insure proper contact between the belt and pulley, and to increase the adhesion between the contacting surfaces to produce a more positive transmission of the power.

DESK AND SEAT.—A. C. HENDERSON, New York, N. Y. Mr. Henderson's invention relates to an improvement in desks and seats particularly adapted for use in school-rooms; and his object is to provide a desk and seat so connected and arranged that they may be simultaneously adjusted to desired heights and to retain their proportionate relations as to height.

ILLUMINATED MAP.—T. IKEMORI, New York, N. Y. This map is for use in a classroom to instruct in geography and history. Means are provided to make the back of the map appear plain, the outlines of countries appearing at the front; but the subdivisions, their names, and other detail will remain hidden until an electric or other light is moved over the back, whereupon the concealed matter will be visible from the front, thus enabling a teacher to make plain any routes, and locations of cities, mountains or rivers, etc.

SUPPLY-VALVE.—W. T. NICHOLS, Hempstead, N. Y. In this instance the object is to provide a supply-valve, more especially designed for use in overhead tanks for water-closets and the like, and arranged to prevent leakage by being abnormally held to its seat by the pressure-supply and to automatically open against the pressure-supply by the action of a float or similar device on the water falling below a predetermined level in the tank.

PANEL-WORK OR WAINSCOTING.—D. P. MILLER, Cumberland, Md. One of the principal objects in this case is to provide means whereby the different elements or parts contributing to the structural organization of panel-work or wainscoting for ceilings, partitions, walls, and the like may be united together in their intended positions practically without the use of nails, screws, or their equivalent.

TOY FOR EXPANDING THE LUNGS.—O. HENRICHSEN, New York, N. Y. This toy affords amusement as a trick device, and is a lung developer. The construction includes a blowpipe, a guide rising from the pipe, a vessel to be blown up from the pipe upon the guide to a position of rest above the pipe, and a second vessel having flexible connection with the frame of the toy which is to be raised by air introduced through the pipe and made to engage with a bail carried by the first vessel or any support located at a point above the pipe.

OVEN-VENTILATOR.—J. F. FERRY, Leadville, Col. Mr. Ferry's invention relates to improvements in ventilators for ovens, stoves, ranges, or the like, the object being to provide a ventilator so arranged as to automatically open upon the opening of an oven-door and permit the escape of smoke and fumes that may be in the oven to a flue or to the atmosphere.

PROCESS OF TREATING CYANID SOLUTIONS.—W. H. DAVIS, Boulder, Col. In this patent the invention has reference to the extraction of gold and silver from ores by means of a dilute solution of potassium cyanid. The object is to provide a continuous process for treating cyanid solutions either during or subsequent to their contact with the ore, whereby the double salts in the solution are dissociated and the regeneration of the cyanid in the solution is simultaneously accomplished with the purification of the solution.

LINE-HOLDER.—W. J. DOTY, Clifton, Kan. The object of this improvement in line-holders and shingling devices is to provide a novel construction of a device whereby one end of the line may be held in position to mark a line across a roof or other object which it may be desired to mark and then be released and will fly back automatically to position to hold one end of the cord in marking another line.

DEVICE FOR HOLDING FLEXIBLE SENSITIVE SHEETS.—R. BECKMANN, Charlottenburg, Germany. The purpose in this case is to provide a device to permit the use of flexible sensitive paper sheets, films, and the like in a camera in place of the ordinary dry-plates and to allow the photographer to manipulate the device and the sheet carried by it during the process of filling the camera, exposing, developing, fixing, washing, and drying to form the photograph, and to allow quick removal of the finished photograph and replacing it by another sensitive sheet.

FOLDING BEDSTEAD.—M. BENZ, Nashville, Tenn. The principal object of this improvement is to provide a folding bedstead which is readily portable for shipment or storage and one which occupies but small space in either position thereof, besides being comparatively light in weight and composed of few parts. The contrivance may be readily manipulated with small exertion of the operator, and may be carried into and out of position for use without noise or friction.

FURNACE-DOOR-OPERATING DEVICE.—L. I. NEWTON, Fort Dodge, Iowa. In this case the invention consists in means specially designed for operating locomotive fire-box doors, though adapted to be used in connection with any ordinary furnace, whereby the fireman may open and close the door with his foot and thus leave his hands free for feeding fuel into the furnace, and thereby facilitate the coaling process in addition to opening and closing the door at each operation.

HOT-WATER HEATING SYSTEM.—A. B. RECK, Copenhagen, Denmark. This hot-water heating system is worked by steam, and the invention relates especially to low-pressure steam; and the object is to create means for attaining this by only changing the load on the pressure-regulator that controls the pressure of the steam. The hot-water system can be worked in two distinctly different manners, one for low and the other for high temperature on the water.

WATCH-PROTECTING FOB-CHAIN.—D. SUMMA, New York, N. Y. This device may be used to advantage by either ladies or gentlemen and may be employed to protect such articles as keys, scissors, and the like as well as articles to be worn for ornamentation. If a person should seize a watch or other object to be protected or pull heavily upon one of the chains, the watch protector cannot be removed from the clothing, for the reason that the teeth cannot be disengaged. The invention is an improvement on a former protector covered by letters patent granted to Mr. Summa.

APPARATUS FOR TREATING SKIN DISEASES, ETC.—J. KJELDSEN, Copenhagen, Denmark. The special feature in this invention consists in using electric-arc lamps provided

with electrodes which wholly consist of metals whose illuminating-vapors form a linear spectrum of wholly or about wholly chemical rays which are specially adapted for the treatment of skin diseases, for telegraphic and photographic purposes, etc. To prevent the melting of these electrodes, they may be cooled in the usual way. Means are provided to permit the passage of the ultra-violet rays. The rays pass through the windows or lenses of the casing to the object to be treated.

SAFETY-BUCKLE.—A. ENGLERTH and H. SCHUETT, Chicago, Ill. The improvement of these inventors resides in a buckle adapted for attachment to a riding-saddle for the purpose of connecting a stirrup-strap thereto in a way to retain the strap on the saddle under normal conditions of use, but when the rider is thrown the pull of the strap in an abnormal direction operates to open the buckle and automatically release the stirrup and strap.

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(9210) E. E. H. says: Can you give me any information in regard to vaporization of alcohol and kerosene? Or can you tell me of any book or publication in which I could get the information? A. In reply to your question regarding the vaporization of alcohol and kerosene, we would say that you will find a very complete statement about alcohol in the "Tables of the Properties of Saturated Steam and Other Vapors," by C. H. Peabody; price $1.00 postpaid. Kerosene is not a single chemical substance like alcohol, but is a mixture of a large number of different hydro-carbons which are vaporized at different temperatures and which obey different laws. It is therefore impossible to give for it information similar to that contained in the tables referred to above for alcohol.

(9211) L. A. I. says. Suppose you take a steel cylinder and completely fill it with a mixture of air and gas under pressure, say, 40 pounds per square inch, similar to the mixture in a cylinder of an ordinary gasoline engine just before ignition. Now suppose the mixture is exploded by an electric spark. What would be the temperature and pressure immediately after the explosion and what would be the pressure after the cylinder had cooled to the original temperature? Are indicator cards ever taken from cylinders of gasoline engines? How much is the average M. E. P. generally found in gasoline engines—that is, how many pounds per square inch? A. Replying to your inquiry we would say that it is impossible to accurately estimate the temperature in the cylinder of a gasoline engine after ignition without knowing the exact amount of gasoline consumed. One pound of gasoline, when completely burned, will generate about 20,000 British thermal units, and each B. T. U. will heat each pound of the products of combustion, if there is no heat lost by radiation, about four degrees. At atmospheric pressure, about thirteen cubic feet of air weighs one pound. From this you may be able to get some idea of the temperature which is possible when the gasoline is burned. Our judgment is that the temperature of the flame in the cylinder may vary from perhaps 1,500 or 1,600 deg. F., according to the mixture, to over 2,400 deg. The pressure is increased in the same ratio as the absolute temperature; after the temperature is lowered to the original temperature, the pressure would be slightly less than it was before combustion took place, because the hydrogen which forms a part of the gasoline would burn out some of the oxygen, forming steam which would condense. The carbon, the other constituent of the gasoline, burns the CO which occupies the same space as the oxygen consumed. Indicator cards are frequently taken on gasoline engines, but the M. E. P. varies very greatly. "Gas Engines," by D. Clerk, price $2.00, and "Gas and Petroleum Engines," by William Robinson, price $5.50, will give you a great deal of valuable information on this subject.

(9212) I. L. says: Thanking you for your answer to my previous questions, I beg to submit some more to you. Does an eel have two hearts, and, if so, how many times per minute does each beat? If not, is there any living organism having two or more hearts, and, if so, what is the respective number of beats per second of each? Has lightning any real width, and, if so, what is it? What is the apparent width? Does it have any shape, that is, the cross section of a stroke? What is the length of an average stroke? Of an extreme one? Of a short one? What is the actual mechanical power in lightning? That is, if we transformed the high pressure of an ordinary stroke of lightning down to a low pressure, raising, of course, the amperage as we decreased the voltage, grant that there is no loss of current in transforming, would the current that we got have any power to decompose water or run a motor to any appreciable extent? Is there such a thing as "ball lightning," and if so, what are the known facts concerning it? Has it, if a reality, been produced artificially; and, if so, how? Is the cause of thunder known? If so, what is it? If not, what is the most probable theory? What about "the air rushing into the vacuum" theory? What are the weak points in this theory? Has thunder been known to kill ducks or chickens in the shell? Does thunder curdle or sour milk, and, if so, why? What is the largest number of people ever carried in one day by the B. R. T. railway system? On what day were they carried? Do you consider the ——— ——— cycle the equal of any other motorcycle? Do you consider it the best? Do you consider the ——— automobile a reliable automobile for ordinary usage? If a perfect vacuum is a perfect non-conductor of electricity, why can't an induction coil be insulated by being "jacketed" in a vacuum tube? If silver is 100, what is the electrical conducting power of glass when heated? I have an induction coil wound with Nos. 14 and 36 wire. What amperage and voltage should I give it? It is a large coil, and I think it was made from plans in one of your SUPPLEMENTS. If you could tell me which SUPPLEMENT it was, I would like to get it. It gives ordinarily 1½-inch spark. Is radium a metal? What is the numerical radio-activity of radium, polonium, actinium, and uranium? What is a good book treating of Geissler tubes and of fluorescence? A. Your questions about lightning have no exact answers, as any can see. No two flashes are necessarily alike. The distance from the cloud to the earth, or rather the resistance between them, determines the intensity of the flash discharge, and so all the quantities you ask for. We know nothing at all about the actual mechanical power of lightning. We may surmise about it, but there is no basis in actual fact for the surmise. It has power enough to split trees, etc., which would require many horse power. Ball lightning is admitted by most to be a reality. Little else is known about it. Thunder is the concussion of the air as it closes up after the discharge has taken place. We do not know whether it has killed ducks or not. Milk is usually found sour the morning after a thunder storm. We cannot explain why. As it is impossible to produce a perfect vacuum, it is not clear how you would put an induction coil into a perfect vacuum. It is still more obscure how you could carry the wire into the vacuum to bring out the discharge of the coil. The specific resistance of glass at 20 deg. C. is given by Thompson as 91 followed by 18 ciphers, and at 200 deg. C. as 227 followed by 11 ciphers. The resistance for silver is 1.492 annealed, and 1.620 hard. You can change this to silver 100 in each case. You do not specify the kind of silver you have in mind, and we leave the calculation for the case in hand to yourself. The coil you have, giving an inch and a half spark, is described in the SUPPLEMENT, No. 160, which we furnish for 10 cents. As you desire to get the paper, you will find all needed instruction and information therein regarding the use of the coil. Radium is supposed to be a metal allied to uranium. The radio-activity of various degrees ranges from small powers up to several hundred thousand. Geissler tubes are not specifically treated in any separate book. Any good book on electricity gives enough regarding them. Try Thompson's "Elementary Lessons," which we send for $1.40 by mail. We have no information relating to eels. Answers to this and your other questions can be given for a fee of $10.

(9213) L. S. asks: I have eight carbon cylinder cells and use sal-ammoniac solution for lighting a few miniature lamps, but the lamps are only bright a few minutes. What formula could I use in the carbon cylinder cells so the lights should burn bright for about one-half hour at a time? A. We would advise that the sal-ammoniac battery is not adapted to lighting an electric lamp. If used constantly it soon falls off in current, as you have observed. A steady service will soon destroy the battery. The Edison-Lalande cell, using about twice as many as of the Leclanche, will give much better satisfaction.

(9214) G. A. V. B. says: Can you give me any information in regard to making brick from cement and sand or cement, sand, and lime? How will cost compare with burned clay brick, also are they as durable and desirable as common clay brick? How much sand and cement are required per 1,000, and proportion of same? How are cementine houses constructed, and are they more costly than lumber houses? I understand there are a great many in California. What are the best proportions for making cement for walls of houses? What kind of cement is generally used for all these different kinds of work—Portland or Rosendale? A. In reply to your inquiry regarding the making of brick from cement and sand, or from cement, sand, and lime, we would say that, as a rule, the cost of such brick will exceed the cost of burned clay brick. For some purposes, however, such bricks have been successfully used, especially for pavement purposes, where the wear is not too heavy. For sidewalk pavements, if properly made, cement and sand brick are very durable, and are preferable to common clay brick. They should be made of the best Portland cement, clean, sharp sand, and finely broken stone or some other hard and durable material. The best proportion of these ingredients will vary somewhat with the character of the cement, sand, and stone. A good average proportion, however, is one part of cement, three parts of sand, five parts of broken stone. If Rosendale cement is used, the mixture should be a trifle richer in cement, and the bricks will not be nearly so durable. They will, however, be less expensive. Cement houses are made by filling in the space between temporary planking, which is constructed so as to form a box, with concrete, the width of this box being equal to the desired thickness of the walls. After the concrete has set, the temporary woodwork is removed and placed higher up, so that more concrete may be filled in. Two or three feet is added to the walls in this way at a time until they are carried to the desired height. Both Rosendale and Portland cements are used for this purpose, but Portland cement is much more durable and decidedly preferable. The proportion for the concrete for such houses is substantially the same as that given above for paving brick. The cost of these houses usually exceeds that of ordinary frame houses. They are, however, more substantial.

(9215) C. D. J. writes: I have read with some interest query 9036, A. W., June 6; 9086, A. M. W., July 11, and 9184, S. R., September 26, regarding the purple coloration of glass. I suppose window glass is the only kind referred to, because it is the only kind I have ever seen the discoloration, or coloration as you might call it, in. I am a window-glass worker, and have been for twenty years, and have the tradition of several generations before, and faded or discolored glass has always been the bane of the window-glass industry. There is no known cause, and one known remedy—that of reannealing it. I can show you glass made ninety years ago in the Catskills, using wood fire to melt, and making the glass with sand, slaked lime, and potash made from ashes; one light of glass as clear as the day made, the other has the coloration. I can show you glass made in 1903 in Indiana, with natural gas; glass made with sand, carbonate of soda, sulphate of soda, and raw lime. One is faded, the other not, and this has always been the way in high altitudes, in low, in hot and cold. We have tried all kinds of experiments to overcome this; different kinds of fuel. Our mix we cannot change much. That is practically the same as it has been for years. We have dipped our glass in the different acids without any seeming difference; some will fade, and some will not. If the SCIENTIFIC AMERICAN or any of its correspondents could suggest something to overcome this, it would be a great boon.

(9216) F. H. asks: 1. Kindly let me know the operation of a Crookes tube. My understanding is that the platinum terminal is the anode and connected to the positive side of the generator and the concave aluminium terminal to the negative side. If the current travels as claimed from the positive to the negative, why does it leap from the aluminium to the platinum, which acts as a target? A. The platinum terminal is the anode of an X-ray tube. From the negative terminal or cathode the stream of particles proceeds which bombard the anode and produce the rays. We do not see that this is connected with the direction in which a current flows through a conductor. The streaming is from the cathode. The current may be in the opposite direction. However, the direction of a current is entirely conventional. We speak of it as from plus to minus. Who knows that it is so? It is as conventional as to shake hands with the right hand, or to call the north pole of a magnet plus. 2. Also the action of the auxiliary tube of a Crookes in connection with X-ray work to adjust the vacuum—how the vacuum is raised and lowered, as well as kept stationary; what connections are made to the auxiliary, when to raise and to lower the vacuum. A. The vacuum of an X-ray tube is lowered by heating the chemical in the auxiliary tube and driving some of it as a vapor into the larger tube. This is absorbed again, and the vacuum rises. Before the tube will work properly the vacuum must be lowered again. The connections are variously made for different tubes. The maker furnishes the proper directions with his tube.

(9217) Mrs. W. C., who inquires for names and addresses of bell founders, should give us full address, as we only answer queries of this nature by mail.

(9218) F. M. W. says: Lawrence, Mich., is a town of 800 population, and has voted lights and water-works. A proposition has been received of a cold process gasoline plant for gas lighting and heating. What do you think of its practicability and expense for this size town? What would be an average price for gas per 1,000 cubic feet in cities? As compared with electricity, what do you think the expense would be? A. The gasoline and air "vapor gas" is in general use in country houses and in villages. There is no objection to its use save the possibility of condensation of the vapor in the pipes in very cold weather, which is not serious with good management in laying out the pipe work. If the company is responsible, they may guarantee this. For heating purposes, coal is the cheaper and safer to manage. Illuminating gas costs in large cities about $1 per 1,000 cubic feet, and in small towns from $1.50 to $2 per 1,000 cubic feet. We advise that the gasoline system is practical and the cheapest for your town. Electrical lighting will be very expensive on a small scale.

(9219) B. K. D. asks: 1. Will you please tell me whether the induction on a