

## ENGINEERING INVENTIONS.

A car coupling has been patented by Mr. Joseph T. Hammick, of Rhinebeck, N. Y. It has stationary and movable drawheads, hinged lifting block and bail, with other novel features, whereby the coupling link is permanently connected with the draw-bar, etc., the invention being an improvement on a former patented invention of the same inventor.

A switch lock and throw bar has been patented by Mr. William B. S. Reed, of Brooklyn, N. Y. This invention covers a novel construction and arrangement of parts for an improved device for throwing switches, which at the same time serves as a lock for automatically locking the switch in place, both when open and when closed.

A station indicator has been patented by Mr. Watson Fuller, of Atlanta, Ga. The invention consists in combining with a shaft a series of rollers or drums surrounded by boxes, each pair of drums carrying a band on which are the names to be shown, and the whole operated by a mechanism to indicate successive stations in their proper order at different parts of a car at the same time.

A locomotive whistle alarm has been patented by Mr. Charles Hulst, of Torch Lake, Mich. It is a novel construction, by which a whistle can be operated automatically by inclined guides at the sides of the track, whereby a whistle signal is given automatically by the locomotive before the train reaches a crossing, bridge, or other place where a whistle is to be regularly sounded.

## AGRICULTURAL INVENTIONS.

A wheel plow has been patented by Mr. Moses B. Farnham, of Germantown, Cal. The construction is such that when the forward end of the tongue is secured to the neck yoke of the team, the forward end of the machine will be moved to one or the other side, to cause the plows to take or leave land, the object of the invention being to facilitate the re-plowing of summer fallowed land.

A check rowing attachment has been patented by Mr. Edward F. Crawford, of Honey Bend, Ill. Combined with a frame and seed slide is a rotary shaft for operating the slide and carrying the wire wheel, with devices whereby the position of the rotary shaft and its wire wheel may be changed, to be operated from either side of the machine, making a simple attachment to facilitate the planting of corn in accurate check row.

## MISCELLANEOUS INVENTIONS.

An attachment for tape measures has been patented by Mr. Edward Herline, Jr., of Hoboken, N. J. The invention consists in a link and hinged point for securing the end of the tape in place, and thus facilitate convenience in the use of such measures.

A mouse trap has been patented by Mr. Lester H. Gear, of Mentor, Iowa. It consists of a cage with tilting plates hung in an opening, with stepped outer ends, and a bait suspending hook upon inclined plates of the cage over the covered openings, by means of which any number of mice may be caught without resetting the trap.

A foot rest for school desks has been patented by Mr. William P. Connor, of Bloomsburg, Pa. Combined with the desk are curved notched bars on the legs and a swinging foot rest bar above the notched bars, with winged nuts for locking the foot rest bar in place, so the rest can be adjusted in different positions or swung entirely out of the way.

A grinding mill has been patented by Mr. Lewis B. Joy, of Bath, N. Y. It has rollers with corrugated faces and grinding plates with beveled and corrugated inner edges, with other novel features, to facilitate the grinding of mixed grains for feed, but making a mill which can also be used for grinding grain for other purposes, and which is so constructed that it can be readily adjusted and controlled.

A combined dust pan and ash sifter has been patented by Mr. John O. Beneke, of New Orleans, La. It consists of lower and upper pans or sections, made of tin or other suitable material, the bottoms being of circular form, and having perforations of any desired pattern, but so arranged that the perforations of the upper and lower pans may be brought in line to pass matter through or not, as desired.

A churn has been patented by Mr. Jas. Hultz, of Greeley, Kan. It is so made that by the turning of a crank, when the churn body is charged with milk, the dashers will be rotated in opposite directions until the butter comes, when they can be made to rotate in the same direction to gather and wash the butter, both dashers being easily removable from the churn when desired.

A drag saw has been patented by Messrs. Ira B. Warren and Charles M. Potter, of Waucoma, Iowa. It is a power machine, in which the beam or log of wood to be sawed is placed in a trough secured on bars pivoted on the base frame, and then the log is pressed toward a saw blade operated by suitable mechanism until the operation is completed, when the frame is swung back from the saw.

A roller skate has been patented by Mr. Joel Heacock, of Brighton, Iowa. It is made with a main roller just forward of the heel, and intended to be almost directly beneath the center of gravity of the body, while there is a forward roller under the ball or toe, on either side of which are guide rollers, the skate being for use on a single track of a railway, the skater propelling himself by means of a staff.

A horse marsh-shoe has been patented by Mr. Charles Dumke, of Portland, Wis. It consists of a board provided at opposite edges with bars and oblong holes, in combination with eyebolts with heads and a lever fastener for clamping the board to the horse's hoof, making an extended surface for the horse's shoe,

to prevent the horse from sinking into the ground in marshy places.

A combined step ladder and adjustable platform has been patented by Mr. Stephen J. Palmer, of Dover, N. J. The construction consists of a platform mounted on end strips carrying steps, and so arranged that it may be set up at different heights, making a useful and safe device for women to work upon about the house, and one which, when folded, takes up but little room.

A gun barrel has been patented by Mr. John K. Ballard, of Grayling, Mich. A short distance in front of its breech end the barrel has an annular groove in its bore, the groove increasing in diameter from the muzzle end toward the rear, whereby the annular shoulder is formed in the barrel so that cloth patched cartridges can be fired without causing the patch to catch in the barrel.

A steamer for use in the ovens of stoves and ranges has been patented by Mr. Charles F. Hanneman, of Ahnapee, Wis. It is of such construction that it may be supported on the ribs or guides usually provided in the upper portions of ovens, or otherwise conveniently placed without interfering with the ordinary uses of the oven, so that articles being baked may be partially steamed or moistened while in the oven.

A grain register has been patented by Mr. Lloyd Nottingham, of Norfolk, Va. Combined with a body or case, and a wheel having a lateral annular flange with a notch or gap, is a second wheel journaled within the flange, with a support and two pawls pivoted thereto, located laterally thereto, with other novel features, making a simple device to indicate on a dial the number of counts of certain measures of grain.

A case for photographic sensitized paper has been patented by Messrs. William H. Lewis and Erastus B. Baker, of New York city. It is a box that is light tight when the sensitized sheet is wholly within the box, or being moved in or out of the box, and adapted for carrying a roller, to be operated from the exterior of the box, for supplying sensitized paper as desired, whether to be used for making negatives or for photographic printing.

Aerial navigation forms the subject of a patent issued to Mr. Ringert Jongewaard, of Harrison, Dakota Ter. This invention covers a construction designed to rise upon the wind by presenting the under side of an inclined plane thereto, while propelling the machine slowly toward it, or to rise on still air, propelling the machine more rapidly in the desired direction, the propeller being driven by the strength of the rider.

A button has been patented by Mr. Gabe Felsenthal, of Louisville, Ky. It has two pairs of spring arms projecting from its back, with two angled levers pivoted in the extremities of the arms, having angled shoulders, which engage each other when the button is arranged for insertion in the button hole, and when it is in position to be worn, making an easily inserted collar or cuff button that will not tear the button hole.

A mould for casting solder joints has been patented by Mr. Arthur Cunningham, of Louisville, Ky. It is made in two halves, arranged to register as they are closed around the pipe, and will hold sufficient melted solder to form a joint of the required size and shape, thus forming a joint by casting upon either a horizontal or vertical pipe, the mould being a device which can be used by inexperienced workmen to make a perfect joint.

An automatic safety check for musical boxes has been patented by Mr. Charles H. Jacot, of Hoboken, N. J. Combined with the cylinder shaft is a friction wheel and a balanced friction pawl, whereby the shaft will be stopped and held should its speed be unduly increased by escaping from the control of the escapements by accident or during adjustments, thus exposing the cylinder pins and the teeth to danger of breaking or injury.

An escapement lever for watches has been patented by Mr. William B. Simpson, of Holden, Mo. It is so made that the lever fork of the escapement can be readily adjusted forward or backward relatively to the ruby pin of the roller plate of the movement, without taking the watch apart and while the balance wheel is on, so that a person can make the necessary adjustment while the timepiece is in working order.

A device for filing saws and drilling has been patented by Mr. Charles L. Polley, of Sandusky, Ohio. It consists of a suitable frame with handles, bevel wheel, detachable file, and socket shaft, which may be used as a means of attaching a driving rope or to receive any tool, such as a drill or an auger, to be driven either by power or hand, or an emery wheel with suitable gear attached may be substituted for the rotary file and wheel.

A saw gummer has been patented by Messrs. Albert Stevenson and John Stumppees, of Stevenson's Pier, Wis. Combined with a base block and clamping plate are dies held therein, yokes on the sides of the base block and screws in the yokes, for adjusting the dies on the base block, the tool being adaptable for clamping any thickness between the base and the top plate, and the invention being an improvement on a former patented invention of one of the inventors.

## NEW BOOKS AND PUBLICATIONS.

"OUTING" for April, under its new management, fully maintains its hitherto well established character. Its matter is all choice in character, while the illustrations and typography are most admirable. Among the principal articles in this number are Ranch Life, by Theodore Roosevelt; American Steam Yachting, by E. S. Jaffray; Around the World on a Bicycle, by Thomas Stevens; Crossing the Atlantic on a Blockade, by Captain Roland F. Coffin; and Work and Sport on the Congo, by Henry M. Stanley—but this by no means exhausts the list of attractions presented.

## Special.

## THE UNITED STATES MAIL.

On the end of a business house on Market Street, Philadelphia, adjoining the new United States Post Office, there is an exceedingly suggestive picture, in two panels, giving the old and the new ways of delivering the United States mail.

The one indicates a very little to do, with leisure in which to do it. The other, much to do, for which haste is required. To one who is familiar with the growth of the postal service, this picture starts a very interesting train of thoughts. One of these brings back the old stage-coach and the horseback rider, and the fact that between these two the work of distributing the mails of the country was divided. Over against these come to mind the facilities of the present day, with the high rate of postage reduced to figures hardly more than nominal by comparison. From the external mechanical changes the mind turns to the contents of the letters, both of the old time and the new.

One of the most engrossing topics in which people everywhere always have had, and always will have, a common interest is the matter of personal health.

A large class of writers, seeing in the public press the statement of cures by the Compound Oxygen Treatment, which has been so widely advertised, at once write to the references for fuller particulars. The patients who have been cured are so numerous, and they have so freely spoken of their restored health, that the divided task has been to many a light one. But one lady in Maine writes us that she has answered letters from nearly every State, and from some sections very many.

Hon. William D. Kelley, Member of Congress, answers a very large number, saying that he owes the good health he has enjoyed for ten years to the treatment. Hon. William Penn Nixon, editor of the *Chicago Inter-Ocean*, receives hundreds of inquiries as to the genuineness of his testimonials and as to the permanence of results. These he answers through the mail, as it was through a letter received from a relative in Boston that he learned first of the value of the remedy. Once in a while one too hard pressed finds it necessary to ask relief from part of the task, as in the case of a prominent member of the bar of Topeka, Kansas, Hon. H. P. Vrooman, whose title came through service in the courts for a term as judge. He is also prominent in temperance work, being Chairman of the State Executive Committee of the Prohibition Party of Kansas. In one of his letters he says, "I have been interrupted about twenty times since commencing writing." This brief statement gives some idea of the value of his time. The reason for his being called upon on this subject, and letters written to him, is found in a letter to Doctors Starkey & Palen, June 27, 1882, telling of the benefits his wife had received from their Compound Oxygen Treatment. We quote exactly: "In the interest of suffering humanity I send you for publication an account of the almost miraculous cure which your Compound Oxygen performed in the case of my wife. Her condition was a very peculiar one. She had a complication of diseases—dyspepsia, torpid liver, or liver complaint, as her physicians have always called it, and general nervous prostration.

"If you will refer to my description of her case, when I made the first order for your Treatment, in December, 1877, you will see that she was suffering from severe attacks of colic and vomiting. These attacks first came once in two or three months, when she would vomit herself almost to death's door, and until she would raise a large amount of green bile. When her stomach was relieved from this, she would become better at once. But as soon as a certain amount of bile would again accumulate, there would be another attack of colic and vomiting. Each time the attacks came at shorter intervals, and were more severe, until she became so weak and exhausted that we are sure she could not have lived many days longer, had not your Oxygen Treatment come just as it did and saved her, for the colic and vomiting had become almost perpetual, and her strength and life were nearly exhausted.

"We could see a change in her condition from the first inhalation, for she never had so severe an attack of colic afterward, and had more strength to endure the pain and retching. She continued to gain steadily, and for the past four years has had no severe attacks. If she is threatened with one, she takes an inhalation or two, and so escapes any severe paroxysms.

"We have used in all nearly five Home Treatments in four years. One of our boys, fourteen years of age, had an attack of inflammation of the bowels, which left him in a very bad condition. The Treatment did him nearly, if not quite, as much good as it did Mrs. Vrooman.

"I think it but right that we should make known to others what Compound Oxygen has done for us, and therefore send you this statement for publication."

Such a statement of necessity attracted wide attention, especially among invalids, who naturally wanted particulars. These Judge Vrooman has in all cases cheerfully given, so far as his time would permit. This he has continued to do for nearly four years, to the gratification of all who need such aid. At the same time his business engagements have made it desirable that a portion of the time thus occupied might be saved. This wish he expresses in a letter, dated February 24, 1886. It is as follows:

"Since I sent you my testimonial, which you published in June, 1882, I have received scores of letters from all parts of the United States asking almost all kinds of questions about the Oxygen, etc.; but the main thing most of them wished to know was, whether I do really exist, or whether I am a mere myth, and you only humbugging the people with fictitious names for the purpose of deceiving them.

"And now I wish to say to the public further (if you will publish it), to save my answering so many letters, that my wife has not been compelled to take any more treatment for nearly five years, since which time her health has been constantly improving, and she weighs more than she ever has before, and has borne a fine, healthy boy, now almost four years old, who, of course, is smart, he being the seventh son.

"I impart this information to show the public that the Compound Oxygen is not merely a temporary relief, but that it will permanently cure and give new life and vitality to the whole system; and if any are still solicitous to know whether I am or not, I will say in the language of Daniel Webster, 'I still live,' and may be found with my law sign still out at 155 Kansas Ave., Topeka, Kansas.

"I hope what I have said may remove some doubts concerning the permanency of the cures performed by Compound Oxygen, and that afflicted ones may not delay too long in testing its efficacy."

The request that Judge Vrooman makes that we print his statement, we cheerfully comply with, and agree with his thought that what he has said should remove some doubts. What he has written to patients has undoubtedly helped many to accept the evidence so freely and abundantly given of the curative power of Compound Oxygen. There are others coming forward to divide

the task with him, and a very interesting letter just at hand, giving in one report the record of results in three cases, one thousand miles apart, will serve to show how this relief is coming. The writer, Rev. Isaac Leonard, of Sperry, Iowa, says:

"I have been able to labor in my old field beyond all my expectations. Some Sabbaths have four services, and some weeks preaching every evening.

"My old friends express their surprise that I appear so young and vigorous. For this I am largely indebted to your Compound Oxygen Treatment. My nephew, James L. Leonard, of Iowa, N. J., writes me that he has been able to accomplish more the past season than for four years past, all owing to the Compound Oxygen.

"My sister, Mrs. Mary S. Leonard, has gone to Lake Worth, Fla., at the urgency of her physician. She writes me that she discontinued the Compound Oxygen Treatment on arriving there, but that she became so nervous that she could not sleep, and became so miserable that she hardly knew what she was doing. She then resumed the Treatment, and in one week was quite comfortable again. I see many that need the Compound Oxygen, and am not slow in recommending it. You are at liberty to use my letter as you desire, with the hope that others may derive the same benefits that my friends and I have received from the use of the Compound Oxygen Treatment.

"P. S.—Two of my friends, whose address I inclose, have applied to me for your address; one in the State of Indiana and one in Burlington, Iowa. They want to see your Treatise. Please respond."

These letters show the widespread interest in this method of treatment for diseases, and in the vivid light they throw on the freedom of communication between different parts of the country, give emphasis to the thought of how great an institution is our United States mail.

A Treatise of nearly two hundred pages, entitled "Compound Oxygen," its mode of action and results, giving full and interesting information, is mailed free to every applicant by Drs. STARKEY & PALEN, 1529 Arch Street, Philadelphia, Pa.

## Business and Personal.

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

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If an invention has not been patented in the United States for more than one year, it may still be patented in Canada. Cost for Canadian patent, \$40. Various other foreign patents may also be obtained. For instructions address Munn & Co., SCIENTIFIC AMERICAN patent agency, 361 Broadway, New York.

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Curtis Pressure Regulator and Steam Trap. See p. 142.

Tools, Hardware, and other specialties made under contract. American Machine Co., Philadelphia.

Best Automatic Planer Knife Grinders. Pat. Face Plate Chuck Jaws. Am. Twist Drill Co., Meredith, N. H.

Bradley's improved Cushioned Helve Hammer. New design. Sizes, 25 to 500 lb. Bradley & Co., Syracuse, N. Y.

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Crescent Steel Tube Scrapers are made on scientific principles. Crescent Mfg. Co., Cleveland, Ohio.

Curtis Pressure Regulator for Steam Heating Apparatus, Waterworks, etc. Curtis Regulator Works, Boston, Mass.

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Tight and Slack Barrel Machinery a specialty. John Greenwood & Co., Rochester, N.Y. See illus. adv., p. 158.

Garden Hose, Linen Hose, Lawn Sprinklers, Hose Reels, Hose Pipes. Greene, Tweed & Co., 118 Chambers St., N. Y.

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## Notes & Queries

### HINTS TO CORRESPONDENTS.

**Names and Address** must accompany all letters, or no attention will be paid thereto. This is for our information, and not for publication.

**References** to former articles or answers should give date of paper and page or number of question. **Inquiries** not answered in reasonable time should be repeated; correspondents will bear in mind that some answers require not a little research, and, though we endeavor to reply to all, either by letter or in this department, each must take his turn.

**Special Written Information** on matters of personal rather than general interest cannot be expected without remuneration.

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

**Books** referred to promptly supplied on receipt of price.

**Minerals** sent for examination should be distinctly marked or labeled.

(1) H. C. S. writes: To make a dynamo machine like that described in SUPPLEMENT, No. 161, larger, do you make the iron part larger in proportion and work with more layers of wire? A. Enlarge the different parts of the dynamo proportionately.

(2) H. L. B. asks how to connect wires in a battery telephone of three stations using ordinary electric call bells. A. Arrange your line so as to cut out all the telephones, leaving the bells normally in circuit. Any ordinary switch which will cut out your telephone and leave the bells in the circuit will answer your purpose.

(3) J. P. L. asks how the zincs and carbons in a bichromate battery for a small incandescent electric lamp are made. A. The zincs are generally cut from sheets of rolled zinc, but they may be made of zinc cast in moulds. The carbon plates cannot readily be made by a tyro. It is both better and cheaper to purchase them; however, if you desire to try the experiment of making your own carbon, you may select clean pieces of coke, finely pulverize them, mix with a small quantity of sirup or molasses into a thick paste, force the paste into a suitable mould, close the mould, leaving vents for the escape of moisture and gas, place the mould in a muffle or crucible, and cover it with powdered carbon. Heat it till the moisture is driven off and the sirup is carbonized, allow the mould to cool, then remove the plate from the mould, dip it in very thin sirup, dry, recarbonize, and repeat the operation until the plate is sufficiently dense for use.

(4) W. K. D. asks: Please inform me in correspondence column of SCIENTIFIC AMERICAN as follows: 1. The best method of rendering a magic lantern screen transparent, or as much so as white thin cotton fabric can be rendered? A. Coat your screen with a varnish made of Venice turpentine dissolved in a good quality of spirits of turpentine. A sizing of the best white glue with a little glycerine added renders a screen quite translucent. 2. Can I use a 1 inch diameter lens of  $3\frac{1}{2}$  inches focus to any advantage in a small photographic apparatus to make transparencies for magic lantern slides, about one inch wide, i. e., the picture on the slide to be that width? What size stop, if any, should I need, and how far from lens should it be placed? Could I make a battery to run Guiscom's electric motor as efficiently as to buy it ready made by them? Also, please say if you know what difference in running power there is between the double induction motor and the V motor made by the Electro Dynamic Company, of Philadelphia. A. Your lens, if of good quality, may be used for photographic purposes in the manner suggested. You should employ different sized stops; a small stop will make a camera work deep and sharp, but slow. You can make your own battery for running your motor. Consult SUPPLEMENT, Nos. 157, 159. We do not know as to the relative merits of the two motors referred to.

(5) R. B. L. asks (1) how to construct a dry kiln to hold about 5,000 feet of lumber. A. The cost in a drying room for lumber depends upon the method used. If you have exhaust steam, that should be used in preference to live steam. In either case, coils of iron pipe are to be placed near the floor with an open platform above for piling the lumber in a proper sized room for the amount of lumber to a charge. See SCIENTIFIC AMERICAN SUPPLEMENT, Nos. 375 and 479, for illustrations of drying apparatus. 2. The power of an average man compared with the horse power? A. The power of man at best performance is from  $\frac{1}{4}$  to  $\frac{1}{2}$  horse power. Average men, one-sixth

horse power. 3. What is the best means of transmitting power by pulleys from a horizontal line shaft to one running at right angles? A. A right angle belt is much in use, and gives as good results as any of the special angle couplers in the market. The right angle belt has a quarter twist passing around idlers on a vertical shaft. 4. The best way of constructing a "rumble" for smoothing chair legs and rounds by friction, as is done in a hollow drum, and how full should such drum be filled to give best results? A. A good "rumble" may be made from a large, strong cask by mounting it on a shaft with flanges to bolt to the heads with suitable door. Charge half full with material, and add sawdust or bran sufficient to accomplish the work.

(6) V. E. N.—Choke bore is a slight narrowing of the muzzle of shotguns to prevent the charge from excessive scatter. To be done well, a gun should be choked in boring. A good gunsmith should be able to make a fair job. Barrels are brazed together.

(7) W. S. C. writes: 1. We use shavings for fuel. When we fill up the furnace, sometimes there is a puff, and the smoke will come out round the doors. What is the reason of this? A. Gas is formed, which, mixed with the air, is explosive. 2. What is a suction chamber connected to a suction pipe designed for? A. To ease the motion of the water in the suction pipe and prevent hammering.

(8) G.—The ear drums you ask about sell for \$3 per pair, silver mounted. For mending band saws, scarf the ends with a file to make a lap of three-eighths of an inch. Grind a piece of borax on a piece of slate or roughened earthenware, with water, to a paste. Take a piece of charcoal, grind one side flat on a stone, and hollow out a place in the middle a little larger than the width of the saw, so as to let the blowpipe flame go under the saw. Fasten the scarfed ends of the saw (after dipping in the borax) together with small binding wire, such as is used by jewelers. Then fasten the scarfed part of the blade over the recess in the charcoal with wire pins, seeing that the saw is straight. Lay a small piece of coin silver on the top at the edge of the scarf, and with the blowpipe throw the flame under the blade, heating until the silver melts, when it will flow through the scarf and appear on the under side, and your work is done.

(9) J. A. T. asks amount of pressure per square foot with the wind blowing at 20, 30, 40, 50, 60, 70, and 80 miles an hour. A. 2,  $4\frac{1}{2}$ , 8,  $12\frac{1}{2}$ , 18, 25, and  $32\frac{1}{2}$  pounds.

(10) K. G. McL. asks (1) how to temper clay that is used in making cast iron water pipe joints? A. By thoroughly working with water and fine sand. 2. How to tell tempered clay? A. By its soft, tenacious feel.

(11) F. P.—Valves should have the full area of the suction pipe, and should lift  $\frac{1}{2}$  of their diameter.

(12) F. D. W.—In the vicinity of New York, tin waste is utilized by the chemical manufacturing companies, for the production of tin salts and polishing powders. The tin scrap is boiled in hydrochloric acid, or sodium hydrates, from which are reduced the salts and pigments used in the arts. Do not know of any patents on these processes.

(13) W. T. F.—The difference in pressure between the top and bottom of a boiler is due to the weight of the water, which is about 0.43 pound per inch for each foot in height of solid water. This should make no difference in choice of the place for the entrance of the feed water.

(14) P. L. asks: 1. Will an eight horse power boiler, using steam at 65 or 70 pounds per square inch, run an engine of four horse power (really a six horse engine, but speeded down to four) and heat a room 45x80 feet and room about 25x80 feet, using the exhaust while engine is running, but having pipe connections, so that live steam can be turned in when engine is shut down? The boiler is a first class upright tubular one, having heating surface equal to over eight horse power, and with inspirator. If boiler will not heat rooms and run engine, how large a boiler will it need? A. It requires one-half the power of your boiler to heat the rooms. If you use the exhaust steam for heating, adding a small jet of live steam when required, you may accomplish considerable economy in fuel. For this purpose, better consult with some steam heating engineer as to details. 2. A plumber in this town claims that there is no more heating capacity in steam at 60 than at 8 pounds per square inch. Is he right? A. He is wrong.

(15) W. T. F.—Multiplying the square of the diameter by 0.7854 gives the area of the piston; multiply the area by the pressure for the whole pressure on the piston. To get the mean engine pressure when a cut-off is used requires a special computation, which you may find in Haswell's Engineer's Pocket Book. A steam gauge will not be harmed at 2 or 3 inches from the boiler, provided there is a siphon below it to keep the steam from heating the interior of the gauge. The firm from whom you purchased the gauge will have it tested.

(16) L. J. S.—Cold cellars, as arranged in New York on the plan you state, have a uniform temperature of 33 to 34 degrees Fah. Such cellars have a pipe surface of one square foot to each 10 cubic feet of space, or 1 lineal foot of inch pipe to  $3\frac{1}{2}$  cubic feet of space. The manner of circulating is of importance. It is desirable that the individual circuit or travel of the brine should not be over 200 feet in length, and that the coils should be so arranged that every pipe shall have an equal circulation. The brine should be kept at near the point of saturation. The ice need not be crushed fine, but rather in lumps, keeping the tank full of ice, with an overflow for the waste brine. The return stream should pour on top of the ice, and the outflow from near the bottom of the tank, with an ample strainer, the salt being fed with the ice. The "tank pumps" are also preferred as a circulating power, as they move nearly twice the quantity of brine with the same size steam cylinder than the power pumps do. Rapidity of circulation is important.

The circulating pipes should be covered with frost when the conditions are right. There is no better or cheaper process with chemicals, except with a refrigerating machine.

(17) W. F. B.—A locomotive built by the Baldwin Locomotive Works, for the Central Railroad of New Jersey, has made 75 miles per hour on straight track, with 5 passenger cars. There are other locomotives in England and the United States that can do as well or possibly a little better for short drives. See SCIENTIFIC AMERICAN SUPPLEMENT, No. 231, for a description of the Baldwin locomotive.

**MINERALS, ETC.**—Specimens have been received from the following correspondents, and examined with the results stated.

G. B. C.—Nothing definite can be said concerning the specimen unless it was analyzed. It appears, however, to be graphite. Its value depends upon the extent and availability of the deposit.

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