

zinc of next, and so on, and an interrupted current to produce the static effects required. See "Galvanic Batteries," in SUPPLEMENTS, Nos. 157, 158 and 159. Also "How to Make Induction Coils," SUPPLEMENT, No. 160. 2. How can a cracked lamp be mended so the oil will not leak through? A. Clean the glass thoroughly with strong hot solution of sal soda, warm, and apply over the parts inside and out the following: Resin, 3 parts; caustic soda, 1; water, 5; boil together until completely saponified, then mix with half its weight of plaster of Paris. 3. What kind of wax is it that engravers use to at the metals that are to be engraved upon by nitric acid? A. White wax, 2 oz.; black and Burgundy pitch, of each, 1/2 oz.; melt together; add by degrees powdered asphaltum, 2 oz., and boil until a drop taken out on a plate will, when cold, break by being bent double two or three times between the fingers. It must then be poured into warm water and made into small balls for use. 4. Is copper better for a boiler, 6 inches diameter and 12 inches long, than iron? A. Yes. 5. Is the pressure in the cylinder the same as in the boiler? A. No; it is always less, and how much less depends on the length and size of the steam pipes and the manner in which they are protected.

(18) I. K. E. asks: Can waterglass in small quantities be prepared for experiments without expensive apparatus? A. Fine quartz sand, 2 parts; carbonate of soda, 3/4; reduce to fine powders, mix, and heat to a very bright red in a crucible capable of holding four times as much. As soon as the mixture is in a state of calm fusion pour out on an iron plate to cool. For use dissolve in hot water.

(19) H. G. E. asks: Cannot eggs, butter, etc., be kept for a considerable period by having them in a vacuum? Could a brick vault be cemented so as to be air tight, and capable of sustaining exterior atmospheric pressure? Would an air pump be the best way of exhausting the air? A. It is not practical; they would doubtless remain unchanged in a perfect vacuum, but that is unattainable by any ordinary means. Such a vault could be constructed; the pressure from without would be equal to about 15 lb. on each square inch.

(20) C. G. W. writes: I am led to believe that the cultivation of and gathering of such sumac as grows naturally in this sandy country would be a profitable industry. The stag horn sumac (Rhus typhina) grows here in abundance, other varieties to some extent. A. The best sumac of commerce is the leaves of the Rhus coriaria, cultivated in Sicily. It closely resembles the R. typhina, or stag's horn sumac, which has proved, when properly handled, to be nearly if not quite as valuable. See article on sumac, on page 199, vol. XXXVI, SCIENTIFIC AMERICAN.

(21) C. D. A. writes: 1. I have heard good engineers say that the friction of a valve depended entirely upon the size of the ports, and if there were no ports in the seat, a valve might be held against it, and when the steam was admitted, if the support was removed the valve would drop down; is this true? A. It would drop down. 2. I always supposed that the size of the valve determined the amount of friction. A. The friction depends upon the size of the valve, deducting so much of the ports as may have steam within, and the pressure upon the unbalanced surface of the valve.

(22) S. B. G. asks: Does a large wheel have any advantage in power over a small one in overcoming the friction on the axle, the axle and load being the same, and running on a smooth level surface? A. Yes.

(23) H. C. M. writes: I notice in vol. XLV., No. 24, page 378, of SCIENTIFIC AMERICAN, article 8, a formula for making oxygen gas for inhalation. Can you tell me whether it is the same as is used by physicians in Philadelphia? A. Probably. 2. Can water be recharged with it, and if so, how? A. By passing the gas through cold water under pressure the quantity of oxygen it normally contains may be slightly increased. On exposure to the atmosphere or heat the oxygen thus taken up will soon escape again. 3. If not, how can it be used other than in the manner given in the paper referred to? A. We know of no other way of using it. There is no liquid solvent for oxygen that will take up enough of the gas to be of practical service in the way you propose.

(24) W. H. asks: 1. Of what kind of silk are balloons made? A. Good common undyed silk will answer. 2. What kind of oil are they prepared with? A. Usually a mixture of boiled oil and wax, thinned with turpentine. 3. How are the seams made air tight? A. The seams are "felled," waxed, and varnished inside and out. 4. Will gas keep its lifting power for one week, or longer? A. Yes, if kept in a perfectly air-tight vessel. In an oiled silk balloon envelope as usually constructed, no.

(25) J. B. B. writes: 1. A claims that a hollow shaft equal in diameter to a solid one has more strength in driving machinery than the solid shaft. B claims that the solid shaft, equal in diameter to the hollow one, is the strongest. Which is right? A. If of the same diameter, the solid shaft is the strongest; if of the same weight, the hollow shaft is the strongest. 2. What steam pressure is considered in getting the nominal horse power of a steam engine? A. The average pressure in the cylinder. 3. Is it not advisable to give a slide valve as small a stroke as possible, provided you get sufficient port opening? A. Yes.

(26) D. B. M. writes: I have a copper boiler, 36 inches long, 12 inches in diameter, 1/4 in thickness, no flues. What would be the highest pressure to run with safety? A. Without knowing more of its construction we could not say. 2. Would a two horse power engine, with the above boiler, afford sufficient power to run one of Edison's generators to supply one of his lamps? A. Your boiler will not supply a two horse power engine, it is not equal to one horse power except it be driven very hard. 3. What would such a generator lamp, etc., probably cost? A. They are not in the market. You should write the inventor in regard to them.

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

M. F. M.—No. 1. Tremolite—calcium-magnesium silicate.

No. 2. Blue glass. No. 3. Calcium aluminum silicate. No. 4. The habitation of some insect—the material is chiefly lime carbonate. No. 5. Marcasite—FeS₂—with a coating of iron oxide. No. 6. Magnetite and hematite. No. 7. Argentiferous (silver bearing) galena. No. 8. Chiefly lead oxide. No. 9. Iron, alumina, and silica, with possibly a trace of silver.—E. S. B.—The gravel contains no precious metals—only mica and pyrites.

COMMUNICATIONS RECEIVED.

- On a Mysterious Boiler Explosion. By W. A. D.
On Ripening Melons Underground. By I. T. B.
On the Wax Myrtles. By J. P. S.
How to Mount very Small Lenses. By C. M.

[OFFICIAL.]

INDEX OF INVENTIONS

FOR WHICH Letters Patent of the United States were Granted in the Week Ending February 8, 1881.

AND EACH BEARING THAT DATE.

[Those marked (r) are reissued patents.]

A printed copy of the specification and drawing of any patent in the annexed list, also of any patent issued since 1866, will be furnished from this office for one dollar. In ordering please state the number and date of the patent desired and remit to Munn & Co., 37 Park Row, New York city. We also furnish copies of patents granted prior to 1866; but at increased cost, as the specifications not being printed, must be copied by hand.

Table listing various inventions and their patent numbers, including items like Air compressor, Gun, rocket, N. E. Rice, and many others.

Table listing various inventions and their patent numbers, including items like Fanning mill, H. Keller, Farm gate, A. Miller, and many others.

Table listing various inventions and their patent numbers, including items like Pump piston, W. Burlingham, Punch, metal, S. H. Jenkins, and many others.

DESIGNS.

Table listing designs and their numbers, including items like Carpet, J. Nell, Hair ornament, A. Proger, and others.

TRADE MARKS.

Table listing trade marks and their numbers, including items like Bitters, A. Dryfoos, Cigars, A. Estlow, and others.

English Patents Issued to Americans.

Table listing English patents issued to Americans, including items like Barrel hoops, machine for nailing, E. Cole, B'klyn, N. Y., and others.