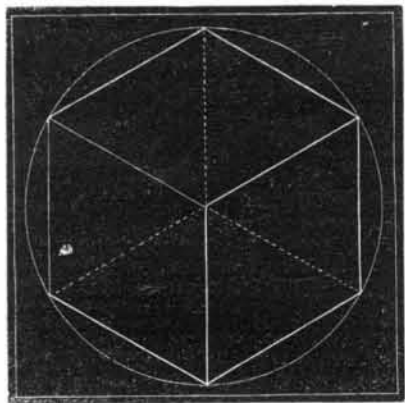


rather the area, of the piston of which is equal to the sum of the others. Answer: To determine the power of the hydraulic press, measure the diameters of the pump plunger and the ram of the press.

J. K. asks: Is it safe to use any remedy, when chemicals are used, to remove scales from boilers? Answer: Mechanical means are always to be preferred, in the removal of scale once formed, whenever they can be employed.

To E. E.—To form a perfect cube in perspective, inscribe a regular hexagon in a circle, then connect each alternate angle with the center by a radius. This will give a cube.



To W. G. B.—This communication was received too late to comply with request relating to an earlier note. The desire of our correspondent is, however, fully complied with in our last remarks upon the subject of the balance wheel.

J. H. D. says: A friend claims that, if a weight of 40 lbs. be put on a wagon axle (which is 200 lbs. on each wheel), the pressure is the same on the top of the wheel as on the bottom; while I assert that, if there are 14 spokes in the wheel, there is just one fourteenth of the weight on the top.

X. Y. Z. says: Will some one inform me what causes sinks, hollows, or low places in brass castings? Answer: The defects you speak of are due to various causes, such as uneven shrinkage, molds not thoroughly dried, etc., but principally uneven pouring and too little pressure in the metal from the pot.

J. G. W. sends a mineral specimen and says: The piece I send you is broken off from a larger piece weighing 3/4 of a pound. It was found while excavating for a cellar and was embedded about three feet below the surface, in a soil composed of sand and clay.

S. S. W. C. says: I am using a plain slide valve engine, 10 by 24 inches. The valve cuts off about two thirds of the stroke. Is it possible to set the eccentric so as to cut off sooner and still give sufficient lead, without changing the length of the valve? Answer: The engine referred to is probably as well arranged as will be found possible.

C. asks how to make a machine to sand paper wood. Answer: Use canvas belts strongly sewed together at the ends. The threads may be so tied together as to leave the face on emery side of belt perfectly smooth and level.

M. H. B. asks: How can I work a blue color into soap? Answer: Ultramarine and smalts or zafre are the materials used; the pigment ought to be stirred into the soap when the latter is in the mold.

S. L. A. says that a steel square which he had kept oiled has lost its temper, and asks if oil affects the temper. Answer: The simple covering with oil cannot effect the hardness and elasticity of steel.

B. St. J. says: I am running a steam saw mill. When getting up steam after the boiler is cold,

there is a thumping or pounding, like striking with a heavy hammer, from the time we get 5 lbs. of steam till we have 40 lbs., when it ceases. What is the cause of said pounding? The boiler is a large flue boiler, four feet in diameter and eighteen feet long.

D. M. O. asks: Is there any process by which grained sugar can be made from sorghum? Answer: The attempts to make granulated sugar out of sorghum have not proved economical.

J. K. M. asks: What is the most powerful bleaching process, and how can I apply it for bleaching an animal substance? Answer: The best bleaching agent for ordinary purposes is chloride of lime.

J. P. C. says: I wish to illuminate a magic lantern with an electric light; what is the best battery to use, and what is the number of cups? Are there any magnetic or other machines that would answer the purpose? Answer: It is difficult to arrange the electric light without employing Foucault's lamp, and this is expensive.

J. F. asks for directions for testing bleaching powder (chloride of lime)? Answer: It is not easy for anyone but a professional chemist to test bleaching powders. The directions for accomplishing an accurate analysis are given in Fresenius' work on quantitative analysis.

W. E. G., of Ky., sends a mineral specimen, asking what it is, and of what use. Answer: It is pure galena, the great lead ore of commerce.

J. M. W. asks for a demonstration of the manner in which a bird rises through the air without exertion on its own part, and states that this will open a new field for perpetual motionists. Answer: If you have read the SCIENTIFIC AMERICAN carefully, you will know that a bird does not rise without exertion on its own part, and you will have a wholesome dread of anything further on the subject of perpetual motion.

F. A. K. says: A lever L has its fulcrum at the angle; the power moves the upper part, and the pressure is exerted perpendicularly at the right hand extremity of the lower part. Another lever, of similar dimensions and with its fulcrum similarly placed at the left hand extremity of its lower part, is of shape L. Which will exert the greatest pressure? Answer: The latter, or L form.

E. M. asks: What cheap preparation can I use to make a box water tight against either hot or cold water? Answer: Dip the box in hot paraffin.

J. B. W. asks for information with reference to the commission for observing the transit of Venus next year. Who has it in charge, and what has been published with reference thereto? He suggests that a table of contents for each number would be a valuable addition to our paper.

C. M. asks if anthracite coal is injured by exposure to the weather, or by immersion in water? Answer: It has soaked in water for some days without any increase in weight. It is carbon soluble in any liquid without chemical change.

A. G. T. says: I read the article on the use of arsenic in paper hangings, etc., and its effect on the health. I have a large case of stuffed birds in my sitting room, which are, of course, prepared in arsenic. Do you consider them injurious to the health of the occupants of the house; and is the profession of taxidermist an unhealthy one?

D. W. P. says that he and another person have a dispute as to whether the heat of the sun's rays is increased by passing through plain glass of uniform thickness. "I hold that it is not; he says that it is."

W. S. B. asks: Am I right in supposing that a cubic foot of atmospheric air, at a pressure of say one pound to the square inch, would, at a pressure of two pounds to the square inch occupy a space of two cubic feet and so on, and is it the same with all other gases? What is the best rule for determining the pressure of water at different heights?

H. C. S. asks if frost will follow down an empty pipe, covered at the top, so as to freeze at six or

twelve inches below the frost level. Or, will a hydrant freeze, if the pipe is empty and the cut off valve is from six to eighteen inches below where the ground is frozen? Answer: If both the pipe and the hydrant are empty, what is there to freeze?

J. L. asks: Is the air which is injected into the receiver or heater of the calorific engine warmed by the exhaust before it is injected or not? Also, is the rigidity of a frozen road bed the only cause of the rails breaking? It is denied by some scientific authorities that iron is less tenacious when it is frosty.

E. H. B. says: The water in Lake Michigan, at one point, is nearly two feet lower now than it was in June, 1871. Some persons have an idea that the wearing away of Niagara Falls and the changing of the current in Chicago River is the cause; but I am of the opinion that it is caused by the action of the elements or by evaporation.

C. A. M. says, in answer to A. J. query 3, page 10, that horn is clarified by first putting into boiling water, and, when thoroughly heated, it is placed upon a wooden pin of a convenient length, and scraped from the tip downwards, removing a shaving the whole length of the horn at each stroke of the shave.

R. B. M. says, in answer to E. S. S., query 3, page 59: Jacket your pipes with asbestos paste, one half inch thick, and then protect the paste by a cover of thin boards or tin; charcoal pulverized, or any other non-conducting material will answer for the jacket.

A. G. C. query 24, page 59, can temper his taps in the following manner: After hardening, polish the bottom of one of the cutting grooves until it is bright (an old fine cut file will answer); then place the shank of the tap in the tongs, with point of the tap from you and the polished groove on the upper side.

C. M. says, in answer to W. L. L., who asked for an explanation of the configuration of frost crystals on windows: The crystalline forms which the vapors of a room assume, while being condensed on the cold panes of a window, depend mostly on the surface condition of the glass.

H. M. W. says: C. A. de S. wants to be helped in his indexing. Having had to index 29,000 words, I think I have a right to speak about it. In the first place, I got hold of a somewhat stiffish paper (old ledger paper is excellent); then I cut it into slips of convenient size (1 inch by 2 inches will be about right).

A. G. C., on page 59, asks how to temper taps. He must first of all bear in mind that a tap is simply a series of cutters on a bar; hence the cutting parts must be uniformly hard enough to cut, and the base soft as possible to insure durability.

ward until the right color is attained. This, too, depends on quality of steel and the size and make of the tap, and lastly the purpose for which it is intended.—P McC.

W. A. W. says, in answer to J. E. S. (query 22, page 10), who asked how to make a boiler for a small steam engine, to be heated by a common stove: Anything that you can make tight, with heating surface enough to make the requisite amount of steam, will answer the purpose.

J. W. says, in answer to J. E. S., page 378, volume XXVII, and W. G. B., page 27, volume XXVIII, on transmission of motion: I would say that it is simply absurd to refute a thing we have not seen practically tested. W. G. B. seems to be a true disciple of doubting Thomas, and much like the man who, when he heard of the first iron ship being built, swore it would sink.

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 Equatorial Protuberance of the Earth. By J. H. On Aero Steam Engines. By D. B. T. On Flux and Reflux. By R. W. On the Action of Water on the Turbine. By J. B. R. On a Unity of Action by Inventors, concerning Foreign Patents. By J. A. B. On the Wheel Question. By H. E. M. On Protection from Fire. By H. & B. On Financial Science. By N. L. On Tidal Water Power. By W. B. S. On the Astronomy of the Ancients. By C. A. L. On the Motions of the Sun. By A. D. On the Mineral Wealth of Virginia. By W. De H. On Marine Camels. By E. S. F. On the Servant Question. By L. C. G. On the Use of River Water for Extinguishing Fires in New York. By W. B. D. On the Detection of Explosive Oils. By J.

[OFFICIAL] Index of Inventions FOR WHICH Letters Patent of the United States WERE GRANTED FOR THE WEEK ENDING January 7, 1872, AND EACH BEARING THAT DATE. [Those marked (r) are reissued patents.]

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 Retissue.....	\$30
On application for Extension of Patent.....	\$50
On granting the Extension.....	\$50
On filing a Disclaimer.....	\$10
On an application for Design (3 1/2 years).....	\$10
On an application for Design (7 years).....	\$15
On an application for Design (14 years).....	\$30

Bag holder, J. B. Brown.....	134,637
Bag fastening, mail, W. J. Stowell.....	134,571
Bayonet attachment, J. W. Neil.....	134,608
Bed bottom, spring, J. L. Secomb.....	134,614
Beehive, D. Loofborough.....	134,687
Bee hives, honey box for, Johnson and Barker.....	134,674
Bell ringer, steam, West and Parker.....	134,719
Blower for grates, F. McCarthy.....	134,556
Boiler steam, F. A. Woodson.....	134,720
Boiler, sectional steam, Babcock and Wilcox.....	134,505
Bone black, revivifying, A. Lonsky.....	134,686
Book, memorandum, H. M. Hinadill.....	134,546
Boat heels, C. V. Glidden.....	134,588
Boots, machine for, C. H. D. D., and F. M. Blake.....	134,584
Boring machine, N. R. & A. P. Merchant (r).....	5,222
Bottlestopper, A. Hebbard.....	134,600
Bracelet fastening, F. Kursh.....	134,681
Brick machine, E. R. Hubbard.....	134,672
Bridge bit, J. Letchworth.....	134,684
Burial casket, S. Stein.....	134,570
Canal boats, propelling, A. Amos.....	134,801
Canal boat, G. B. Martin.....	134,555
Canejuice with sulphurous acid, J. Dymond.....	134,655
Car coupling, J. W. Bates.....	134,629
Car coupling, J. L. De Good.....	134,648
Car coupling, C. H. Kendall.....	134,676
Car coupling, B. Moore.....	134,695
Car coupling, street, J. Stephenson.....	134,616
Car spring, R. M. C. Parker.....	134,701
Car spring, J. W. Culmer.....	134,646
Car spring, railroad, J. W. Culmer.....	134,645
Car axle bolt, H. G. Downs.....	134,594
Caraxie, lubricating, J. R. Morris.....	134,696
Car seat, railroad, A. Barney.....	134,627