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A. M. C. asks: Is there anything which will as effectually protect iron from rust, etc., as the gal vanizing process, but which is less expensive?

H. J. H. asks: What is the best composition to preserve pickets set in the ground?

T. B. C. wants a recipe for sticking emery n tin. "There is a constant jar on the tin, and glue will not hold."

H. F. U. asks for the exact proportion of in-gredients requisite to make a wholesome self-raising flour.

M. C. asks: What is the process of graining oak root, and what colors are used by painters in doing it in distemper?



C. T. S. can preserve his composing stick or other steel articles from rust by following the directions on p. 27. volume 25.—F. can attach leather or cloth to galvanized iron by using the recipe given on p. 167, vol. 82.—J. W. J. shouldtry the method described on p. 406, vol. 25, for preserving eggs.—F. A. will find a recipe for shoemaker's ink on p. 75, vol. 27.—R. H. L. will find his question as to the weight on a safety valve answered in the reply to W. A. S. on this page.—E. R. D. should consult the makers of windmills. His query about slip of belts is answered on page 380, vol. 28.—J. L. R. can try the much recommended tannate of soda in his lime vater.

W. C. F. asks: At what velocity will steam issue through a round hole, one eighth inch long and one sixteenth of an inch in diameter, under a pressure of 100 lbs. to the square inch; and what would be the difference in the velocity provided the diameter of the hole be increased to one eighth inch, the pressure and length of hole remaining the same? Answer: See editorial pages of this issue

W. H. S. asks how to precipitate gold, sil-ver, copper, nickel, and platinum from solutions. An-swers: To precipitate gold, add a strong solution of ferrous sulphate, or sulphate of iron, to a solution of any salt of gold, as the chloride, prepared by dissolving gold in *aqua regia*. The gold is precipitated as a brown powder. Silver is precipitated in themetallic statefrom by iron. Add clean pieces of iron to a solution of the chloride of silver. For copper, add clean scrap iron to a solution of blue vitriol, sulphate of copper. For metallhc nickel, first add a strong solution of oxalic acid to a strong solution of sulphate of nickel. Collect the pale bluish green precipitate. Heat the precipitate in a cov ered crucible, lined with charcoal. For platinum, dis-solve the metal in aquaregia (a mixture of muriatic and nitric acids), precipitate with a solution of sal am moniac, and heat the precipitate red hot. The result is spongy platinum.

N. J. N. asks: 1. How can I calculate the difference between the steam pipe nd exhaust pipe of a stationary engine? Is a three inchexhaust large enough for an engine of 12 inch bore and 20 inch stroke, with a 2 inch steam pipe, running at 104 revolutions per minute, 80 lbs, pressure to the square inch in the boilers? 2. What is the accompanying specimen composed of? 3. Will it affect the water in the boiler toput in the carcase of a dead mule, in pieces? 4. How can I compute horse power? Answers: 1. Consult "Link and Valve Motions," by W. S. Auchincloss. 2. Some compound of lime, probably the carbonate. 3. We never heard of the plan before. 4. See answer to M. C., on this page.

J. R. K. says: 1. We want to carry the condensed steam from an engine into a tub eight feet deep, for the purpose of boiling straw. What per cent-age of power do we lose on the eng.nes? 2. We have a tubular boiler 42 inches in diameter, 80 two inch tubes. 14 feet long, with stark 18 inches diameter and 50 feet high, with very 1 oor draft. The boiler is situate in a hollow; the hill on one side is about as high as the stack, the other twice as high. Can you suggest a remedv for the bad draft? Answers: 1. None. if the condensed steam does not have to be raised, to be put into the tub. 2. Prohably a mechanical draft, by a blower. will remedy the trouble. J. P. C. says: I use a small vertical portable engine and boiler, and sometimes I have to carry 100 lbs. steam to do the work. The boiler is 56 inches high 28 outside diameter, with 24 one and a half inches tubes The firebox is 18 inches diameter x 23 inches high. The middle gage is 39 inches from bottom of boiler, and she steams best with water at that hight. I use fir wood for fuel, which makes an intense heat. Am I safe from heating the tubes too hot with the firebox full of wood, and water at middle cock, 13 inches above crown sheet? Evaporation is rapid and steam is pretty wet if carried higher. The boiler foamed so badly that I could not tell anything about the hight of the water. I fancied that the oil which got in around the plunger of the force pump had something to do with it. I got the idea from omething I once saw in the SOIENTIFIC; since then I have been very careful to keep all oil out, and have rpessure from 20 to 100 lbs. Answer: If when the engine

is 'n motion, the water issues solid from the lower gage cock, there is no danger. It is only when boilers have cock, there is no danger. It is only when bollers have such a bad circulation that the tubes or crown sheet are left bare that there is danger from heavy firing.

H. B. & K. ask what kind of dryer is best to put in coaltar, in making a gravelroof. Answer: Try boiled linseed oil, or litharge.

T. S. S. asks how to make and bleach skeletonized or phantom leaves. Answer: Boll the leaves in a weak solution of caustic soda for some hours, wash thoroughly and then expose to the fumes of burning sulphur.

E. C. C. says: I want to make springs 4 nches long $x \not\prec$ inch wide by one thirty second thick, to be pressed from sheet metal or otherwise. They are required to spring % inch and not to rust, and to be as cheap as possible. Is there any metal cheaper and bet ter than sheet spring steel? They can be tinned or galvanized to prevent rust. Answer: Spring steel will probably be the best material for you to use.

G. says: Some bins containing soft crushed sugars are full of little red ants; I would like to know why they select that sugar from the other kinds, and how we canget them out? Answer: A plentiful supply of what is known as Persian powder, around (not in) the sugarbins, will prevent the inroad of ants. Sugar bins should be made of hard stout plank, with closely fitting covers, and kept perfectly clean. If they could be lined with earthenware or stoneware, and mide air tight, so much the better. The only way we can suggest to you, for getting rid of the ants already in the sugar, is to spread it out in thin layers and pick out the ants by hand. The ants prefer the brown sugar, probably on account of its greater sweetness and moisture.

R. W. W. asks how to clean a carpet which is been soiled by accident. It was washed with soap has been solied by accident. It was washed with soap suds: and to remove a sour smell, it was washed with soda water. "The color remained good until, to remove further odor, I poured on bay rum; that operation turned it a light green color. The original colors are wo shades of brown, red, green and black, on a white ground." Answer: We advise you by all means to discontinue the use of soda water and bay rum on the car-pet. The alcohol in the bay rum has probably so dis-solved and spread the colors the t there is no remedy. To remove the smell, try a very dilute solution of carbolic acid.

W. H. R. asks: 1. How great a vacuum can be produced with an airpump with one inch bore and 3½ inch stroke? 2. Can an article be held on a trap by glass answer for artificial stone exposed to the weather? . What sudden pressure will a cast iron tube stand safe y, if given by a quantity of gunpowder or other combustible? Answers: 1. It depends on the relative size of the receiver and connections. With the cylinder alone, if the piston is tight, a nearly perfect vacuum can be produced, with reference to the air. 2. No, if the trap is the size of the cylinder. 3. Correspond with the manu-facturers. 4. The tensile strength of cast iron is about 18,0001bs.per square inch. Take \varkappa of this for a safe strain, and then the pressure per square inch that it will safely bear may be found by multiplying the thickness in inches by the safe strain, and dividing it by the diam-eter of the tube in inches. This is for thin cylinders. For thick ones, see article in Scientific American for June 21, 1873.

A. S. asks how to bleach and cure palmetto grass. Answer : Steep or boil the leaves in a weak solution of caustic soda, wash thoroughly, and then expose them to the fumes of burning sulphur in a close chamber; or instead of the sulphur fumes, soak in a weak solution of chloride of lime and rinse well afterwards.

H. R. asks: Is there such a thing as scag-liola? If so, where can I get it, how can I make it, and what is it used for? Answer: Scagliola is a species of stuccomade with the best plaster of Paris and a weak solution of Flanders glue; it is colored according to taste. This composition is often applied upon hollow columns of wood, and the surface, when hard, can be smoothed in a lathe or polished.

A. H. C. asks: What is the cause of white sugar flashing like a glow worm when you run the scoop into it? Answer: The cause of sugar flashing, as you describe, is probably owing to the electricity developed by the friction between the scoop and the sugar.

C. E. asks: What is the difference between true north and magnetic north in the city of New York for the year 1573? Answer: The magnetic north is 7° W. of the true north.

P. D. asks: By what means flowers, leaves and other vegetable matters are deprived of their colors, that is, bleached or whitcned, for introduction into what I think are called "skeleton bouquets?" Answer: Expose the flowers for a few minutes to the fumes of burning sulphur in a close vessel, care being taken to prevent the heat from reaching them.

W. A. S. asks: 1. What formulæ are used n measuring safety valves of different sizes? 2. How do you go to work after you get the figures? Answers: 1. Measure the diameter of the valve, in inches-square this and multiply it by the decimal '7854; this will give the area of the valve in square inches, Find the weight of the lever, and the distance of its center of gravity from the fulcrum. This can be found by balancing the lever on a knife edge. We call the distance, the lever arm of the lever. Weigh the valve, and measure the dis tance from the center of the valve stem to fulcrum, noting that all distances are to be measured horizontally. This is the lever arm of the valve. Find the number of pounds in the weight, The distance of point of suspension of weightfromfulcrum is called the leverarm of the weight. 2. Having obtained these figures, make an equation thus: Pressure of steam in pounds per square inch \times area of value in square inches \times lever arm of value = (weight of ball×lever arm of ball)+(weight of lever×lever arm of lever) + (weight of valve \times lever arm of valve:) It is evident that if all the parts but one are known, this equation will determine that part. E. M. K. says: 1. How quickly can a 35 horse power engine be stopped if it is making 75 revolutions perminute with 70 lbs. steam? 2. How can I Babbitt a governor on a high pressure engine? 3. The oil or tallow cup that was on the cut off-chest was changed and put above the governor in the steam pipe ; is that right? 4. How can I reverse an engine? 5. The boller is to carry 75 lbs. steam. There is a41% lbs. iron weight added to the safety valve. When it is off, steam blows off at 75 lbs. by steam gage. Is this right? 6. Is there water or oil used on emery stones and wheels, and how are they turned off? 7. Are the toads that stay around gar-dens poisonous? Answers: 1. It depends in a great measure on the weight of the moving parts, but under ordi-nary circumstances such an engine could be saiely stopped in 15 seconds. 2. If it is a box, closed at both never been troubled with foaming in the least, at any ends, hat the journal, cover it with a piece of olled rpessure from 20 to 100 lbs. Answer: If when the engine writing paper, place it in the box, and pour in the molten

metal. If the place is open at the bottom, after putting in the journal stop the opening with clay, and proceed as before. 3. Yes 4. Arrange stops for the eccentric so that it will be loose on the shaft, between the posttionsfor forward and backward motion. 5. We think you had better remove the extra weight. 6. There are emery wheels made to run in oil and water. Unless hey are specially prepared, they should be run dry. 7 So far as we know, such toads are not poisonous.

J. K. S. asks: 1. How can I construct a orm glass? 2. How cau I expel fleas from a cat that is filled with them? Answers: 1. Put the following ingredientsinto a long and narrow bottle : one quarter ounce camphor, one sixteenth ounceniter, one sixteenth ounce muriate of ammonia, dissolved in 2 ounces of alcohol. Cover the mouth of the bottle with a piece of bladder, containing a puncture made by a fine needle. 2. Boil tobacco leaves in water, and wash the cat in the decoc tion.

M. W. H. asks: 1. What is nitro-glycerin made from? 2. Does it, when ignited, leave any sedi-ment or ash? 3. Can gunpowder be ignited by a current of electricity without the conducting wire touching it? 4. What will be the pressure of one ounce of common gunpowder, wh£n ignited in a cubic foot of space? 5 What is the pressure of nitro-glycerin per ounce, in a cubic foot of space? 6. What the pressure of white or fulminating powder per ounce, in a cubic foot of space? 7. How many cubic feet will one ounce of common gunpowder fill, if exploded in a cylinder or tube one foot square, it standing upright, so that there will be only the atmospheric pressure of one square foot to sustain? 8. Will sulphuric acid keep ink from molding? 9. Will a pocket compass lose its magnetic power? Ifso, how long will it take, and can it be made good again, and now? Answers: 1. Made of nitricacid, sulphuricacid and glycerin. 2. No. 3. Yes, if the powder be confined. 4. One ounce gunpowder equals about 1 cubic inch space, and expands at the moment of explosion, as estimated by competent chemists, 2,700 times, or to about 1% cubic feet. Therefore the pressure in a confined cubic foot space, will be 2214 lbs. ab we the atmosphere per square inch. 5. Nitro-glycerin has 13 times the explo-sive force of gunpowder, therefore the pressure of one ounce may be estimated at 293 lbs. per square inch above the atmosphere. 6. No known experiments have de termined. 7. At moment of explosion 1% cubic feet. After the gases have cooled, however, probably from $\frac{1}{2}$ to $\frac{1}{2}$ of this. 8. The effect will be to corrode steel pens. 9. It will not, if not tampered with. When lost, the magnetic power is easily restored by rubbing on another magnet.

C. G. G. says: I wish to dig an ice cellar near my well of excellent water. If Y drain the cellar through a filter, into the well, will the water be affected hurtfully? Answer: We would advise you by no means to drain your ice house, even through a filter, into your well. Filtered water may look perfectly clear and taste pure, and yet be poisonous, though that from your ice may be harmless. Let no drain come near your well.

M. C. asks: 1. How can I find the power of a steam engine by plain arithmetic? 2. I want a plain rule for finding the horse power of a tubular boiler. 3. Will the same rule apply to all boilers? 4. Is there a rule for finding the capacity of a plunger pump? 5. Which would be the proper place for an air chamber of plunger pump, on suction or force side? I propose to attach it to relieve a very heavy thumping. 6. What causes a vacuum in steam cylinder, and how can it be prevented? Answers: 1. Multiply the diameter of the cylinder in inches by the decimal 7854; multiply this by the number of revolutions per minute, and by twice the length of stroke in feet, and divide the result by \$3,000. 2. Divide the number of square feet of heating surface by 15. 3. Only approximately to eny. We do not know of any absoluterule, except a practical test. 4. Multiply the diameter of rlunger in feet by the length of stroke in feet, and by half the number of strokes per minute, and you will get a rough approximation of the number of cubic feet delivered per minute. So much depends upon the construction and location of the pump that it is difficult to give a general rule that is reliable. 5. On delivery side generally. 6. The condensation of the steam. It can be destroyed or prevented by letting in air.

J. H. says: You repeatedly advise young mechanics to study mathematics. Will you tell me how long it will take to make a person sufficiently posted on the subject, provided that he has an average amount of brains, a good general knowledge of arithmetic, no knowledge of algebra (or very slight), a fair amount of knowledge of algebra (of very singht), a fair allount of perseverance, his nights only to study, and no funds to employ a teacher? What work would you advise me to commence with? Answer: A great deal depends upon making the right kind of start, so as to know how to study, as well as what to study. In algebra, we would recommend Davies' "Bourdon," and in geometry, trigo nometry, and the use of logarithms, Davies' "Legendre." Each book costs from \$1.50 to \$2.00, and to master their contents thoroughly will require, with the limited time afforded you for study, from nine months to a year. But you will have galact, from memory in a venues of great benefit to your business will be opened to you, which would otherwise have been as sealed chambers. In commencing your studies, remember that it is not so much rules, as methods, that you wish to acquire. Always proceed on the principle that the book is wrong and must be provedright; and get practice continually in the interpretation of formulas and results.

A. A. D. says: I am constructing a rotary engine with 4 vanes, each of which has 2 8125 square inches area; it is constructed on the eccentric principle and is to work on expansion, with 50 lbs, steam pressure and to make 200 revolutions per minute. Would more vanes create more power? What sized boiler would it require, and what kind of boiler, of plate iron or copper for efficiency and cheapness? How much fire surface ought it to have to make the most steam and be the most economical? Please rate the power of the above engine, and give a reliable mode of calculating power o rotary engines. Answer: We cannot answer these questions without receiving more data. To calculate the power developed by a rotary engine, multiply the piston area that is acted on continuously by the mean pressure of the steam throughout the stroke. Multiply this by the mean piston speed in feet per minute, and divide by 33.000.



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E. A. W. asks: How is the black varnish or lacker applied to small articles of wire, such as fish hooks, hair pins, etc., and of what is it composed? An swer: Add to 2lbs. asphaltum (fused in an iron pot) ho boiled oil 1 pint; mixthoroughly, remove from the fire and when cooled a little add 2 quarts oil of turpentine Apply with a varnish brush.

F. B. T. asks: What should be the size of a water wheel, and of the stream of water to run i sewing machine? The water is supplied through hose to a tank 8 feet above ground. Answer: There are : number of sewing machine motors, driven by water, it the market. Correspond with their manufacturers.

V. R. H. asks: How can I make india rubervious to kerosene oil? Answer: You cannot pra-kerosene attackingindiarubber where it comes in ct contact with it. Still good rubber, well vulcan-, ought to last long enough to make its renewal at rvals not very expensive.

A. H. asks: Is nickel plating a success general thing, and can zinc be successfully plated nickel? Answer: Nickel plating is a success, but e 14 no known method of plating zinc. The acid used is an obstacle, the acids attacking the zinc at

P. G. asks if the dry heat of the Turkish is less penetrating than moist heat. Answer: The an body can withstand for some time a heat far e that of the Turkish bath, 220° Fahr.,11 the medium sat of hot dry air. The rapid evaporation from the see of the body prevents the internal heating of the d. If the air be moist, however, or the medium of be steam, a temperature considerably below 212° would be sufficient to, in a short time, effectually man

. F. A. asks: 1. How can I melt old compo-a printers' rollers, so as to pour into molds forcast-laster in? 2. What are the exact proportions of ngredients used in making the composition rollers in use? 3. Can you: nform me how the composition by decorators for looking glass frames, etc., is Answers: 1. You can melt composition rollers acing them in a vessel surrounded hyboiling water. the ordinary glue pot. When melted, you can pour o molds. 2. Dissolve, in two pounds of molasses) at hest not above that of boiling water, one dof good glue, previously soaked over night in water. 3. Decorators use for gilding, what isknown nosaic gold", a bisulphuret of tin. This is mixed varnish and applied to wood.

. S. B. asks how to recover diamonds from cors of a fire. Answer: You can get rid of plaster me, or any substance that will remain for a length ie suspended in water, by the following means: de a large tank, fitted with a stirrer at the bottom. stream of water enter the tank at the bottom : and the taik is full of water and the stirrer in motion, redebris in as fine powder as possible. Let a pipe off the surplus water at the top of the tank 'ay, with plenty of water, you can wash free fro.n n and lime.

E would like to know the rule for finde speed of shafts or pulleys. Suppose a 22inch pul-making 420 revolutions per minete with a beltrun in a 10 inch one; what would be the number of itions of the small one? Wh t is the rule forsuch Answer: The speeds of two pulleys, under such astances, are inversely proportional to their diam-In the case men ioned, the speed of the smaller

, if the belt did not slip, would be $420 \times 22 + 10 = 924$ uions a minute.

. H. D. asks: 1. Is an engine shop the lace in which to learn the machinist's trade? 2 what manufacture would you recommend? 3:

I you recommend me to work at what my mind artisset upon, in preference to anything else? ers: 1. Probably a large machine shop would be or acquiring a general knowledge of the work, on at of the great variety of machinery constructed h a place. 2 We cannot recommend any particu-ablishment. Try and get in a shop where the men couraged by the owners to study and improve elves. 3. If you are so stitlated that you can fol-our favorite pursuit, by all means do so. That is the greatest steps towards success in life.

S. L. F. says: Can you refer me to any hat will tell me how to ascertain the exact power take to force water up 250 feet high, at the rate of lons per minute? Answer: See article on "Fric-Water in Pipes," on page 48 of our current vol-The power required in your case will be that used ag the water, and overcoming the resistance due tion.

C. C. asks how to take off window glass luish appearance said to be caused by using creeid sulphur. It makes its appearance while the going through the flattening process. Answer: uish appearance on your glassis probably caused ie defect in its mode of manufacture. Too much would be apt to cause it. If only on the surface ell with whiting and rub off with a linen cloth.

R. C. asks: Will a railway head, con-d to run a section of six cards, run a section of rds without alteration? Answer: It will probaaccessary to change the trough and gearing.

O. S. says: I have a small sailing boat sh to convert it into a steamer. She is 22 feet d of 8 feet beam. What number of horsepower int to run her 12 or 15 miles an hour? What be the size of wheele and what the length, width, mber of buckets? Answer: See & imensions pub-n SCIENTIFIC AMERICAN for May 10, 1873.

. O says: We had a new engine cylin-in this spring, 14 by 24 inches, with circular valve w pattern. The supply pipe and governor are 3% In diameter, or about 10inches area, and the steam is between the ports and cylinder are about 9½ area, but the passages above the ports are only os area, and still the designer of the valve persists ig that the valve and passages are exactly right. 70 pounds of steam and run 96 revolutions per

I claim that the steam is wire drawn, and that

J. H. H. says: I am using a horizontal cyl-inder boller. 4 feet in diameter, 12 feet long, with mud drum across back end, 22 inches diameter. Said boller drives a compound engine, working highpressure in up percylinder and condensing in lower. Feed water is taken from condenser for boiler. The inside of mud drum deteriorates by something eating holes in the surface, some of which are large enough to place theend of a finger in, and the bolts which protrude into drum from check valve, blow-off, etc., are eaten off. The boller makes a moderate amount of scale which becomes mostly detached when about 16 inch thick. Pressure of steam 40 pounds. Please give your opinion as to the cause of this corrosion or deterioration of mud drum. An swer: We have known cases of this kind in which the trouble was caused by the lub icating material used in the cylinder, which passed into the condenser and thence into the boiler. We cannot say positively that the corrosion in your boiler occurs in this way, but it is quite probable.

T. E.C. asks: How much resistance is required to stop an ordnarry full steam car going at 3_0 miles an hour? 2. Which is the best patented steam ear brake, the cost of the same, and the cost of keeping it in running order? 3. In how short a space of time can a carrunning at the rate of 30 miles an hour be stop-ped by the best brake? Answeis: 1. The moving force of the car can be ascertained by multiplying its weight by the square of its velocity, in feet per second, and di-viding by 64'4. Suppose a car, moving 30 miles an hour, weight 48,000 pounds. A speed of 30 miles an hour cor responds to 44 feet per second, and the power required to stop the car will be sufficient to raise $[48,000\times(44)^2]$ + 64.4-1,442,981 pounds one foot high. 2. With so many competitors for public favor, it would be out of place for us to name any one as the best. We advise you to correspond with the different manufacturers. 3. In about 10 seconds.

A. W. I. says: I differ from J. E. E. in his reply to H. B., concerning the power required for differ ent sized circular saws. He says that "a saw just large enough to cut through a board will require less power than a saw larger, the number of teeth, speed and thickness being equal in each." Now I am running three saws, one 48 inches with 43 teeth, one 53 inches with 42 teeth, and one 64 inches with 56 teeth, all 8gage in thickness; and I find the 64 inches saw will cut through a 12 or 14 inches cut with less power than either of the others. I differ with him concerning the saw with few teeth cutting the easiest, as my 52 inches saw with 42 teeth takes more power than either of the others; and I run the same hook in the teeth, and file them all exactly allke. My engine is small and timber large, so that I have every facility for finding out which cuts with least power.

W. E. H. says, in reply to S. N. G., who asked for a recipe for crystal gold for dental uses: Take any gold, the purer the better, roll into thin ribbons and dissolve in aq areg a, or 1 part nitric acid and 3 parts hydrochloric acid, by measure. After action has ceased, pour off into a deep glass jar, leaving the silver alloy in form of a chloride. Dilute the clear solution of gold with an equal quantity of water, and slowly add a saturated solution o protosulphate of ircn in water, which precipitates the gold as a brown powder. Pour off the water, etc., wash the powder with several waters, dry it and amalgamate it with mercury to the consistency of samation with alcohol or salt water, and put the mixture into pure nitric acid, setting the dish into a hot sand bith. The acid dissolves the mercury, leaving the gold in form of a sponge, which wash with water and anneal at a red heat for half an hour to expel any traces of acid or mercury. The porosity will depend on the thickness of the amalgam. The softer the amalgam, the lighter the sponge. There are difficulties attending the process, owing to impurity of chemicals, mercury, etc., which are so great as to make it impracticable for an amateur to make the gold as cheaply as he can buy it in the market: but the above directions are reltable, as the wri er has made several lots from this formula.

A. M. asks for a_{11} explanation of the word "penny" as used to describe the size of nails. Answer: In the early history of our country, all nails were wrought (forged by hand); our currency then was pounds, shillings, pence and farthings. Each sized nails were sold by so many pennies per hundred. The usual way was to ask for fourpenny nalls, sixpenny, tenpenny, etc. Hence in mercantile circles, the sizes are designa ted of the price in pennies per hundred. When cut nulls word introduced, the sizes were still designated by pennies; and this has been continued and in all probability will be, as long as nails are used.-J. E. E., of Pa.

C. F B says: In filing hand saws, the majority of mechanics file toward the handle: that leaves the teeth with more bevel on the back side than on the front, which is caused by the taper of the file. A few persons file their saws towards the point, which gives more bevel to the front or cutting side of the teeth. I think that the back side of the teeth should be filed nearly square across; the saw will cut equally well and reinam sharp much longer. The front side of the teeth should be beveled to suit the timber: soft wood requives more bevel than hard wood. Answer: The correspondent is perfecily correct in his idea of filing a hand saw, as it is only intended to cut oneway.-J.E.E. of Pa.

COMMUNICATIONS RECEIVED.

The Editor of the SCIENTIFIC AMERICAN with much pleasure, the ledges ceipt of original papers and contributions upon the following subjects: On Steam and Compressed Air. By-On Retrogression of the Sun. By J.A.B. On the Patent Right Question. By R. H. A. by M. J., by T. W., and by L. G. J. On a New Motive Power. By H. P. J. On the Nebular Hypothesis. By E. H. P. On a Shocking Accident. By J. E. E. On the Case of Stearns, Hill, & Co. By J.F. On a Diagram of the Months. By E. B. W On the Multiplex Telegraph. By J. T. On Steam on the Canals. By S. W. H. Also enquiries from the following : F. J. H. Jr.-R. D. L.-P. A. M.-M. P. J.-Z. S.-P. R. -Y. Z.-E. B.-J. L. McL.-P. A. S.-T. P. P. Correspondents who write to ask the address of Certain manufacturers, or where specifiel art.cles are to be had also those having goods for sale, or who want to find partners, should send with their communications an amountsufficient to cover the cost of publication under the head of "Business and Personal," which is specially devoted to such enquiries.

Scientific American.

(OFFICIAL.) Index of Invention

FOR WHICH Letters Patent of the United S

WERE GRANTED FOR THE WEEK END

July 22, 1873, AND EACH BEARING THAT DATI

[Those marked (r) are reissued Patents.]

Abdominal supporter, J. W. Gurley Axle and sleeve for vehicles, W. H. Sparks..... Bag holder, C. H. Thomas..... Banjo, J. S. Stiles Basket, S. H. Wheeler..... Baskets, cover for fruit, Ingham & Colby...... Beer and yeast, manufacture of, L. Pasteur Belt tension apparatus, S. E. Jewett..... Bevel, carpenter's, S. D. Sargeant..... Boiler, steam, S. Ritty..... Boilers, injector for feeding, W. & C. Sellers..... Boiler injector, W. Sellers..... Bolt heading machine, J. O. Jones..... Boot soles, shaping, J. B. Johnson..... Boring machine, earth, Wilson & Baisley...... Breast cup, A. M. Knapp Bridge, truss, A. Bannister..... Bridge, truss, Hunter & Rice..... Broaching machine, A. P. Stephens..... Buckle, trace, Brayton & Baugh Bureau drawers, fastening for, A. J. Grant..... Can, oyster, C. H. Dexter..... Candle guard, B. Morgan..... Cane stripper, R. C. James.... Car coupling, Beddow & Jackson..... Car coupling, T. Smith..... Car elevator, coal, P. H. Lamey. Car starter, C. J. Moors. Car wheel, railroad, W. H. Paige..... Car window stop, adjustable, C. Page...... Car ventilator opener, J. E. Cross...... Carbureter, F. A. Fisher. Carpet cleaner, H. W. Bates..... Carriage, F. M. Watson..... Carriage seat, J. N. Mi ler..... Cartridge, loading, T. L. Sturtevant..... Chair, reclining, E. Collins...... Chimney, cap, T. Boyd.... Clasp for suspenders, J. W. Smith.... Cloth finishing machines, tray for, A. Woolson... Cluthes line reel, C. Rosenthal..... Clothes pounder, E. S. Saxton.. Clothes reel, J. McMahon..... Coating metals with copper, Gauduin *et al* Compound for cleaning metals, M. McGlenn..... Connecting rod, B. F. Wilson..... Corset, T. S. Gilbert..... Cradle, L. A. Chichester, (r).... Cradle, F. Chichester. Cradle, spring, F. Chichester Culinary apparatus, R. H. Cazier..... Cultivator, O. Kugler Cultivator, O. Kugler Curling iron, Rosenstein & Feder..... Doors, fastening for sliding, E. W. Staples, Jr... Dovetail machine, A. C. Van Alstine..... Drilling machine, coal, J. Grimm, (r)..... Electrotype etching plate, A. & H. T. Dawson ... Engine, air and gas, O. Trossin Engine, rotary, W. P. Eayrs..... Faucet attachment, E. L. Danbar..... Faucet, compound, W. S. Bate Fire escape, J. A. Talpey..... Fire extinguisher, H. S. Maxim..... Fire plug, J. P. Gallagher.... Fires by steam, etc., extinguishing, J.A.Coleman Furnace breast plate, blast, R. A. Fisher Furnace for melting metals, J. Harrison Furnace for roasting ores, L. Stevens..... Furnace, gas, L. Stevens Furnace, gas, L. Stevens..... Furnace, metallurgic gas, J. M. Hartman..... Furnace, puddling, H. McDonald, (r)..... Furnaces, hot air flue for heating, G. R. Barker. the days hereinafter mentioned: Gas, vapor, R. L. Cohen. 141,119 24,963.-FLOUR PACKER.-S. Taggart. Grain dryer, W. F. Morgan 141,160 24.952.-MEAT CUTTER.-J. G. Perry. DISCLAIMERS. Hat pressing machinery, D. Brown...... 140,993 Journal bearing, frictionless, J. Eccles 141,129 Kn1fe, L. Eddy...... 140,997 Wis. Lathe, rotters'. W. Meek...... 141,157 Leather, artificial, H. A. Clark...... 141,117 Leather, artificial, H. A. Clark...... 141,116 Lock, combination, H. Clarke (r)..... 5.497 Locks, seal for, F. W. Brooks Locomotive heal light, P. F. Stout...... 141,133 Loom picking mechanism, W. Townsend...... 141,1.7 Magn. sia, milk of, Phillips & Reid...... 141,167 Medical compound, C. D. Bradley..... 141,030 Milling machine, G. T. Pillings..... 141,912 Music notation, J. P. Powell...... 141,013 Paint for roofing, wood, etc., J. C. & C. M. Bills... 140,991 Paint vessel and package, J. W. Masury...... 141,061

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. 5,500	for the extension of the following Letters Patent.	Hear
. 141,101	ing upon the respective applications are appoint	ed fo

25,874.--BRONZING MACHINE.-G. H. Babcock. Oct. 8. 25 888.-GLASS COFFIN.-J. R. Cannon. Oct. 8. 25,978.--TACKLE BLOCK -I. E. Palmer. Oct. 15. 25,984.--BITSTOCK.-N. Spofford. Oct. 15.

EXTENSIONS GRANTED.

41.915 -CASTING COPPER CYLINDERS.-F. Adams. 24,923.-ELEVATOR.-A. Betteley.

DESIGNS PATENTED. 6,776 to 6,778.-NUBIAS.-H. Boot, Philadelphia, Pa.

TRADE MARKS REGISTERED. 1,572.—SCAEFS, ETC.—Brownson Bros, Chicago, Ill. 1,373.—MEDICINE.—D. Dick, Yew York (ity. 1,374.—MINERAL WATER.—C. & E. E. Dunbar, Waukesha 1,375.-STOVE POLISH.-Fletcher & Co., Lynn, Mass. 1,873.—BRANDY.—H. Imhorst, New York city. 1,377.—STEEL AND IRON —Leng & Ogden, New York city 1,378. - TOBACCO.-Loewenthal & Co., Chicago, 111. 1,379.—SOAFSTONE PACKING.—Sellers Bios., Fulla, Pa. 1,380.—STEELAND IRON.—Sweet & Co., Syracuse, N. Y 1.381 -HEATERS -Gold Heating Co., New York City. 1,382.-STEAM GAGE.-Utica Steam Gage Co., N. Y. SCHEDULE OF PATENT FEES: (in filing each application for a Patent (17 years)...\$15 (in issuing each original Patent.....\$20 On appeal to Commissioner of Patents..... On filing a Disclaimer......\$10

not obtain the full power of engine. Please say live is properly constructed. Answer: We think its are sufficiently large, and that the cylinder ave more area than is absolutely necessary to wire drawing.

". I asks: What is the effective power by 24 inches cylinder stationary engine, running volutions perminute with \$0 pounds steam pressvoiler as shown by gage? By effective power, I he power that would be available for driving achinery after deducting that necessary to run Ine itself. Answer: We could not answer this n otherwise than approximately without a pracst, but we think the engine would develope from horse power.

L. says: The joint between the cylinder we jacket of my engine is badly eaten away, I am unable to make a tight joint with rubber [have tried red lead and iron borings, but it will it a short time. It appears to be eaten away by m or tallow. How can I make a joint that will Answer: You can probably make a permanent utting a groove and driving a rust joint; but it lifficult to break the connection if this is done. ish to make a joint that can be readily broken, sparts filed off. If you think the tallow causes tle, try some other lubricant : but we have an t, if you will get the joint perfectly tight, you e no farther trouble.