ANSWERS TO CORRESPONDENTS

G. W. L. can anneal his lamp chimneys by the process described on p. 42, vol. 26.—C. F. R. will find the directions for transferring pictures to glass on p. 233, vol. 26.—H. C. M. will find a recipe for fireproof paint on p. 331, vol. 29.—F. W. E. can stop the leak in his pipe by the process described on p. 364, vol. 29.—R. A. D. will find a recipe for black ink on p. 106, vol. 27. For violet ink, use a decoction of logwood, to which a little alum or chloride of tin has been added.

S. C. H. says: I have a ½ inch pipe, 2 miles in length; and at one end there is an atmospheric pressure of 10 lbs on the square inch. What amount of time would be required, to produce a pressure of 5 lbs. at the other end of pipe? A. A question of this kind could only be determined by experiment. Formulas have been established for the velocity of discharge of air through long tubes, but the constants have not been determined with sufficient precision to apply to this case. You will find the flow of air through tubes discussed in Weisbach's "Mechanics and Engineering."

W. E. M. asks: How many pounds will a steel screw 2 inches in diameter with ½ inch thread be capable of raising? A. If you mean that the thread is cut half an inch deep, the screw will lift about 60,000 lbs.

G. W. J. asks: 1. How many revolutions does the screw of an ocean propeller make in a minute? 2. How is the screw made to revolve with the desired rapidity? A 1. In the case of large ocean steamers, the number of revolutions per minute is generally between 50 and 65. 2. By having sufficient power in the engines. Governors are commonly fitted, to correct a tendency to change the speed.

F. J. S. asks: How can I prepare mustard with vinegar, for table use? A. The common practice of preparing mustard for the table with vinegar, or still more with boiling water, checks the development of the peculiar principles on which its strength almost entirely depends. Prepare as follows: Mustard (ground) 3½ lbs., water sufficient to form a stiff paste. In half an hour, add common salt, rubbed very fine, 1 lb. Then reduce to a proper consistency with vinegar, grape juice, lemon juice or white wine. A little soluble cayenne pepper, or essence of cayenne, may be added.

L. & H. say: We have a tubular boiler 12 feet long, 34 inches diameter, with 30 three inch tubes. We would like to know how to set it so as to economize fuel. We find our shavings and waste insufficient to run it. It has been suggested to set the grates on a level with the floor, without a front, or at least with a door of full size, so that the furnace may be easily and quickly fed; with the ash pit connnecting with a passage leading outside of building to supply draft. A. We think the plan proposed will answer very well. In regard to grate bars, you had better order them from some manufacturer who makes a specialty of building boilers for places where sawdust and shavings are to be used as fuel.

C. Q. asks: 1. How can I find out when sand contains gold, and how is the gold separated from the sand? 2. What is whiting? 3. What are the proportions of alcohol and chloride of lime used in making chloroform? 4. Is there such a thing as gold wash? If so, how is it made? 5. How can I make lemon soda water, in bottles? 6. Can you give me a recipe for making bronze ink? 7. Can I make alcohol from rotten potatoes? If so, how? 9. What are cornices made of? A. 1. You can see the fine glittering grains of gold, if they exist in the sand, and you can separate them by washing in a pan. This pan is best made with sloping sides, and a circular depression in the center, into which the grains of gold settle, while the sand and earth are washed along on the edge. 2. Whiting is elutorated chalk. 3. Chloroform can be prepared as follows: Chloride of lime in powder 4 lbs., water 12 lbs.; mix in a capacious retort or still, and add 12 fluid ozs. of rectified spirit (strong alcohol). Continuously distil the mixture as long as a dense liquid, which sinks in the water which passes over with it, is produced. Separate this dense liquid, which is chloroform, from the water, agitate with a little sulphuric acid, and lastly rectify from carbonate of baryta. 4. A gold wash can be made by agitating ether with a solution of terchloride of gold for some time. Allow it to repose and pour off the supernatant liquid. When this liquid dries, it leaves a coating of gold. 5. By using a carbonic acid gas generator and a bottling machine, with receptacles for sirup. Soda water is only put up conveniently in this way on the large scale. 7. Grind up bisulphide of tin, or bronze powder, with a little gum water. 8. Not from those portions of the potatoes which have undergone putrefactive fermentation. The sound portions left can be used. 9. Cornices are generally molded in plaster of Paris.

R. T. M. asks: Is there anything that will remove the tattoo marks, made in the flesh with common Indian ink, without leaving a scar? I have heard that they could be made to disappear by first rubbing the marks with a salve of pure acetic acid and lard, then with a strong solution of potash, and finally with hydrochloric acid. Is this so? A. There is little doubt that tattoo marks could be made to disappear by the application of the chemicals you name, but the entire cuticle and something more would undoubtedly be sacrificed in the operation, and we therefore advise you by no means to be imposed on by applying corrosive chemicals to the skin. The difficulty of removing the carbon which lies buried under the outer or scarf skin, without removing the skin at the same time seems unsurmountable, but perhaps some correspondent may be able to suggest a practical and painless method.

A. K. says: I have two upright (external tubes) boilers, connected at steam and feed water. Each boiler is provided with a stop valve on steam pipe, so that either or both can be shut off. I find that, when both valves are closed, the water will fall in the one and rise in the other and run out of safety valve, when the pressure on steam gages indicates the same for each boiler, with no fire under either of them. Can you explain this? 2. Should the bottom of a circulating boiler, such as is used in connection with a cook stove or range, be set higher than the highest part of the water back exposed to heat of the fire; or is it only necessary to have the pipe, that carries the hot water into boiler, higher where it enters boiler than highest part of water back? A. 1. You do not send enough particulars to enable us to answer this question. 2. The boiler should always be kept full of water; and provided there is sufficient pressure in the tank or main to secure this, it probably makes no difference at what point the connections are made.

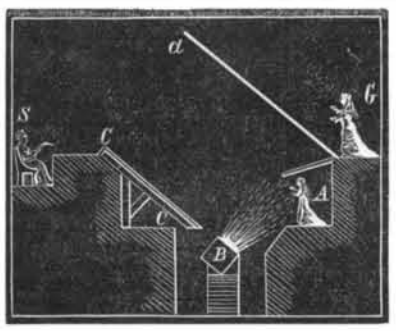
J. W. asks: 1. What are the relative strength and freedom from vibration of two husk frames to carry machinery (especially the burr husks of flouring mills), one built with timbers all standing perpendicular to the base, and the other with the sides vertical? 2. What is the best work for a millwright's guide? A. 1. From your statement it seems to us that you desire to compare two identical arrangements. 2. "Machinery and Mill Work," by Professor Rankine, and "Mills and Mill Work," by Sir William Fairbairn, are both excellent books. Byrne's "Practical Model Calculator" is also a useful work.

H. W. asks: 1. What is the philosophy of soap taking grease spots out of cloth? 2. Is there any profit in manufacturing lemon extract on a small scale, and how is it made? 3. Can you give me a recipe for making an oil for light machinery? A. 1. There is an excess of alkali in the soap. This mixes with the grease on the cloth, and forms more soap. 2. You can readily try it. For an account of the method, see page 331, current volume. 2. It would probably be cheaper and more satisfactory for you to buy it.

L. R. asks: Can you explain the working of a steam trap? A. Steam traps are frequently arranged with floats, so that when they become filled with water to a certain hight, a valve is opened below the water line. Thus the water escapes, but the steam is not permitted to do so; and when the water level is lowered to a given point, the float is not sustained, and the valve closes.

C. J. asks: How can I find the radius of a wheel to make any number of turns, when worked by a worm or a screw, the pitch being given? A. To find the radius of the wheel to make any desired number of revolutions in a given time, knowing the number of revolutions and the pitch of the screw: Multiply the number of revolutions of the screw by the pitch in inches, and divide the product by 6·2832 times the number of revolutions made by the wheel. Example: Suppose a screw with one inch pitch makes 140 revolutions per minute, what should be the radius of the wheel so that it shall make 2 revolutions per minute? Radius = 140 × 1 ÷ 6·2832 × 2 = 11·141 inches, nearly.

J. J. P. asks: How is Pepper's ghost produced? Can I perform the experiment with a common magic lantern? A. The real figure is situated below the stage, at A, and has a strong light thrown on it, from B. C is a mirror, and *a* a piece of plate glass. To a spectator in front of the stage, as at S, the figure appears to proceed from a point G, behind the glass. Really, the figure would appear to be back of the glass as far as the image formed in the mirror was in front of it, and thus the spectator does not perceive the plate glass.



T. thinks that, in the manufacture of shot, the melted lead, when it drops from the top of the shot tower, ought to assume an elongated form, and asks what prevents, or what makes the shot so round. A. The spherical form is due to the addition to the lead of a small amount of arsenic, which hardens the lead and causes it to assume the spherical form when poured through the strainer. The air chills the shot, which falls into the vessel of water below.

O. A. F. asks: 1. How can photographs be taken on another piece of paper without injury to the original photograph? 2. I have a small engine, 1 inch bore x 1⅛ inch stroke; it makes 400 or 500 revolutions per minute with 60 lbs. steam when loaded. The fly wheel is 9½ inches diameter. What is the actual power of it? A. 1. We have seen several recipes for this purpose, but are not sure that they are reliable. 2. The engine, at 500 revolutions, probably developes about one fourth of a horse power. In answer to your steam gage question: It would be possible to test them by such an apparatus as you describe, but great care would be required in the experiments, and it would probably be necessary to apply several corrections for differences of temperature, and variations in the bore of the tubes. A column of mercury, having one inch area of base, and a hight of 2·03759 inches, weighs one pound, at a temperature of 62° Fahrenheit. Every change of temperature will affect the hight of this column, since mercury expands about 0·00010085 of its volume for each degree that its temperature is increased.

W. J. S. asks: 1. What degree of heat is required to hatch eggs? 2. How can I construct an oven for this purpose? A. 1. 102° or 104° Fah. 2. See Science Record for 1873.

J. E. H. asks: How is lard oil made? A. By subjecting lard to pressure. In answer to your other query, enquire for employment in a machine shop, and study Bourne's works on the steam engine.

J. W. F.—Your general design of guide pulleys is correct, except that, unless the connection is very long, it will not answer to have their shafts vertical; but they must be placed at such an angle that the belt will not have a tendency to change its plane of action and thus run off.

T. Y. S. asks: Can a fly wheel be too large for an engine? I have an eighty horse engine which I have been using at only twelve or fifteen horse power. Since it has been doing so little, it has broken the bed plate, loosened the foundation, and otherwise damaged the engine. I use about 80 lbs. of steam. My idea is that the momentum of the wheel is so great that it wants to get ahead of its work, which the steam will not allow, thereby keeping the engine moving on the foundation. A. We have an idea that the trouble arises from improper setting of the engine, or from the fact that you use such a high grade of expansion as to strain the engine seriously.

P. S. asks: Is it dangerous to make oxygen gas (for a stereopticon light) from chlorate of potash and black oxide of manganese? A. If the pipes from the retort and washer are all of liberal dimensions, we think there is little danger. We call to mind a few explosions, one of a very serious nature, due to clogging of the pipes owing to their small dimensions.

M. D. asks: How is it possible that a grindstone can wear away into angles, so that as many as thirteen corners are seen in it? A. There are probably soft and hard places alternately in the stone from which it was cut.

J. E. S. W. asks: 1. How can I dissolve gum so that I can spread it on the soles of leather shoes, and what kind of gum shall I use? 2. What will take ink blots off paper? 3. How can I make a blackboard? 4. What can I make a mold of, to mold a leaden piece to set type in, with a level surface and without flaw? A. 1 You can dissolve India rubber in bisulphuret of carbon, and use it in the way you suggest. 2. Dip a camel's hair brush in dilute oxalic acid and paint the blots over with it. 5. See p. 299, vol. 28. 4. Lead is apt to form flaws in casting. Cast your plate on a smooth piece of iron, with a border of putty or clay.

A. A. B. asks: If a stove has no air to its furnace except what is delivered through an airtight pipe, the other end of which runs into water in a barrel, with a smaller barrel turned bottom up on the water, in the manner of a gas holder: Will the fire in the stove draw air from the barrel and burn it, and thereby allow the smaller barrel to fall down entirely inside of the larger? A. If the air in the chimney is heated, it will be lighter than the surrounding atmosphere; hence the stove will draw air from the barrel, or the barrel will draw air from the chimney, until the weight in each is the same.

C. R. asks: When and where did a race between the Niagara (American) and the Agamemnon (British) war vessels take place? A. We do not find any account of this race, but suppose it took place when the Niagara and Agamemnon were engaged in laying the Atlantic cable. Captain William L. Hudson commanded the Niagara at that time. Possibly some reader may have the particulars.

J. A. E. asks: Can a steam engine give more horse power than its nominal duty? Some persons claim that a 10 horse engine can be geared up to 20 horse power. A. The engines of reputable builders will generally do the work at which they are rated, with a given steam pressure and piston speed. Hence by increasing one or both of these elements of the power developed, the engine could do more.

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

R. R. R.—No. 1, barytes and fluor spar. No. 2, celestine No. 3, analsime. No. 4, limonite. No. 5, magnesite. No. 6, serpentine.

F. H.—Your specimens are crystals of quartz. Quartz is pure native silica, and is an important constituent of granite and other rocks, and of ordinary sand. The transparent variety, like the two larger specimens, is called rock crystal.

J. R. C. asks: Can you give a simple practical rule for finding the exact position of the wrist in the shaft of a nail machine?—C. F. S. asks how to make a blue stamping ink for marking knitted goods.

COMMUNICATIONS RECEIVED.

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

On the Science of Iron and Steel. By C. C. Jr.

On the Currency. By J. W. H.

On Reconstructing the Navy. By W. Y.

Also enquiries from the following:

J. B. H.—C. G. E.—J. C.—McG. & H.—S. H. A. F G. R. & B.—S. P.—F. G.—R. H. M.—W. A. B.—J. H. A. M.—E. H.—H. R.—C. E. H.—W. L. R.

Correspondents in different parts of the country ask: Who makes life boats from willow and cork? Whose is the best shingle machine? Who builds lime kilns? Where can I get stave machinery? Where is oil well boring machinery sold? Whose is the best cement for making corundum wheels? Who makes a hand willow peeler? Who makes a good velocipede, or a similar machine to be worked by the hands? Who makes platinum plates for Smee's batteries? Who makes steel runners for ice boats? Makers of the above articles will probably promote their interests by advertising, in reply, in the SCIENTIFIC AMERICAN.

Correspondents who write to ask the address of certain manufacturers, or where specified articles are to be had, also those having goods for sale, or who want to find partners, should send with their communications an amount sufficient to cover the cost of publication under the head of "Business and Personal" which is specially devoted to such enquiries.

[OFFICIAL.]

Index of Inventions

FOR WHICH

Letters Patens of the United States

WERE GRANTED IN THE WEEK ENDING

November 18, 1873,

AND EACH BEARING THAT DATE.

[Those marked (r) are reissued patents.]

Alarm, overflow, T. Mayes	144,687
Bag fastener, S. R. Bush	144,738
Bale tie clamp, T. D. Leonard	144,776
Bale tie, cotton, F. Quarles	144,793
Barrel heads, making, J. L. Kilgore	144,771
Barrel making machinery, C. Ruggles	144,635
Bed bottom, S. B. Freeman	144,754
Bed bottom, spring, W. C. McGill	144,688
Bee hive, J. R. East	144,750
Belt hole scupper, B. L. Wood	144,816
Billiard table, S. H. Waldie	144,716
Blackboard rubber, P. B. Horton	144,674
Boats, propelling, Black & Jones	144,732
Boiler, milk, O. Zwicker	144,819
Boiler, steam, G. G. Lobdell	144,778
Boiler, wash, W. H. Hammond	144,761
Boiler, wash, R. Lawyer	144,774
Boiler, wash, W. Reinemer	144,795
Boiler water gage, C. G. & B. M. Martin	144,686
Bolting machine, H. Cabanes	144,739
Boot soles, trimming, R. C. Lambert, (r)	5,661
Bottle stopper, H. S. Lesher	144,777
Box, paper, E. M. Slayton	144,800
Brick, method of burning, T. Billesbach	144,652
Bridge girder, J. W. Evans	144,751