

nary limit. A. You should speak of a "110 volt circuit," there is no such thing as a "110 volt current." The resistance must exceed the quotient obtained by dividing the resistance of a single lamp by the number of lamps on the leads in question. Otherwise the safety fuses will melt or the house wire become too hot. A 20 ohm resistance will pass 55 amperes, and hence should be placed upon at least a ten-lamp lead, or the safety fuses may melt. A German silver wire No. 7 will be of sufficient size for this current, and 3,000 feet will give the desired resistance. The "Arithmetic of Electricity" is now ready for delivery by us, \$1 by mail.

(3077) A. R. L. asks whether chloride of silver can be changed to nitrate or metallic chloride, and how to do it? A. Yes. Place it in dilute sulphuric acid with some metallic zinc. This will reduce it to metallic silver if enough zinc is added. This may then be washed and dissolved in nitric acid, evaporated to dryness and fused at very low heat to give pure nitrate of silver. The fusion may be dispensed with.

NEW BOOKS AND PUBLICATIONS.

THE ARITHMETIC OF ELECTRICITY. By T. O'Connor Sloane, Ph.D. Pp. 138. 12mo. Norman W. Henley & Co., New York. Price \$1.

This little book is a manual of electrical calculations by arithmetical methods, and contains, first of all, an introductory chapter explaining some of the principles of electricity, giving the relations of absolute and practical units, and examples of the principal ones taken from actual objects. The second chapter treats of Ohm's law in a concise manner, giving six different versions of this fundamental theorem. There are chapters on resistance and conductance, with many rules and problems; on potential difference, containing much good information on leads and wiring for arc and incandescent systems; on the measurement of conductors by circular mills and on many other topics; a chapter on the arrangement of battery cells, and general calculations for battery current, treats this subject in full detail. The electro-magnet, dynamos, and motors come in for their share of attention. All the calculations in the book are done arithmetically, algebra being left out entirely. The problems are stated in a series of rules accompanied by examples fully worked out. Each rule is generally followed with a formula embodying its statement. The simple system of calculating dynamos and motors deserves especial notice. The tables of equivalents, wire gauges, and other factors contained by the book are newly calculated and will be found very convenient. This little volume shows a great deal of careful work, and will prove of great value to both the professional and amateur electrician.

TO INVENTORS.

An experience of forty years, and the preparation of more than one hundred thousand applications for patents at home and abroad, enable us to understand the laws and practice on both continents, and to possess unequalled facilities for procuring patents everywhere. A synopsis of the patent laws of the United States and all foreign countries may be had on application, and persons contemplating the securing of patents, either at home or abroad, are invited to write to this office for prices, which are low, in accordance with the times and our extensive facilities for conducting the business. Address MUNN & CO., OFFICE SCIENTIFIC AMERICAN, 361 Broadway, New York.

INDEX OF INVENTIONS

For which Letters Patent of the United States were Granted

June 2, 1891.

AND EACH BEARING THAT DATE.

(See note at end of list about copies of these patents.)

Table listing inventions such as 'Adding machine, Richardson & Heath', 'Advertising device, S. D. Jackson', 'Air compressor, O. A. Clark', etc., with corresponding page numbers.

Table listing inventions such as 'Cable gripping mechanism, J. B. Stetson et al.', 'Can. See Sprinkling can.', 'Cane and umbrella, combined, S. J. & J. Knox', etc., with corresponding page numbers.

Table listing inventions such as 'Ledge, mechanical, J. A. Langstroth', 'Leg, artificial, J. B. Kreier', 'Light, spirit, F. Sobeloff', etc., with corresponding page numbers.

Table listing inventions such as 'Telegraph receiver, C. Langen-Davies', 'Telegraph, sextuplex, T. A. Edison', 'Telephone circuit, W. W. Jacques', etc., with corresponding page numbers.

DESIGNS.

Table listing designs such as 'Ax blade, J. M. Diero', 'Ballot box, J. Pettibone', 'Bottle, W. Indiger', etc., with corresponding page numbers.

TRADE MARKS.

Table listing trade marks such as 'Ale, ginger, H. L. Mills', 'Boots and shoes, leather dress for, S. A. White', 'Canned fruits, vegetables, meat, and fish, Portland Packing Co.', etc., with corresponding page numbers.