## Notes & Queries

S. A. T. will find a description of making plaster molds on p. 58, vol. 24.—E. L. will find directions for making colored paper for manifold writing on p. 363, vol. 31.—E. L. will find a correct rule for ascertaining the curvature of the earth on p. 395, vol. 31.—S. H. M. will find directions for preparing bones for manure on p. 75, vol. 31.—J. W. R. will find a recipe for a gold wash on p. 43, vol. 30.—C. R. B. will find a recipe for fine blacking on p. 283, vol. 31.—W. S. R. will find directions for making a pot for melting metals on p. 235, vol. 32. Plaster of Paris is the best material for making molds for small castings.—J. E. M. can repair the silvering on looking glasses by following the directions on p. 203, vol. 31.—J. S. H. will find full directions for mounting chromos on p. 91, vol. 31.—C. E. will find a good recipe for axle grease for heavy bearings on p. 90, vol. 31.—W. H. T. will find a recipe for waterproof cement for aquariums on p. 202, vol. 38.—A. A. will find a recipe for bronze for use on brass on p. 283, vol. 31.—E. F. can make his tent waterproof by using the varnish described on p. 347, vol. 31.—L. K. Y. will find a description of water glass on p. 154, vol. 32. Furniture polish is described on p. 315, vol. 30. Muriate of ammonia can be bought for a small fraction of what it would cost an amateur to make it.—L. J. B. will find a description of the manufacture of rubber stamps on p. 156, vol. 31.—J. P. A. will find a formula for the proportions of a safety valve on p. 197, vol. 31.—W. W. H. will find a description of sailing faster than the wind on p. 176, vol. 28.—E. W. will find directions for waterproofing muslin on p. 347, vol. 31.—C. M. B. will find that etching on glass is described on p. 409, vol. 31.—J. R. M. will find directions for calculating the diameter of the driven pulley on pp. 26, 73, vol. 25.—C. D. will find directions for making colored lights on pp. 58, 154, vol. 30, and pp. 90, 219, vol. 31.—S. F. S. will find an answer to his queries as to lime light in our reply to J. H. S., p. 218, vol. 32.—C. C. will find directions for casehardening plow mold boards on p. 202, vol. 31.—C. L. and W. B. A. will find directions for imitating bronze on gun barrels on p. 171, vol. 32.—W. B. A. will find that iron can be softened by following the directions on p. 123, vol. 31, for steel.—C. L. D. will find directions for laying out a sun dial on p. 409, vol. 29.—H. D. E. will find a recipe for waterproof blacking on p. 155, vol. 26.

(1) F. D. D. asks: Why is it that oscillating engines are not used on steamboats or by manufacturers? A. They are, to some extent.

(2) H. C asks: What degree of angularity can be given to a wedge of cast iron, finished smooth and thoroughly lubricated, without its being forced back by the compression of wood into which it is driven? A. It must not exceed twice the angle of friction between the wedge and the surface. An average value of the angle of friction is 5¾°, so that, for such a case, the angle of the wedge should not be greater than 11½°.

(3) T. J. A. & Co. ask: What is the process of cupellation? A. The principle depends upon the property which lead possesses of absorbing oxygen at a high temperature, and of forming with it an easily fusible oxide, which imparts oxygen with facility to all those metals which yield oxides which are not reducible by heat alone. Most of the oxides thus formed unite with the oxide of lead, and produce a fusible glass, which is easily absorbed by a porous crucible made of burnt bone, termed a cupel; while any silver that the mixture contains is left behind in a bright globule, which admits of being accurately weighed. The cupels are prepared from bone ash (burnt to whiteness, and ground to a fine powder), by moistening it with water; a suitable quantity of the mixture is placed in a mold, and the required form and coherence is given to it by the blow of a mallet or of a press; the cupels are allowed to dry thoroughly before they are used. The method of cupellation you can find described in any good book on chemistry.

(4) J. & D. N. say: You mention a large magnet, weighing half a tun, that can raise twenty times its weight. At what distance would a magnet of that strength, being stationary, draw another magnet of the same strength not stationary? A. We can give you no general rule for determining magnetic attraction of this description. Much depends upon the quantity of current flowing through the helices.

(5) G. W. S. says: I am running an engine, 12x24 inches stroke, with a common slide valve set to cut off ⅝ stroke, making, with throttle wide open, about 63 revolutions. If I shut my throttle to reduce the speed to about 55 or 56 revolutions, with no load on, I have no back lash, neither have I back lash when load is on; but as soon as load comes off, I have back lash, and in consequence I must slow down my engine. Why have I back lash without load, and none with? A. It appears probable, from your statement, that the governor does not control the engine properly; so that when the work is removed, the speed of the engine is changed. It would be impossible, however, for us to give a definite opinion without further knowledge of the situation.

(6) S. H. M. says: I have a small steam chest which is cracked near one of the bolt holes. What will make a perfect steam joint? The chest is of cast iron. A. If it cannot be brazed, you might apply a patch with tap bolts, either driving a rust joint or using a piece of sheet rubber for packing.

(7) H. F. R. asks: 1. What should be the thickness of shell for boiler of one horse power, to bear 135 lbs. with perfect safety? A. We have no idea of the size of a one horse power boiler. 2. What power would each of two engines give, the one 1½x4 and the other 2x6 inches, with 100 lbs. boiler pressure? A. The power would depend upon the piston speed, which you have not stated: but you will find numerous rules in back numbers by which you can make the necessary calculations. 3. What are the addresses of the Cooper Institute and Cornell University? A. Cooper Institute, New York city; Cornell University, Ithaca, N. Y. The tuition is free at the Cooper Institute. By addressing the presidents of the institutions named, you can doubtless obtain full information in regard to their relative advantages. 4. Has there been any contrivance patented to light the gas in any part of a residence by electricity, each jet to light independently of all others, but all getting the spark from one battery? A. We think that something of this kind has been introduced. 5. Is there a portable forge made of boiler iron, arranged to use all the extra or lost heat to generate steam to run a small blower, or the steam from several such forges to drive a light steam hammer? A. We have never seen anything of the kind.

(8) B. asks: Will pine wood ignite by coming in contact with a pipe through which live steam is passing? A. Not unless the steam is greatly superheated.

(9) M. E. C. says: 1. I have a small boat with upright boiler two feet in diameter. I have 4 or 5 feet of common one inch iron dipe in the firebox, connected to the crown sheet and side of firebox, and of course there is a good circulation. A friend says that these pipes will burn out very quickly if I use the boat in salt water. Is this so? A. The pipes would soon burn out if scale were formed in them, which would be very likely to occur by the use of salt water. 2. If I wish to take this boat to Florida by inland navigation, would the boat have to be inspected? A. Yes. Apply to the inspector in your district.

(10) W. R. J. asks: Are there any Barker's centrifugal mills now in use? A. We believe there are some turbines constructed in such a manner that they are virtually Barker mills. They do not meet with much favor, however, since the Barker mill is by no means an efficient machine.

(11) A. H. C. asks: 1. At what power would you rate an engine that is 8 inches bore by 15 inches stroke, running at 120 revolutions a minute and using steam at 80 lbs.? A. About 12 horse power. 2. Do you think steam-riveted boilers are as good as hand-riveted? A. Yes, if a good machine is used. 3. Do you think double rivets along the side seams of a boiler make it any stronger? A. Yes.

(12) O'B. & D. asks: 1. What size of wire rope will be strong enough to draw 7,000 lbs. up an inclined plane of one foot rise in three? A. From ⅝ to ¾ of an inch in diameter. 2. Will the wire rope work satisfactorily on a wooden drum 15 inches in diameter? A. No. It would be better to make the diameter of the drum from 24 to 30 inches.

(13) C. D. says: On p. 36 of your current volume, it is stated, that five minutes before a certain explosion occurred, the water stood at 3 inches above the flues. By a long experience with steam boilers, I have become convinced that the water at such times is converted into foam, and entirely fills the boiler. Upon pressing the gage the water has the appearance of being flush, while in reality the boiler was nearly dry. A. We would be glad to receive some facts in corroboration of your statement.

(14) W. S. S. asks: How is burnishing done, with the use of a burnisher? A. By rubbing the tool rapidly over the work.

What kind of briar roots are pipes made of? A. They are made of knotty roots of the common heath, which is found abundantly in Europe, and to some extent in this country.

The cone pulley on my lathe has 3 sizes for change of speed, 2½, 4¼, and 7¾ inches. I want to make a treadle wheel so that one band will suit the three sizes. What rule can I work by? A. We hope soon to publish a simple explanation of the method.

I wish to make some stamps for marking clothing. I have the printer's types, and I wish to make the impression of the types in something that I can run the old types in after being melted. What will answer? A. Plaster of Paris.

(15) W. L. asks: 1. Which will stand the greater pressure, a pipe one inch in diameter or a pipe six inches in diameter, provided both pipes are of the same material and of the same thickness? A. The former. 2. In a boiler with steam up, is the pressure greater or less below the water level than above? A. Greater.

(16) S. says: A train of cars is going round a curve. The outside wheel must go a greater distance than the inside one, yet they are geared together. Please explain it. A. If the wheels are not coned, one must slide. If the wheels are coned, the one on the outer rail will be larger than the other, so that it is possible there may be no slipping. Of course this can only occur when everything is rightly proportioned; and in general there is some slip even with coned wheels, though it is usually reduced by coning.

(17) G. G. C. says: I have a foot lathe on which the belt does not run true, but runs ¼ inch off of both large wheel and pulley wheel. Is this because the shaft and lathe bed are not parallel? A. It is either on that account or because the pulleys are not round or are not centered properly. You can make the adjustments, if required, by measurements.

(18) C. asks: Who first invented the dial steam gage, Eastman, Bourdon, or a German engineer? A. We believe that the Magdeburg gage was the first. Perhaps some of our readers have definite information on the subject.

(19) C. A. C. asks: 1. What can I use to fill up blow holes in some small steam cylinders, subjected to 100 lbs. pressure? A. Braze plugs in the holes. 2. Will a steel boiler be better than an iron one for a two horse engine? A. The steel boiler can be made lighter than an iron one of the same strength. We do not know that it would have any other advantage.

(20) D. E. B. asks: Can a common slide or rock valve be set to work expansively? A. Yes.

What were the seven wonders of the world? A. The pyramids of Egypt, the tomb of Mausolus, the temple of Diana, the walls and hanging gardens of Babylon, the Colossus of Rhodes, the statue of Jupiter, the watch tower built by Ptolemy.

(21) W. H. B. says: L. O. S. says that the same power will do the same work with a 60 inch as with a 30 inch saw. I do not see how it is possible for an equal power to move (through a log) a 60 inch saw. Of course the 60 inch has double the leverage from center to verge, consequently the power to drive such a saw successfully would do twice the work of the smaller saw. But I cannot see how he gets away with the short lever in favor of the small saw. Admitting the verge of each to travel at same speed, of course there must be an increase of speed only at the expense of power. A. In the case of the large saw, the pressure on the engine piston must be doubled, but the piston only moves half as fast.

(22) L. C. W. says: My water pipe, leading from main in street to house, is frozen. Some two or three hundred fellow townsmen are in the same fix. Some few have dug up the street and sidewalk and thawed the pipes out, but this is very expensive and difficult, owing to the frozen condition of the earth. Is there any plan by which they could be thawed out from the inside of the house? A. It can often be done by forcing steam into a pipe from a small boiler.

(23) G. A. McL. asks: What is agate, used for making buttons, etc.? A. It is a variegated chalcedony. It is supposed to have been formed by a deposit of silica from solutions intermittently supplied, and deriving their concentric waving courses from the irregularity in the rocky walls of the cavity in which they were formed. The colors are due to traces of organic matter, or of oxides of iron, manganese, or titanium.

(24) J. C. K. asks: What kind of a locomotive is the Fairlie narrow gage engine, with smoke stack at each end? Is the boiler solid throughout? A. Yes; it is all one boiler, and the two trucks, with the engines, are each pivoted so that they can swing.

(25) W. S. C. says: Can steam power be used in place of horse power in threshing wheat with the same machine? A. Yes.

If two boilers are supplying a third one with steam, will the third one have double the amount of pressure of the other two, or will steam be of equal pressure in all? A. The pressure will be equal in the three boilers.

How should a whiffletree be made so as to hitch 2 horses against one, giving equal advantage to all? My notion is that the middle hitch should be made so as to give the single horse ⅔ of the lever, and the 2 horses just ⅓ of it. Am I right? A. Yes.

Will pewter or lead do to make a cylinder head for a small steam engine 1x2 inches? A. Yes, but it will not be very serviceable.

(26) J. E. R. says: I have an 18 inch circular saw for sawing stove wood. I have it set to double the thickness of saw, and it is perfectly straight. I have run it at different speeds; yet when it is a few inches in the wood it blackens the wood on both sides, though I can see through all the time on either side. A. The bends in the teeth are probably too far from the point. Have the bend in the teeth on a true curve to the extreme cutting point, so that no part of the tooth can touch against the timber except the extreme cutting point, and you will obviate the trouble. The teeth of your saw probably wedge and bind in the kerf, about one third the length of the tooth from the point.—J. E. E., of Pa.

(27) E. F. F. asks: 1. What will be the effect of inserting teeth two gages thicker than the saw? Will not the teeth be likely to expand the saw more than the light teeth? A. If properly fitted, the thick teeth would have no more tendency to expand the saw than those of the same thickness as the saw plate. 2. Would such a saw stand to saw frozen beech, if the blade is properly hammered, using such teeth on ¾ or 1¼ feed? A. Such a saw, if properly made and kept in order, will stand to saw any kind of frozen timber. But in a saw for ordinary use, there is no advantage in having the teeth thicker than the plate of the saw at the rim.—J. E. E., of Pa.

(28) S. A. H. asks: With a column of water of a given hight, and a tube leading out from its base, turning up and opening at a level with the base, and all the proper conditions of free passage secured, to what hight, proportional to the columns, will the jet of water spurt? A. From 50 to 75 per cent.

(29) D. A. R. says: I want to make a magic lantern. I have two lenses 2½ inches in diameter and of 8 inches focus. Will these do? A. Place a reflector and a light in the focus of the fixed condensing lens, then the slide in the focus of the objective, the latter in a sliding tube, both with plane side to light.

(30) T. M. says: I have seen a small battery consisting of two cells, with zincs 2x2 inches and ½ inch thick. The exciting fluid was sulphate of mercury. The cells were black. Are they made of rubber or carbon? A. They are probably carbon. Such cells and also positive plates are made of carbon deposited in gas retorts by the splitting-up of too highly heated hydrocarbons. In default of this, mix coke or charcoal powder with molasses to a stiff paste, mold, bake, and heat red hot.

Who sells second hand scientific books? A. Scientific books out of date are of but little value.

How can I grind and polish small lenses? I cannot get rid of the scratches in lenses of about 1 inch diameter. A. Repeat the fine grinding with emery that has been suspended in water one hour, then poured off and settled; repolish with rouge or putty powder treated in like manner.

Is there a practical way to transform motion into heat? A. Two flat iron disks rotating in opposite directions were found exceedingly wasteful of power.

(31) E. J. S. asks: What is the distance of Jupiter from the sun? A. Mean distance 475,692,000 miles.

(32) H. C. C. asks: What is the difference in bulk between 1 lb. gold and 1 lb. silver? What is the difference in value? A. These metals in our coinage contain $\frac{9}{10}$ of pure metal, alloyed with copper. It may be profitable for you to work out the answers yourself, from the following data: Value of 1 lb. of pure metal: Gold $301 45, silver $18·85. Weight of a cubic inch in lbs.: Gold 0·697, silver 0·381.

(33) W. B. C. says: On p. 36, vol. 32, you describe a new light invented by MM. Delachanal and Mermet, of Paris. The description is hardly full enough. You say: "The flask is filled with spongy fragments, which imbibe the carbon sulphide." Is the carbon sulphide the liquid bisulphide? 2. Do you understand that only a sufficient quantity of this liquid is applied to saturate the porous substance, or would a surplus in the bottom of the vessel be desirable? 3. Can you give a brief description of the St. Claire Deville apparatus and the Bunsen burner, as you understand them to be adapted in this case? A. In answer to these questions, we cannot do better than refer you to *Science Record* for 1873, p. 208.

1. Can you tell me how to stop the hissing noise made by the oxyhydrogen calcium light, when under heavy pressure? A. Slightly enlarge the opening at the orifice in the jet. 2. Would enlarging the orifice in either of the gas jets be equivalent (in effect of producing greater light) to putting heavier pressure upon the bags? A. It would simply tend to render incandescent a larger surface of the lime, with a corresponding decrease in the intensity of the light from each point of the heated surface.

(34) G. R. asks: How many times is an object increased in size when viewed through a magnifying glass of a power that increases the diameter 1,500 times? I contend that it is increased 2,250,000 times; my adversary says that it is only 1,761,150. A. You are right.

(35) N. R. H. asks: What preparation is used to stick gold leaf or powder to paper or cardboard, for book marks or illumination? A. Use the slightest possible touch of oil on the surface, and apply gold leaf. The powder is best applied by mixing it with size.

(36) C. M. says: I wish to make microscopic objectives of the following foci: 2, 1, ⅔, ¼, ⅛ inch. What should be their respective dimensions? A. Try the following formula for a 1½ inches, and let us know the result: Single front: Plano convex; radius of curvature 06 inch, thickness 0·2 inch, diameter 0·3 inch. Triplet: Diameter $\frac{9}{15}$ inch; composed of a plano convex front lens 0·9 inch radius, a double concave flint, radii 0·9 and 1·5 inches, and a double convex, radii 1·5 and 1·7 inches. Back lens: ⅝ inch diameter, plano convex, 2·7 inches radius. Convex lenses to be of a crown glass slide; the double concave to be flint (Chance's heavy glass).

(37) E. A. W. asks: Can a perspective drawing be reduced to a mechanical drawing? A. Not unless the object is represented in all its parts, and the proportion of all the parts given.

(38) E. L. asks: How can I remove the glaze from a cup, to make it porous for battery use? A. Porous cups can be bought for a few cents each from any dealer in telegraph supplies, and it will not be worth your while to make them by such a process as the one you enquire about.

(39) C. C. asks: How is zinc used as a substitute for lithographic stone? A. It is used exactly as the stone is. It is convenient to attach the zinc plate to a slab of stone or slate.

1. How is the wax removed from an electrotype after it is taken out of the battery? My object is to overcome the warping or twisting. A. Lift it off. The plumbago prevents adhesion. 2. What is used for filling or backing, lead or type metal? A. Either will do.

(40) L. W. F. says: I have made three good-looking violins, that sound harshly. I used soft pine for the top. Is this right? A. No. The purity of tone of a violin depends on the hardness and immutability of the wood of which it is made. Hence old violins are the most highly esteemed. Look about for some very old hard wood; it may sometimes be found when an old house is pulled down.

(41) J. W. asks: How can I prevent chickens from eating their own eggs? A. Fill an egg shell with pepper, and give it to them to practise on.

(42) J. C. R. asks: What is the best method of keeping chickens clean and free from vermin? A. Give them plenty of gravel and dry sand to rub themselves in.

(43) J. F. W. asks: How can I make shaving soap? A. Take genuine Naples soap 4 ozs., powdered Castile soap 2 ozs., honey 1 oz., essence of ambergris, oil of cassia, and oil of nutmegs, 5 or 6 drops each. Melt and mix. Smear the slightest portion of this soap on the chin, then use the shaving brush wet with cold water. Do not put water or the brush in the soap dish.

(44) J. B. S. asks: What can I use to polish ivory with? A. Ivory turned in a lathe is readily polished by applying its own dust to it.

(45) R. J. S. asks: What is the correct rule for ascertaining the size of a fly wheel for any given horse power of engine? A. Boulton and Watt give the following: Multiply 44,000 times the length of the stroke in feet by the square of the diameter of the cylinder in inches, and divide the product by the square of the number of revolutions per minute multiplied by the cube of the diameter of the fly wheel in feet. The quotient will be the sectional area of the rim in square inches.

(46) M. M. asks: How is the case-hardening compound mentioned on p. 150, vol. 32, applied? A. Mix the ingredients thoroughly and put the iron articles, red hot, in the powder, and leave till cold.

(47) R. & W. ask: How can we find the number of lbs. pressure obtainable from a wheel weighing 1,000 lbs., diameter 4 feet, velocity 100 revolutions per minute, geared 4 to 1, 5 to 1, 6 to 1, or 7 to 1? A. It would be difficult to obtain an accurate result in any other way than by making a few experiments, to get the necessary data.

(48) G. A. B. asks: From a post a gate is hung which extends horizontally 20 feet. In the center of the gate, or ten feet from the post, the gate has hinges, which allow one half of it to be opened without disturbing the half next to the post. Is the strain as great on the hinges of the post when one half of the gate is folded back so as to lie against the other half as when the whole gate is opened, that is, when the second half is in line with the first? A. The strain is the same in both cases, but the moment of the couple which is acting, and which represents the tendency to break the hinges, is twice as great when the gate is extended.

Can I get a film of copper on a piece of steel without a battery? A. Yes. Clean the steel and immerse it in a solution of sulphate of copper.

(49) J. S. M. asks: If a stick of timber is 20 feet long, 12 inches square at one end and 18 inches square at the other, and of a uniform taper throughout, what are the cubic contents of the stick? A. 31·66+ cubic feet.

(50) E. D. F. says: Given the area and radius of a circular segment to find the hight of the segment. Is there any formula for finding this exactly? A. No.

If two iron balls, one 1 inch in diameter and the other 10 inches, are at the same instant dropped from an elevation of 100 feet above the earth, will both touch the ground at the same instant? A. The difference would not be essential; but the resistance of the air would affect the balls differently because the cross sections of the two balls are as the squares, while the weights are as the cubes, of the diameters.

(51) B. P. G. asks: Which is the best for a a water pipe, lead or galvanized iron? A. We can recommend iron pipes, prepared with a coating of pitch.

(52) F. R. M. asks: How many degrees compose the angle $f\ h\ k$, making $f\ h\ k = a$, so that $\cot. a = \cot. 110° + \frac{1}{\sin. 20°}$? This formula is from Fairbairn's "Mills and Mill Work," part 1, p. 160. Are there any numbers, from 100° to 110°, and from 15° to 20°, that will produce, according to formula, 30° or nearly so for the angle $f\ h\ k$? If there be such numbers within these limits, please state them. A. You can readily work it out with a table of natural sines and tangents, by substituting proper values in the equation and solving it. It will be a good problem for some of our readers who are beginning the study of trigonometry.

(53) M. B. L. asks: How can steam be superheated in an ordinary flue boiler? A. You must attach a superheater. 2. What is the piston speed per minute in the fastest passenger locomotives? A. From 700 to 800 feet.

(54) F. M. A. asks: How can I prepare mucilage for office use? A. Make a concentrated solution of gum arabic in hot water, and add to it a little Blätter sulphate of quinine, which will effectually prevent it from molding. Only a very small quantity of the last named substance is necessary.

(55) P. McL. asks: How can I make molds with plaster of Paris? I have tried to do it, but they come out full of airholes. A. Use your plaster thinner when constructing the molds; and when ready to cast the metal, heat them nearly to the melting point of the metal; or thoroughly dry the mold and coat it with a solution of shellac in alcohol.

(56) H. & C. ask: 1. How can we make a strong thick paste for pasting sheets of brown paper together in large quantities? A. Melt together in an iron pot equal parts of common pitch and gutta percha. It is kept liquid under water, or solid, to be melted when wanted. 2. Which makes the strongest paste, starch or flour? A. Prooably flour. 2. Is alum of any use in paste? A. Yes, to prevent its molding.

(57) H. J. M. says: 1. I find that if fully hydrated oxalic acid be suddenly heated to about 300°, it is resolved into carbonic dioxide, carbonic oxide, and formic acid. How can I separate the formic acid from the other two substances? A. Formic acid ($C_2H_2O_3$) is not known in the free state. Its hydrate, or what is generally known as formic acid, was originally obtained from red ants, and was named from that source. This may be obtained by immersing a glass retort or flask, about one third filled with concentrated glycerin, in boiling water, and adding to the glycerin as much dry oxalic acid as it will cover. The mouth of the retort or flask should be connected with a receiver in such a manner that the formic acid distils over into the receiver, while the carbonic acid escapes. When it ceases to come over some fresh oxalic acid is put into the retort, and the process is repeated with the same portion of glycerin until enough acid has been collected. 2. How can I render the oxalic acid fully hydrated? A. What is commonly called oxalic acid is the hydrate required. The anhydrous acid is not known in a free state.

(58) D. C. asks: How can I bore an oblong hole 1x1⅝ inches and 1 inch deep in a block of malleable cast iron (having sides and bottom perfectly smooth) in an ordinary turning lathe? A. The conditions, as stated, are incompatible.

(59) C. W. asks: I have a steam boiler, hight 2 feet, diameter 1 foot, with a 2 inch flue through it. The head is made of cast iron ½ inch thick, the shell being of ⅛ iron. What pressure will it stand with safety? A. About 80 lbs. per square inch.

(60) L. A. D. says: A. contends that a man born in 1800, and living now, would have lived in both the eighteenth and nineteenth centuries. B. contends that he would not. They will abide by your decision. A. B. is right.

(61) V. H. N. says: A turbine of about 3 inches diameter proper, purchased by us, behaved strangely. It was first located in the second story of a printing house, and water was conducted to it by a 3 inch pipe connected at a right angle to main in the street, then led 20 feet to cellar, thence at right angle to floor of second story (say 18 feet), thence at right angle to wheel (1 foot). A 3 inch pipe, connected to bottom of wheel, discharged water near point of entrance in cellar, having a siphon end to make it an exhaust tube. Under a few turns of valve (15 or more being required to open it entirely) it drove a ⅛ medium and a ½ medium job presses, with power to spare. Now presuming the exhaust pipe to compensate for elevation to second story, the fall was 102 feet. It was removed up street, difference in elevation being 10 feet. A 3 inch supply pipe is connected with main in street at right angle, thence runs 130 feet to wheel in cellar, attachments being made to the pipe on the floor above. It gave scarcely any power, after repeated examination, until 13 out of 16 apertures in wheel were closed with wood; and with valve entirely open, it seems to give less power than the difference in elevation would justify. The water discharges right from the wheel into an open ditch. What is the cause? A. We judge, from your description, that increasing the length of pipe, and diminishing the elevation, cut down the head to a serious extent.

(62) M. U. asks: I have a steam engine 1⅜ inches bore x 3 inches stroke. What size should the feed pump be? A. You can make a plunger pump with same stroke as the engine, and diameter from $\frac{3}{16}$ to ¼ inch.

(63) W. B. says: 1. I have a small boiler 10 inches long with 5 two inch tubes half around a five inch flue. The tubes are connected with it by small pieces of pipe. The water is placed in the tubes and fire passes up between them and out at top. The tubes are ⅛ inch thick, and the ends are secured by a bolt. What would be a safe pressure? A. One of 150 or 175 lbs. per square inch, if the boiler is well constructed. 2. What size of engine ought it to run? A. One developing from ⅛ to ½ a horse power.

(64) S. G. asks: 1. Will an engine of 2 inches bore and 4 inches stroke be powerful enough to run a foot lathe with 10 inch swing? A. Yes. 2. What size of boiler should I use? A. Give it from 8 to 10 square feet of efficient heating surface.

(65) M. E. C. says: Our engine is 16x30 inches, and makes 80 revolutions per minute. It is impossible to keep the journals cool. We have ample power. It would do the work with 20 or 30 lbs. of steam. A. The piston speed is not excessive, if the engine has large bearings and is in good adjustment, with the valves properly set and the parts in line. You may possibly find that the trouble occurs from a neglect of some of these details.

(66) E. R. C. asks: Can you give me some information as to using lead pipe for carrying steam underground? Will the expansion and contraction weaken the pipe? A. We have had no practical experience with the lead pipe for this purpose, but are inclined to think that it will answer very well. We would be glad to hear from any of our readers who have used it.

(67) E. W. P. asks: In an artesian well, 1,200 feet deep with 3½ inch bore, what flow of water per minute might be expected at a depth of 20 feet below the highest point to which water will rise in the pipe, conceding that the supply at the head is inexhaustible? A. We do not know of any method but experiment, applicable to such a case.

(68) J. W. says: I wish to build a small steamboat 35 feet long and 20 feet wide, without any upper work, save a frame and awning. Would a five horse engine do to drive it? A. The engine will answer very well. Use an upright tubular boiler. You will require a license. We could not answer your other question without more data.

(69) J. W. H. asks: What is the effect on air, as regards volume, of increasing the heat from say —20° to 80° Fah.? Does not the heat greatly increase the volume of air? A. If the volume is maintained constant, the pressure increases. If the pressure is maintained constant, the volume increases.

(70) C. S. asks: 1. Will it be safe to use condensed steam to feed the boiler with, and convert it into steam again? A. Yes. 2. Will the condensed steam be soft water? A. Yes.

(71) E. G. P. says: I have seen the bottom of small creeks coated over with ice, in shape corresponding with the shape of the gravel and small rocks on the bottom. I found it much more difficult to walk across the creek, from the unevenness of the bottom, than on clear ice on the surface. During this time there was no ice running on the surface. How is this? A. Very likely the water was frozen solid during the winter.

It is well known that heat and cold are antagonistic. Which of the two predominates? If all heat were annihilated, can the amount of cold be estimated? A. Heat and cold are only relative terms, so that a body could not be cold unless it had some heat. Were heat annihilated, we should reach the absolute zero of our temperature scale, and could take no more account of heat and cold.

(72) L. F. M. and others.—The square of the diameter (expressed in inches) is the number of square inches in a square which has the diameter for a side. It is also the number of circular inches in the circle (a circular inch being the area of a circle whose diameter is one inch). Hence, as a circular inch is about 0·7854 of a square inch, the square of the diameter multiplied by 0·7854 gives the number of square inches in the circle.

(73) W. S. C. asks: What is meant by a steam boiler priming? A. The boiler is said to prime when water is mingled with the steam.

An artesian well is said to be one bored to a stratum of water that will force itself up out of the well, and that the water will rise as high as the source of supply. How then can an artesian well deliver water higher than its source? A. It cannot, but the source of the water may be very distant. There are some artesian wells which are estimated to be more than 200 miles from the source of supply.

There is a kind of powder claimed to keep coal oil from exploding. Can that be done? A. No. The thing is a fraud.

Where does the supply of oxygen come from that we breathe? A. Animals exhale carbonic acid, which the plants require. The plants take the carbon and set free the oxygen.

(74) R. M. asks: I am building a small steam engine with a square cylinder, of $\frac{5}{16}$ wrought iron, to be bolted together. The bolts are to be 2 inches apart; the cylinder is 4 inches in the clear by 8 inches long. Would such a cylinder be as good as a round one? A. You will have difficulty in keeping the piston tight without excessive friction. You do not send enough data for the determination of the other points.

What will cut off the attraction of a lodestone from steel? A. It can sometimes be done by striking the bar, or bringing it under the influence of a more powerful magnet, and reversing the poles.

Is there a rule for telling how much lumber there is in a log? A. We do not know of any that is applicable in all cases.

(75) R. L. asks: What sized boiler, engine, and propeller would it take to run a boat 20 feet, long by 4 feet beam, and 3 feet depth of hold at 15 miles an hour, with steam at 60 lbs. pressure? A. The boat is too small to carry the machinery required for such a speed.

(76) J. V. asks: How can the area of a circle be equalized to that of an equilateral triangle? A. A side of the triangle is equal to 2·6942 times the radius of the circle.

Would a locomotive be able to run through a drift of wet snow 6 feet high and about 25 feet wide? A. Some engines are powerful enough.

What is an easy process of testing gold and silver? A. They can be treated in solution by various substances, when they will give characteristic precipitates. Consult a good work on chemistry.

(77) H. A. J. asks: What will remove a kerosene stain from a carpet without injuring the colors? A. Try benzine.

(78) G. W. H. says: 1. I am making a small oscillating engine, cylinder of 3 inches diameter and 6 inches stroke. Would it do to run an ordinary rowboat? A. Yes. 2. What kind of propeller wheel should I use? A. One of 2 feet diameter and 3 feet pitch. 3. Would a boiler 2 feet in diameter by 3 feet high be large enough to run it at 7 miles an hour? A. No.

(79) D. H. asks: 1. In testing a boiler with cold water through a rubber hose, does the hose sustain the same pressure per square inch as the boiler? A. Yes. 2. If the entrance to the boiler is smaller than the hose, will the hose have to stand the same pressure as the boiler? A. Yes.

(80) D. H. M. asks: What is the process of oil tempering tools for cutting wood, such as planer knives, chisels, etc.? A. Heat them red hot, and quench them right out in oil.

(81) J. H. F. asks: 1. What kind of clay do artists use for modeling? A. The material used in modeling is common potter's clay of the best quality, made so wet that a mass of it will not stand an inch higher than its own width without support. 2. Is modeling done by the hand or trowel? A. Modeling tools are either loops of wire of different sizes fixed in wooden handles, or various shaped pieces of ebony or boxwood. Both are to be considered merely as occasional aids to the fingers, or to be used in portions of the work which cannot be reached by the fingers.

(82) J. M. asks: 1. How can I give paraffin a fine red color? A. By the application of magenta and stearic acid, to the purified paraffin, a most beautiful rose color is obtained. 2. How can I perfume paraffin? A. We can give you no recipe for the purpose.

(83) J. G. asks: How are red and green lights made for use in tableaux? A. Red fire is made by using 61 per cent chlorate of potash, 16 of sulphur, and 23 of carbonate of strontia. Green fire, 61 per cent nitrate of baryta, 22 sulphur, and 18 chlorate of potassa.

(84) M. M. & Co. say: There is a person here who proposes to sell a recipe for causing 50 gallons of water to mix with 50 gallons of lard oil, thereby doubling the quantity and not deteriorating the value of the oil for lubricating purposes. Is this a fraud? A. Yes. We know of no chemical which will impart such properties to water.

(85) H. J. asks: 1. Are green paper hangings, that have been on the wall four or five years poisonous? A. Very probably. 2. Is the gas arising from coals taken from a stove as poisonous as that arising from burning charcoal in a room? A. Yes, if the gas given off is of equal amount. 3. In a recent article in your paper, you stated that kerosene oil barrels were poisonous. Is refined kerosene poisonous? A. It is injurious if taken in large quantities.

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

M. A. P.—The brilliant metallic particles are copper pyrites; they are imbedded in an impure quartzose rock.—T. A. H.—It is a rock, composed of quartz and mica.—E. W. S.—The sand is made up mostly of pure white quartz sand, and the bright shining appearance is due to little scales of mica. It can be employed where a fine white sand is needed.—O. H. P.—It is sulphuret of iron.—A box, directed to Rev. L. S. Bacon, contained red argillaceous (clay) shale, containing sufficient red oxide of iron to make it appear like an iron ore, but not enough to make it fit for working. When shale of this character gives a good color on grinding, it is sometimes used as a coarse paint.

A. B. asks: What is the material used in the manufacture of corduroy, which gives that fabric so disagreeable an odor whenever it is wet?—H. S. asks: Is there a good and speedy dryer for lithographic ink?—C. H. U. asks: How is the black stain and finish, similar to that used on lead pencils, made?—W. asks: How can I make rice paper?—L. K. Y. asks: In what way can I plug up screw holes in finished work, so the plugs will not show?—J. E. M. asks: What will keep sumac or bark liquor from souring in warm weather?—J. W. B. asks: How can I bleach yellow paraffin?—E. L. asks: How can I make a preparation for coloring eggs blue, red, and yellow?—J. W. asks: Is there a cheap mode of soldering or otherwise making a tight joint on black sheet iron pails?—J.N. P. says: I have some books that got very badly smoked from being in a burning house; the insides are not burnt, but the backs and edges of the leaves are very black. What can I do to take it off?

## COMMUNICATIONS RECEIVED.

The Editor of the SCIENTIFIC AMERICAN acknowledges, with much pleasure, the receipt of original papers and contributions upon the following subjects:

On a Ride on a Locomotive. By G. M. G.
On the Patrons of Husbandry. By W. R. S.
On Chemical Telegraphy. By G. L.
On Rubber Ligatures. By R. B. M.
On Telegraph Alphabets. By J. M.
On Boiler Explosions. By T. F. T.
On Squaring Numbers. By F. C.
On Cleansing Dirt from the Hands. By B. F. R.
On Steam Climbers. By W. E. S.
On Frozen Water Mains. By A. C., by W. T. F., and by F. T.
On Polarity of Water. By J. T.
On Flies. By C. T.
On Kaolin. By G. B.
On Talking Ants. By R. A. H.
On Flying Moths. By J. S.
On Finding the Meridian. By J. A. M., and by C.

Also enquiries and answers from the following:

E. E.—F. F. A.—J. T.—J. M. S.—A. G.—R.—T. L.—A. A. P.—J. D. M.—W. L. S.—D. L. B.—W. P.—A. S.—T. A. B.—O. G. S.—W. H.—W. W. H.—S. N. M.—J. H. P.—A. S. G.—S. B.—E. R. H.—J. L. B.—A. G.—R.—H. C. W.—H. O. T.—E. J. E.—T. H. N.—J. C. G.—A. R. L.—G.—J. C. B.—H. T. B.—A. Y.—R. E. M.—S. & S.—J. M.—L. D.—A. F.—S. A. T.—W. M.

## HINTS TO CORRESPONDENTS.

Correspondents whose inquiries fail to appear should repeat them. If not then published, they may conclude that, for good reasons, the Editor declines them. The address of the writer should always be given.

Enquiries relating to patents, or to the patentability of inventions, assignments, etc., will not be published here. All such questions, when initials only are given, are thrown into the waste basket, as it would fill half of our paper to print them all; but we generally take pleasure in answering briefly by mail, if the writer's address is given.

Hundreds of enquiries analogous to the following are sent: "Who makes firemen's respirators, invented and described by Professor Tyndall? Who makes the best ten horse engine for a sawmill? Who makes a lathe for turning wooden bowls? What is the price of galvanized iron water pipe? Who sells machines for sandpapering wooden rollers? Who sells sash holders that are efficient substitutes for sash weights? Who makes the best dynamometers? Who sells dentist's diamond drills? Whose is the best mode of drying lumber? Who sells an icebox constructed on scientific principles? Where can seeds of *arundo arenaria* be obtained? Who sells machines for turning croquet balls? Is there a glass bead factory in the United States? Who sells diamond drills? Who sells the most economical steam boiler? How small are hydraulic motors made? Who can give particulars as to drying lumber by steam? Who makes a spiral spring that will sustain 500 lbs.?" All such personal inquiries are printed, as will be observed, in the column of "Business and Personal," which is specially set apart for that purpose, subject to the charge mentioned at the head of that column. Almost any desired information can in this way be expeditiously obtained.

[OFFICIAL.]

# INDEX OF INVENTIONS

FOR WHICH

**Letters Patent of the United States were Granted in the Week ending**

**March 16, 1875,**

**AND EACH BEARING THAT DATE.**

(Those marked (r) are reissued patents.)

Acid, obtaining boracic, F. Formhals..... 160,761
Advertising medium, C. H. and H. F. Torsch..... 160,971
Air compressor, relief, G. H. Reynolds..... 160,956
Alarm, burglar, M. E. Lasher..... 160,918
Alloy, bronze, S. Doubleday..... 160,885
Anatomical specimens, jar for, J. M. Maris..... 160,926
Anvils, casting steel-faced, J. Donovan..... 160,816
Atomizer, C. Weed..... 160,802
Awning, C. J. Trumper..... 160,973
Bag, rubber coated, W. D. Grimshaw..... 160,897
Barrel barrow, J. H. Brown..... 160,810
Barrel crozing machine, Steel and Munson..... 160,966
Bed bottom, P. C. Ingersoll..... 160,913
Bed bottom, E. W. Tucker (r)..... 6,338
Bed bottom, spring, E. P. Bennett..... 160,809
Bedstead, C. Snyder..... 160,963
Bedstead, wardrobe, R. G. McClure..... 160,833
Beer vent, J. W. Spahn..... 160,847
Bill holder and separator, A. M. Lockhart..... 160,780
Bird food holder, S. E. Tompkins..... 160,853
Blacking for boots, etc., C. Alvord..... 160,741
Blind stop, G. Woodward..... 160,805
Boiler feeder, F. McGuire..... 160,930
Boiler, feed water heater, H. N. Waters..... 160,979
Book clip, H. T. Dunlap..... 160,886
Boot or shoe tip, Merrill and Holtt..... 160,835
Bowling alley, A. A. Hamlin..... 160,900
Box, sheet metal, W. C. McGill..... 160,834
Brick, mold for angle, J. H. Mathes..... 160,832
Bridle bit, J. P. Hisley..... 160,772
Brush, W. A. Megraw..... 160,933
Bucket ear, J. D. Field..... 160,818
Buckle, J. Hudson..... 160,912
Buckle, trace, J. P. Hisley..... 160,909
Burial caskets, coating for, C. H. Mulligan..... 160,784
Burners, lamp black, P. Neff..... 160,787, 160,789
Burner, gas, E. Evans..... 160,758
Burner, waste gas, P. Neff..... 160,785
Burner, automatic lighter, E. L. Megill..... 160,932
Can for mixing paint, W. W. Thayer..... 160,852
Cap, travelling, A. Schwarz..... 160,844
Car coupling, W. Green..... 160,822
Car coupling, M. Kurtzeman..... 160,779
Car signallight, Burnham and Strong..... 160,871
Car starter, D. D. Hardy..... 160,769
Car truck, railroad, A. Gilman..... 160,821
Car wheel, S. B. Chapman..... 160,814
Cars, moving railroad, B. F. Phelps..... 160,839
Car clamp apparatus, W. Eppelsheimer..... 160,757
Carriage, child's, R. Kreter..... 160,917
Carriage painter's easel, A. G. Rykert..... 160,959
Carriage spring, J. Enders..... 160,887
Carriage top, C. Heergeist..... 160,905
Carriage top support, A. Goodyear..... 160,849
Cart, dumping, J. J. Adgate..... 160,861
Cartridge, metallic, F. W. Freund..... 160,763
Chair, J. V. Meigs..... 160,934
Chair, folding, G. E. Whitmore..... 160,985
Chair, tilting, W. Gardner..... 160,764
Chair, tilting, R. W. Myers..... 160,943
Clamp, S. Kuh..... 160,773
Clamp, S. Rydbeck..... 160,960
Cloth shearing machine, I. L. Holmes..... 160,825
Clothes dryer, I. Whipple..... 160,980
Clothes pin, O. F. Porter..... 160,840
Clothes pin machine, J. W. Millet..... 160,783
Coal hod, E. W. Byrn..... 160,873
Coke, machine for crushing, C. Glazier..... 160,765
Compress, A. A. Lellevre..... 160,830
Cooler, beer, B. A. Stevens..... 160,796
Corks, removing wire from, G. A. Potter..... 160,950
Corpse cooler, C. Hoff..... 160,910
Corpse cooler, C. O. Peck..... 160,948
Cotton chopper, T. C. Burnham..... 160,811
Cotton chopper, Mickle and Dearring..... 160,937
Cotton planting attachment, S. H. Wade..... 160,975
Cotton worms, destroying, W. T. Willie..... 160,986
Curtain fixture, H. E. Busch..... 160,872
Cutlery, handle for, O. W. Taft..... 160,969
Digger, potato, M. W. Knox..... 160,776
Drill chuck, J. O. Reilley..... 160,954
Drill, corn, J. B. Ludlow..... 160,923
Drill for well boring, J. M. May (r)..... 6,337
Egg beater, M. Cline..... 160,815
Ejector, fluid, G. Westinghouse, Jr..... 160,803
Elevator, J. B. Sweetland..... 160,850
Elevator, stump, J. M. Bachelor..... 160,866
Elevator, stump, J. H. Barnes..... 160,808
Engine, compound, C. E. Emery..... 160,817
Engine governor, steam, Judson and Cogswell..... 160,774
Exercising machine, A. M. Allen..... 160,863
Farm box, M. M. Murray..... 160,942
Faucet, bottling, A. C. Meyer..... 160,936
Fire arm, breech loading, E. Burt..... 160,748
Fire arm, breech loading, D. Conner..... 160,880
Fire arm, breech loading, F. W. Freund..... 160,762
Fire arm, breech loading, C. A. King..... 160,915
Fire arm, breech loading, J. Lee..... 160,919
Fire arms, sight for, F. W. Freund..... 160,819
Firearms, stock for, J. V. Meigs..... 160,935
Fire plug or hydrant, D. Minich..... 160,941
Gaiter, congress, J. W. Tutewiler..... 160,853
Game board, O. A. Gill..... 160,820
Gas from hydrocarbon, F. G. Voigt..... 160,799
Gate, swinging, F. Raymond..... 160,842
Glue dryer, S. T. Swasey..... 160,797
Grain band, C. L. Travis..... 160,972
Grain drill, B. Kuhns..... 160,829
Grain, unloading and dumping, J. B. Whitcomb..... 160,984
Grate, J. Byington..... 160,813
Grate, parlor, G. W. Walker..... 160,856
Harness clip, F. Conway..... 160,751
Harrow, W. T. McGhee..... 160,929
Harvester, M. L. Gorham..... 160,895
Harvester, C. D. Shrader..... 160,845
Harvester rake, I. Dodenhoff (r)..... 6,339
Harvester rake, A. A. Henderson (r)..... 6,336
Hooks, snap, A. B. Conde..... 160,879
Ice creeper, A. L. Willis..... 160,804
Jack, lifting, J. J. Adgate..... 160,860
Jewelry die, G. Stetter..... 160,967
Kettle, heating or cooking, G. W. Walker..... 160,857
Key ring, H. Tilden..... 160,970
Kiln, brick, R. F. Marshall..... 160,927
Knob, door, S. Hiler..... 160,908
Knob rose, S. Hiler..... 160,907
Lamp, Storey and Lewis..... 160,848
Lamp extinguisher, W. H. Zimmerman..... 160,988
Lamp pendant, E. Stevens..... 160,968
Lampblack, manufacture of, Fales & Neff..... 160,759
Lampblack, manufacture of, P. Neff..... 160,786, 160,788
Lantern, L. F. Betts..... 160,744
Lath sawing machine, P. W. Hart..... 160,903
Lath sawing machine, M. S. Norton..... 160,838
Lathe centers, grinding, M. R. Lemman..... 160,921
Leather, finishing, J. H. Radey..... 160,841
Leather seams, pressing, J. W. Hatch..... 160,770
Limekiln, Cole & McCulloch..... 160,878
Liquids, drawing effervescent, Malmström *et al*..... 160,925
Lock for doors, etc., H. Winn..... 160,859
Lock, seal, J. N. Smith..... 160,962
Loom, suspender webbing, C. H. Chapman..... 160,749
Loom shuttle, M. Safford..... 160,843
Lubricating can, L. F. Betts..... 160,745
Mains, machine for tapping, J. J. Quinn..... 160,952
Mangle, H. Tamms..... 160,851
Mantels, marbleizing, R. J. Howdon..... 160,911
Measuring distances, W. F. Harrsch..... 160,823
Meat chopper, A. Nittinger, Jr..... 160,944
Metal, machine for shearing, Walsh & Dutot..... 160,858
Mill, disintegrating, G. B. Davids..... 160,884
Mill, disintegrating, J. M. Hendricks..... 160,771
Mill spindle, R. S. Cathcart..... 160,874
Millstone balance, J. A. Althouse..... 160,864
Millstone bush, R. S. Cathcart..... 160,875
Mower, lawn, H. C. Crowell..... 160,882
Mowing machine, A. B. Allen (r)..... 6,332
Music leaf turner, F. G. Johnson..... 160,826
Neck tie, A. J. Adams..... 160,806
Needle book, F. Swan..... 160,849
Nut lock, J. J. Adgate..... 160,862
Ornament, personal, F. C. Kiergaard..... 160,858
Pan forming machine, G. A. Bowers..... 160,747
Pantaloons, etc., J. W. Davis (r)..... 6,335
Paper bag machine, H. S. Merrill..... 160,782
Paper clip, W. V. Perry..... 160,949
Paper dryer, Hatch & Smith..... 160,824
Paper pulp engine, M. R. Bouju..... 160,746
Parasol and whip, combined, J. Perrins..... 160,791
Pen and pencil case, G. W. Mabie..... 160,924
Picture frame hanger, Dobbs & Brayton..... 160,754
Piers, construction of, Milroy & Butler..... 160,938
Pile driver, steam, T. T. Loomas..... 160,781
Pistol stock, W. L. Godfrey..... 160,766
Piston, T. S. Davis..... 160,752
Planter and distributer, J. B. Legg..... 160,920
Planter, gang corn, S. P. Evans..... 160,889
Plow, J. O. Minor..... 160,836
Plow, steam, J. Fogarty..... 160,760
Pouncing block, H. G. Disbrow..... 160,753
Press, hay, C. Waste..... 160,976
Printing press, date, Palmer & Clark..... 160,947
Prism, A. K. Eaton..... 160,756
Projectiles, attaching rings to, J. Vavasseur..... 160,855
Propeller, endless chain, E. E. Everitt..... 160,890
Pump, J. S. Ash..... 160,742
Pump bucket, chain, A. L. Corey..... 160,881
Pump or motor, rotary, N. Upham..... 160,974
Pumps, sectional bucket for, G. W. Burr..... 160,812
Railway, elevated, L. Lotz..... 160,831
Railway rail joint, J. M. Kenny..... 160,916
Railway rail joint protector, I. Mills..... 160,150
Reversing mechanism, R. B. & J. C. Chapman..... 160,877
Rule, measuring, G. S. Hastings..... 160,904
Sad iron, J. M. McMaster..... 160,931
Sails to spars, attaching, H. B. Stephenson..... 160,795
Sash balance, O. Davis (r)..... 6,334
Sawmill head block, F. N. Whitcomb..... 160,982, 160,983
Sawing laths, machine for, P. W. Hart..... 160,903
Sawing laths, machine for, M. S. Norton..... 160,838
Sawing machine, J. Gehr..... 160,892
Sawing machine, W. P. Hale..... 160,899
Sawing machine, M. M. Miller..... 160,939
Sawing machine, scroll, J. Hale..... 160,768
Seaming machine, double, F. Kenney..... 160,775
Separator, grain, W. S. Clymans..... 160,750
Sewing machine cording attachment, H. C. Jones 160,827
Sewing machine motor, B. C. Chambers..... 160,876
Sheep skins, dressing, R. Hart..... 160,902
Shirt stud, E. W. Averell..... 160,865
Shoe, A. Ballard (r)..... 6,333
Sifter, ash, F. Anthes..... 160,807
Sign, street, H. S. Finney..... 160,891
Sled, hand, J. B. Monroe..... 160,837
Steam and air brake, J. R. Renifi..... 160,955
Stench trap, R. L. Walker..... 160,800
Still, rectifying, E. F. Prentiss..... 160,951
Stone, etc., machine for sawing, English & Willard 160,888
Stove, W. Doyle..... 160,755
Stove, barrel, J. F. Scholes..... 160,961
Stove, cooking, R. Thomas..... 160,798
Stove fire back, G. W. Herrick..... 160,906
Straw twisting machine, S. Kuh..... 160,777
Sugar cutting machine, G. P. Ockershausen..... 160,945
Sugar, refining, F. O. Matthiessen..... 160,928
Surcingle, H. M. Witter..... 160,987
Table and bed combined, office, D. Walker..... 160,801
Table, ironing, A. C. Gilbert..... 160,893
Table, ironing, S. C. Hamlin..... 160,901
Tenons, machine for relishing, E. A. Rowley..... 160,957
Toy fire arm, E. T. Starr..... 160,965
Valve, check, W. H. H. Bowers..... 160,869
Valve, safety, A. Orme..... 160,790
Valve, steam, J. Johnson..... 160,914
Vegetable washer, J. Brooks..... 160,870
Vehicle axle skein, B. Snyder..... 160,964
Vehicle chafing iron, G. Smith..... 160,793
Vehicle fender, H. M. Curtis..... 160,883
Wagon cover, E. M. Saunders..... 160,792
Wash benches, F. and M. Way..... 160,977, 160,978
Washing goods in the piece, C. J. Barker..... 160,743
Watch key, ratchet, G. A. Beidler..... 160,867
Water closet, J. H. Gould..... 160,896
Water meter, A. Guthrie..... 160,767
Waterproof compound, W. D. Grimshaw..... 160,898
Water wheel, R. R. Royer..... 160,958
Wind wheel, S. and D. Johnson..... 160,773
Windmill, O. B. Blakeslee..... 160,868
Windmill, G. H. Lucas..... 160,922
Windmill, A. and G. Raymond..... 160,953
Windmill, A. H. Southwick..... 160,794
Wood, apparatus for preserving, G. B. Smith..... 160,846
Wrench, J. L. Whipple..... 160,981
Wrench, pipe, H. Otto..... 160,946

## DESIGNS PATENTED.

8,206.—AQUARIUMS.—J. W. Fiske, New York city.
8,207.—MUSTARD BOTTLE.—J. Gulden, New York city.
8,208.—CARPET.—A. Heald, Philadelphia, Pa.
8,209.—GAUNTLET.—B. G. Shults, Johnstown, N. Y.
8,210.—PERFUME BOTTLE.—G. Storm, Philadelphia, Pa.

## TRADE MARKS REGISTERED.

2,287.—PERFUMERY.—W. B. Dorman, Georgetown, Mass.
2,288.—COOK STOVE.—M. L. Filley, Lansingburg N. Y.
2,289.—MEDICINE.—B. Gorrell, Hopewell, Md.
2,290.—CIGARS.—Harned & Co., Brooklyn, N. Y.
2,291.—MEDICINE.—Henry & Co., New York city.
2,292.—FLOUR.—T. C. Jenkins, Pittsburgh, Pa.
2,293.—PRONG HOES.—Reisig *et al.*, New Castle, N. Y.
2,294.—CIGARS.—A. Schuneman & Co., Detroit, Mich.
2,295.—OILS.—W. C. Stiles, Jr., Volcano, W. Va.
2,296.—SOAP.—Kendall M'f'g Co., Providence, R. I.
2,297.—ENTREMETS.—Underwood & Co., Boston, Mass.
2,298.—BURNING FLUID.—B. A. Rose, Urbana, Ohio.
2,299.—LINIMENT.—E. Maatman, St. Louis, Mo.
2,300.—FERTILIZERS.—Patapsco Guano Co., Baltimore, Md.
2,301.—DYEING CHEMICAL.—Weeks *et al.*, Boston, Mass.

## APPLICATION FOR EXTENSION.

14,535.—WATER WHEEL.—J. Haseltine, Boston, Mass.

## SCHEDULE OF PATENT FEES.

On each Caveat..... **$10**
On each Trade mark..... **$25**
On filing each application for a Patent (17 years)..... **$15**
On issuing each original Patent..... **$20**
On appeal to Examiners-in-Chief..... **$10**
On appeal to Commissioner of Patents..... **$20**
On application for Reissue..... **$30**
On filing a Disclaimer..... **$10**
On an application for Design (3½ years)..... **$10**
On application for Design (7 years)..... **$15**
On application for Design (14 years)..... **$30**

## CANADIAN PATENTS.

LIST OF PATENTS GRANTED IN CANADA, MARCH 12 to 19, 1875.

4,487.—P. Mayrand, Gentilly, P. Q. Wood splitting machine. March 12, 1875.
4,488.—G. R. Edwards, Galena, Ill., U. S., *et al.* Safety whiffletree. March 12, 1875.
4,489.—J. B. Hava, New Orleans, La., U. S. Treatment of cod liver oil. March 12, 1875.
4,490.—J. S. Garner, Galena, Ill., U. S. Wash boards. March 12, 1875.
4,491.—J. A. Lakin, Westfield, Mass., U. S. Overdraw bar check. March 12, 1875.
4,492.—H. B. and E. W. Rathbun, Mill Point, Ont., *et al.* Barrel heading cutter. March 12, 1875.
4,493.—C. C. Roe, Hamilton, Ont. Machine belt buckle. March 15, 1875.
4,494.—C. I. Corbin, East Oxford, Ont. Extension of 287. Rake. March 15, 1875.
4,495.—M. Pettingill, Minneapolis, Minn., U. S. Car coupling. March 15, 1875.
4,496.—E. L. Howard, Boston, Mass., U. S. Fagotting attachment to sewing machines. March 15, 1875.
4,497.—C. F. Ritchel, Corry, Pa., U. S. Brush block boring machine. March 15, 1875.
4,498.—L. Coté, St. Hyacinthe, P. Q. Forming stiffeners for boots. March 15, 1875.
4,499.—J. S. Anderson, Flintville, Wis., U. S. Wash boiler. March 15, 1875.
4,500.—R. Paradis, St. Hyacinthe, P. Q. Shingle machine. March 15, 1875.
4,501.—T. Richardson *et al.*, Fergus, Ont. Gang plow. March 15, 1875.
4,502.—J. K. Feick, Berlin, Ont. Felt boot tree. March 16, 1875.
4,503.—G. Houlton, St. Andrews, N. B., *et al.* Car axle boxes. March 16, 1875.
4,504.—W. R. Close, Bangor, Me., U. S. Friction catch wheel. March 16, 1875.
4,505.—J. Collins, Montreal, P. Q. Bag tie and fastener. March 16, 1875.
4,506.—J. C. Peacock, Finsbury, London, England. Non-conductor of heat. March 16, 1875.
4,507.—J. F. Williams, Niagara, Ont. Extension of 289. Lever buckle. March 17, 1875.
4,508.—L. J. House *et al.*, Stanstead, P. Q. Stump extractor and stone puller. March 18, 1875.
4,509.—C. C. Jones, Fredericton, N. B. Combination barrel pump. March 18, 1875.
4,510.—S. E. Foster, Minneapolis, Minn., U. S. Vehicle spring. March 18, 1875.
4,511.—F. G. White, Ottawa, Ont. Artificial honey. March 19, 1875.
4,512.—J. M. Mehag, Montreal, P. Q. Wedge valve. March 19, 1875.