amount of water. From which could we obtain the most power, or would it be the same? A. The friction of water in pipe increases with the length with given heads. The shorter pipe gives the most power. See the "Power of Water, or Hydraulics Simplified," in SCIENTIFIC AMERICAN SUPPLEMENT, No. 788.

(3056) R. P. writes for a recipe for making and flavoring sirups for soda fountain. It is one of the older kinds. It has no gas reservoir, but the gas is formed by the combination of two chemicals, one in the flavor and the other in the fountain. What proportions of tartaric acid, flavoring and simple sirup in the flavoring extracts, and how much soda to a gallon of water in the fountain? A. For each quart of liquid use 4 drachms tartaric acid and 5 drachms bicarbonate of soda, all in powder. For simple sirup use 35 parts water to 65 parts sugar. Flavored sirups are very numerous. For sarsaparilla add to three gallons of simple sirup, 3 ounces extract of sarsaparilla, 2 ounces essence of sarsaparilla, 1 ounce extract licorice root, 1 ounce citric or tartaric acid. Color, if desired, with caramel. Use in quantity to suit taste, about 1 part to 5 of soda water.

(3057) T. D.—The estimated cost to fire a full round from one of the British war ship Victoria's great guns is about $2,500. These are 110 ton guns, the largest in the British navy. The charge is 960 pounds of powder and a projectile of 1,800 pounds. No full round has yet been fired. Next to the above are the 12½ inch guns of the Japanese navy lately tried at a stated cost for each round of $2,000. The cost of firing per round for the Chicago's 8 inch guns, using the cheapest kind of projectile, namely, cast iron shells, is $65.25; with steel projectiles the cost would be increased to $212.

(3058) H. S. writes: I live almost on latitude 29°. The sun never gets over 23°25′ north of the equator. Why is it that it seems to rise in the northeast and set in the northwest? I confess it puzzles me. A. The apparent daily motion of the sun is parallel with the equatorial plane. At the equinoxes the sun rises and sets east and west at all latitudes, save at the poles, where it skims the horizon all around the circle. As its declination increases, its point of rising and setting also moves to the north of east and west, increasing with the latitude, so that when it reaches its maximum of 23½° it makes an entire circuit of the horizon at latitude 66½°. You should be able to demonstrate this condition with a small globe.

(3059) J. M. asks: Can you give me recipe for making black preparation for filling brass engraved sign? A. Use black sealing wax melted into the engraving by heating the plate, then carefully scrape the surface and heat to glaze the sealing wax.

(3060) J. F. S. asks: Do you know of some chemical mixture, paste or process, to prevent steel from welding or sticking fast to wrought iron, when making a steel casting? The wrought iron piece is placed in the mould, and is used as a key, the steel is pored into the mould at a temperature of 3,000° to 4,000°. The wrought iron key should be loose after the casting is made. A. Wash the key with a thick cream of porcelain clay and thoroughly dry before placing in the mould.

(3061) H. L. H. asks: Can you give me any directions for a formula for the preservation of flowers? I wish them to retain their shape and color as nearly as possible. I have tried alcohol, but they lose their color when exposed to the light. A liquid is preferable. A. It is difficult to retain all of the color. The best method is to dust salicylic acid on the plants as they lie in the press and remove it again when dry. Another method is to use a solution of 1 part salicylic acid in 14 of alcohol by means of blotting paper or cotton wool.

(3062) A. D. F. asks: What can be used to soften the first covering of linen that is gummed to the body of an Egyptian mummy, so as to remove the cloth without injuring or dissolving the skin? A. The mummy was embalmed with bitumen, which can be softened with chloroform. Proceed very slowly, gradually unwrapping the linen and applying the chloroform to the outside and to the place where the linen is stuck together on the inside.

(3063) C. D. P. asks: Please tell me how to loosen the sliding crooks of a horn when they become corroded. A friend of mine has a horn in which nearly all the crooks have become stuck and cannot be gotten out. A. Soak the joints of the horn with kerosene oil. If necessary blow some oil inside so as to reach the joints. If one crook can be got out, the oil can be put in through the opening.

(3064) J. B. writes: I would ask for a recipe to lacquer brass on doors. A. For lacquering brass.—Make the surface perfectly clean of grease or dirt. Lacquer with a thin solution of shellac in methylic alcohol, color with dragon blood gum to suit taste, and decant the clear lacquer. Use a camel's hair brush, and if possible heat the articles to about the temperature of boiling water.

(3065) C. F. K.—You will see articles on artificial stone and its manufacture in SCIENTIFIC AMERICAN SUPPLEMENT, Nos. 154, 325, and 355.

(3066) E. H. S. asks the various uses to which sand and borax are put, in the process of welding steel and iron. A. You will find an interesting article on welding in SCIENTIFIC AMERICAN SUPPLEMENT, No. 47.

(3067) E. J. H. writes: Mr. Werner Langguth, writing to the *Engineering and Mining Journal*, states that oxygen gas produced by adding a few drops of a cobalt salt to a strong solution of bleaching powder will be perfectly pure. Will not the gas be wet, and consequently contain traces of the chemicals in solution? If so, how can these impurities be removed on a small scale, inexpensively, so as to render gas safe for inhalation? A. Purify the gas by passing it through strong solution of caustic soda.

(3068) J. D. asks: What is the best gold dip for brass or fine gold lacquer? A. Gold dip for brass.—A thin decanted solution of shellac in methylic alcohol. Colored with dragon blood and saffron, more or less of either to suit your taste.

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Tube scraper, H. Gillmore 452,938
Twine bobbins, tension regulator for, E. E. Biedeman 453,073
Twine cutter, G. A. Kerr 452,009
Type bar bearing, J. D. Mason 452,847
Type writing machine, W. J. Barron 452,825
Type writing machine, J. Becker 453,166
Type writing machine, A. B. Reid 452,984
Urinal, Johnson & Kruse 453,118
Valve and gear, cut-off, B. F. Fitch 453,173
Valve, cut-off, W. H. Laurie 452,978
Valve for automatic brake mechanism, triple, F. Moore 453,154
Valve for heaters, etc., duplex eccentric, J. Dreisorner 453,109
Valve operating gear for gas, petroleum, or other similar engines, C. Gramm 453,080
Valve, piston, W. D. May 453,017
Valves, machine for refitting, C. F. Hall 453,001
Vapor or oil burner, J. J. Buhoup 452,861
Vehicle running gear, G. W. Farrell 452,915
Vehicle, side spring, E. H. Carpenter 452,990
Velocipedes, package carrier for, C. H. Lamson 452,977
Ventilator, W. Wright 453,057
Vermifuge, J. McCrossie 453,063
Vessel loading and unloading apparatus, A. McDougall 453,155
Wagon running gear, D. H. Turnbull 452,814
Wall protector, W. H. Jones 452,863
Washboard, J. H. Lapham 452,884
Washing machine, C. E. & F. L. Hutcheson 452,788
Washing machine, W. H. Turnbull 452,135
Watch key, R. H. Franklin 453,168
Water closet bowl, J. C. Beekman 452,963
Water closets, double flush tank for, J. C. Beekman 452,962
Water closets or other constructions, valve for, J. Vosburgh 453,069
Water or other motor, J. Nielsen 453,128
Water purifier, E. Bretney 453,105
Water wheel, F. M. Bookwalter 452,829
Water wheel, F. Trump 452,813
Well drilling machine, Krassin & Boucher 452,878
Wheel. See Fifth wheel. Metallic wheel. Trolley wheel. Water wheel.
Wheel, W. N. Stroud, (r) 11,168
Whiffletree, E. Haiman 453,146
Wire coiling reel, J. McIlvried 452,889
Wire drawing machine, J. F. Ellis 452,837
Wire mat, B. Scarles 452,923
Wire reel, barbed, Beresford & Bedson 453,139
Wire strands, mechanism for forming, G. P. Rishel 453,066
Wire tightener, J. L. Buckingham 453,106
Wrench, Ohnstrano & Gustafson 452,907

DESIGNS.

Ax, C. W. Hubbard 20,771
Carpet, A. F. Reddie 20,783
Finger ring, E. P. Beach 20,772
Hammer, tool, J. F. Shannon 20,777
Radiator, T. H. Williams 20,780