

rule to go by, that I never saw or heard of one. A. The question put to you was a very crude one. There is no rule for the wear of boilers, this depending upon the use and abuse of them, as well also as the quality of the metal. The kind of water used is also to be considered. Acidulated water as found in some parts of the country eats away a boiler very fast. Outside rust also thins the sheets and tubes in boilers not in constant use.

(4633) W. W. H. writes: We are putting up a good sized coffee roasting plant and desire to put in a floor, fireproof, that will not break or crack when heavy iron trucks are run over it—something cheap and durable. A. Assuming the floor is on the ground, we recommend a cement concrete not less than 4 inches deep, and on this lay an asphalt and sand floor 1 inch deep. Just enough asphalt to make the sand solid, laid hot.

(4634) A. B. asks how to harden aluminum, sheet and wire, extremely hard and elastic, just like tempered steel? A. Aluminum cannot be tempered like steel. It can only be hardened by hammering, by making a hard alloy, and by slowly cooling. By the slow cooling process springs have been made of pure aluminum. See Richards' work on "Aluminum and its Alloys," \$5 mailed.

(4635) J. H. W.—Nut locks have been profitable to a few inventors. There are a large number of patents on this device. The kind mostly in use are very cheap, perhaps 5 cents per pound. A short, quick-running siphon may have the discharge end out of water. Long siphons should always have the end immersed.

(4636) Insects from Flagstaff: Reply by Professor C. V. Riley.—The insects sent comprise a number of specimens of the common cabbage plant louse (Aphis brassicae). This species is found upon a number of cruciferous plants, but owing to the fact that it feeds on the underside of the leaves, it is frequently difficult to reach with the ordinary insecticide sprays. The best mixture to use against it is the kerosene soap emulsion, made according to the formula on page 3, of circular No. 1, Division of Entomology, Second Series, published about a year ago in the SCIENTIFIC AMERICAN and a copy of which is sent herewith. The apparatus commonly used in such cases is one of the knapsack pumps fitted with a stiff rod or lance which will reach from the hand of the operator to the ground, and upon the extremity of which is soldered an upturned cyclone nozzle, so that the spray may be thrown easily on the underside of the leaves.

(4637) T. R. B. asks: Which of the metals copper, brass, zinc or galvanized iron will undergo the greatest expansion and contraction in a temperature varying from 125° to 135° Fah.? A. Zinc expands and contracts most of all the common metals, and very evenly between any temperatures below 212°. Brass next, and iron the least of those mentioned.

(4638) J. C. S. asks: Will you tell me about the amount of steam pressure an ordinary glass fruit jar will stand? A. Ten pounds. 2. Can glass receive as high and uniform a polish and surface as lead, copper, zinc or steel? A. Yes.

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INDEX OF INVENTIONS

For which Letters Patent of the United States were Granted December 27, 1892, AND EACH BEARING THAT DATE.

[See note at end of list about copies of these patents.]

Table listing inventions with names and page numbers, including items like 'Addressing mail matter, machine for, C. A. White', 'Air cooling and purifying apparatus, G. E. Proctor', 'Alumina, apparatus for making, H. W. Shepard', etc.

Table listing inventions with names and page numbers, including items like 'Briek press steam heater, B. C. White', 'Bridge gate, E. Della', 'Brush, bottle, A. Zolper', 'Brushes, device for use in the manufacture of leather bound, C. R. Baker', etc.

Table listing inventions with names and page numbers, including items like 'Inked ribbons, method of and apparatus for making, G. W. Bishop', 'Inkstand, C. G. Knott', 'Inlaid work for decorative purposes, manufacture of, H. A. Cousins', etc.

Table listing inventions with names and page numbers, including items like 'Springs, method of and apparatus for, making leaf, O. F. Freeman', 'Square, folding, E. De Camp', 'Steam jointing machine, W. J. Wright', etc.

DESIGNS.

Table listing designs with names and page numbers, including items like 'Bottle or flask, W. T. Murphy', 'Breastpin, H. A. Pistorius', 'Chair, A. Casiraghi', etc.

TRADE MARKS.

Table listing trade marks with names and page numbers, including items like 'Antipyretics and antineuralgics, Lehn & Fink', 'Antiseptics, Allaire, Woodward & Company', 'Antiseptics and disinfectants, Schering & Glatz', etc.