F. D. H. asks: 1. How many Grove's cups are required to heat a fine platinum wire to redness? 2. Does it require quantity, or intensity of electricity to accomplish this result? Answers: 1. The electricity from a No. 1 cell of Grove's battery, if passed directly through a piece of platinum wire one quarter of an inch long and one four-thousandth of an inch in diameter, will heat it to redness. 2. Quantity.

J. M. W. asks: If gunpowder be enclosed in a very strong glass tube, leaving no waste space, and then exploded, would (provided the tube did not burst) all the powder explode? If it did, would the resulting gases remain as such, or would they be changed into a solid? In short, what would be the result of the explosion? Answer: We think this experiment has never been tried. If there were no waste space and no air in the tube, no explosion would take place, for although gunpowder contains in itself a quantity of oxygen sufficient for its combustion, the gases thereby produced must have room for expansion in order to produce an explosion. A patent was once taken in England for transporting gunpowder safely by placing it in airtight vessels filled with some neutral gas like carbonic acid, which does not support combustion. But this was a useless device. To ascertain the resultants from the explosion of a given quantity of gunpowder, the latter is commonly suspended within an iron globe several times larger than the charge, and the air is then exhausted. The powder is now fired by electricity, and the chemist ascertains the nature and quantity of the gaseous and solid products. The solids are mainly carbonate and sulphate of potash; the gases, nitrogen and carbonic acid. The sudden heating and expansion of the latter gives the mechanical effect.

J. K. asks (1) how to straighten a circular saw when it gets sprung. 2. Is there a chemical preparation to sharpen worn out files? Answers: 1. No instructions for straightening saws that will assist any one can be given. It is an art only attainable by practice. 2. There are various processes of using acids for sharpening files. I have tested three of them, but my experience is that they are more trouble than benefit. The cheapest way, all things considered, is to sell the worn out files and buy new ones. It will not pay even to get them recut, for filing tempered steel.—J. E. E., of Pa.

J. B. asks: What factory turns out the greatest number of locomotives? Answer: The Baldwin works, Philadelphia. Pa.

C. G. D. asks: 1. Does the law offering the reward for the improved canal boat for use on the Erie canal require the wheels and apparatus to be so constructed that the banks shall not be washed? 2. What does a boat cost, exclusive of engine and neeessary machinery? 3. Is it probable that this season will decide the question? Answers: 1. A device that would injure the banks of the canal would not be likely to take the State reward of $100,000. 2. A common canal boat costs, we believe, about $1,000. 3. This season will probably decide the reward question.

E. McD. asks: Is there such a blessing as a clockwork fanning machine, for keeping a body cool? Answer: Yes, any quantity of them. Makers will do well to advertise them in the SCIENTIFIC AMERICAN.

S. H. asks: If I make the cores of a common sized electro-magnet extend ½ inch beyond the end of the spools in front, will the magnetism be as strong at the poles, when a current excites the cores, as though the cores were not extended? Answer: No, the magnetic force will be a trifle less.

C. H H. asks for a method of covering pulleys with leather. What sort of leather and what sort of glue should be used? Answer: Ordinary belt leather will answer quite well. Secure it to the face of the pulley with small belt rivets. For information as to the process lately described in the SCIENTIFIC AMERICAN, address the patentee.

J. O. E. says: 1. An engine pumpis 6 inches in diameter and 1½ feet stroke. The sucker is a flat one. When all the air is shut off, it makes a loud crack in the pipes, as if it was going to break everything to pieces. 2. What is the best solution to make solder adhere to old copper pipes and to tin? Answers: 1. We cannot answer this, as we do not know what our correspondent means by the air being shut off. 2. For soldering copper pipes, use sal ammoniac or chloride of zinc. For tin, resin or chloride of zinc.

W. E. F. says: We use 8 cords of pine (Jersey) wood daily. Price $3. Nut hard Schuylkill coal can be delivered at $7.25 a ton. Which is cheaper? Answer: The wood is probably the cheaper fuel of the two. If your furnace is so constructed that you can burn wood or coal without change, you might try the experiment. General results sometimes fail to be realized in special cases; and whenever the test of experiment can be readily applied, it should be done.

J. E. W. says: In your reply to V. M. K. regarding the relative power of the same machine with either a 20 inch or 10 inch driving pulley at the same surface speed, did you not lose sight of the extra friction produced in the journals by the necessarily closer hug of the belt to the smaller pulley in order to transmit the same power? Answer: In each case the belt is transmitting the same amount of power, and consequently has the same strain, as its speed is unchanged.

B. says: A cubic foot of anthracite weighs about 95 pounds. Will some one state the number of cubic feet per tun of the various sizes in common use, "nut," "stove," "egg," etc.? By measuring the coal bin, we can then decide whether we have full weight or not. Answer: From the average weights of a great variety of coals, we obtain as a mean result, for broken coal of almost any size: Anthracite, 38 5, and bituminous, 40, cubic feet per tun of 2,000 pounds. Probably many of our readers may have made observations on weight and bulk of different kinds of coal, and if they will send us their figures, specifying kind of coal, size, and weight in pounds per cubic foot, we will tabulate them, and publish them in our columns. If a sufficient number of replies are received, we shall be enabled to form a very interesting and valuable table.

E O. W. asks what is the best substitute for nitro-glycerin for blasting purposes? Answer: Dynamite is a good substitute for, or a rather a safer means of using, nitro-glycerin. If you want a powerful and dangerous explosive, use picrate of potash, either alone or combined with an equal quantity of saltpeter.

M. M. W. asks: How many pounds pressure does the water, (coming from the reservoir in your city) exert at the outlet of a half inch faucet? Answer: This depends upon the amount of water in the reservoir, the part of the city, and the height of faucet from ground. It varies every hour in the day. The fact that Croton water is often able to rise, in pipes, to the fifth floor of a house will enable you to get some idea of the pressure, remembering that a column of water 33 feet 9 inches high exerts a pressure of 15 lbs. to the square inch.

J. C. asks how many revolutions per minute an engine 6x18 inches must run to get the most power? Answer: The speed at which you can run the engine, provided you have sufficient boiler power, depends upon how well the running parts are balanced. If the engine is well designed in this respect, 100 revolutions will not be too fast.

J. P. L. asks how to tin small brass articles. Answer: The process employed in tinning small brass articles, such as pins and hooks, is to boil them in a solution of one part cream of tartar, 2 parts alum, and 2 parts common salt, in 12 parts of water. In this bath is placed a sufficient quantity of granulated tin. They can afterwards be polished with sawdust or bran and tow.

A. P. asks: 1. Is there any cheap substance known which, mixed with water, will make the same evaporate more rapidly, at the ordinary temperature, than the water would of itself? 2. Has any one metal the property of making water evaporate from its surface more rapidly than another? Answer: We should advise you to employ vacuum pans or some other method of diminishing the pressure of the atmosphere, if heat can be used. If not, keep the air in rapid circulation. If the quantity is small, place it under a receiver, and near it place fused chloride of calcium or oil of vitriol. If the quantity is large, try the German method with brine, called graduation.

R. F. says, in reply to R. A. C., who asked for a remedy for bleeding at the nose: I will give one obtained from Dr. Gleason during a course of lectures; it is a vigorous motion of the jaws, as if in the act of mastication. He advised us, in the case of a child, to make a wad of paper, put it into the child's mouth, and instruct it to chew it hard. Of course an adult does not need the paper. It is the motion of the jaws that stops the flow of blood. This remedy is so simple that people sometimes laugh when I recommend it, but I have never known it to fail in a single instance, even in very severe cases.

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

J. W. S.—The specimen is chiefly mica, with a little felspar. It has no value.

J. R.—We think it is corundum.

G. S. K.—Iron pyrites. Their only use is in making oil of vitriol.

C. D. M.—Copper pyrites.

D. Van B.—Tourmaline.

J. McM.—Quartz; of no especial value. Perhaps agates, suitable for mounting as ornaments, may be found in that locality.

J. J. F.—The rock you send contains some pyrites, iron, alumina, silica, etc. An assay will cost $10 or $15.

J. D. A.—Limestone.

DELTA sends us a specimen of chrome red (American vermilion) and asks how it can be prepared. Answer: Liebig and Wöhler state that it is best prepared by fusing together, at a very low red heat, equal parts of potassium and sodium nitrates, gradually pouring into the fused salt small quantities of chemically pure yellow chromate of lead. After cooling, the insoluble chrome red is washed and dried. It is then a magnificently colored, cinnabar-like crystaline powder. Professor Dulong prepares chrome red by precipitating a solution of acetate of lead with a solution of chromate of potassa to which caustic potassa has been added. Various shades from deepest to palest vermilion red are caused by the difference in size of the constituent crystalline particles. According to Dr. Dufios, its formula is $2PbO, CrO_3$.

COMMUNICATIONS RECEIVED.

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

On an Auroral Phenomenon. By J. D. B.

On Pressure Gages and Safety Valves. By E. D. S.

On the Natural Rights of Inventors. By T. W.

On Iron Steam Yachts. By J. H.

On Retardation of the Earth's Rotation. By J. H.

On Fresh Water Crayfish. By J. S.

On the Patent Discussion. By E. A. B., by M. J. and by M. J. D.

On Embryology. By J. L.

On Mechanical Elements. By F. M. McM.

On the Roper Engine. By H. S. W.

Also enquiries from the following:

T. R. J.—A. O.—J. S. T.—C. R.—B. L.—R. L. S.—A. M.—J. P. D.

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 Patent of the United States

WERE GRANTED FOR THE WEEK ENDING

June 24, 1873,

AND EACH BEARING THAT DATE.

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APPLICATIONS FOR EXTENSIONS.

Applications have been duly filed, and are now pending for the extension of the following Letters Patent. Hearings upon the respective applications are appointed for the days hereinafter mentioned:

25,565.—ROLLING MILLS.—J. & G. Fritz. September 10.
25,569.—BEDSTEAD SLATS.—T. Howe. September 10.
25,572.—MOLDING WATER TRAP.—J. A. Lowe. Sep. 10.
25,586.—BURGLAR ALARM.—A. Q. Ross. September 10.
25,588.—STEAM PUNCHING MACHINE.—J. Sparrow. Sep. 10.
25,640.—STEAM BOILER.—J. Harrison, Jr. September 10.
25,683.—HYDRANT.—C. L. Stacy. September 17.
25,796.—JACQUARD MACHINE.—A. Babbett. October 1.
27,539.—GUN BARREL.—J. H. Burton. September 10.

EXTENSIONS GRANTED.

24,531.—GAS RETORT.—W. Beaumont.
24,563.—COUCH FOR RAILROAD CAR.—C. Knight.
24,588.—HAY SPREADER.—J. C. Stoddard.

DESIGNS PATENTED.

6,711 & 6,712.—CENTER PIECES.—B. Dreyer, Phila., Pa.
6,713 to 6,720.—CARPETS.—A. Heald, Philadelphia, Pa.
6,721.—JEWELRY BOX.—E. C. Moore, Yonkers, N. Y.
6,722.—FURNITURE.—T. W. Moore *et al*, New York city.
6,723.—LOCK FRONT.—E. J. Steele, New Haven, Conn.
6,724.—DRAWER PULL.—L. Widmayer, New Britain, Conn.
6,725.—BARBER'S FOOTSTOOL.—F. J. Coates, Cincinnati, O.
6,726 to 6,733.—STOVE PLATES.—S. H. Ransom, Albany, N. Y.
6,734.—HANDLE SOCKET.—J. S. Ray, East Haddam, Conn.

TRADE MARKS REGISTERED.

1,329.—MEDICINE.—F. W. Barnum & Co., Danbury, Conn.
1,330.—VARNISH BRUSH.—E. Clinton & Co., Phila., Pa.
1,331 & 1,332.—PLUG TOBACCOS.—Liggett *et al*, St. Louis, Mo.
1,333.—WINES AND LIQUORS.—Morrow & Co., N. Y. city.
1,334.—COSMETIC.—W. T. Wenzell, San Francisco, Cal.
1,335.—STOCKING SUSPENDER.—C. A. Shaw, Boston, Mass.
1,336.—PAINT.—H. P. Webb, New York city.
1,337 & 1,338.—OILS.—Devoe Manufacturing Co., N. Y. city.
1,339.—FOUNTAIN PUMP.—J. A. Whitman, Cranston, R. I.

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 application for Extension of Patent	$50
On granting the Extension	$50
On filing a Disclaimer	$10
On an application for Design (3½ years)	$10
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