

C. H. S. asks: How can a piece of iron, 1/4 inch thick, be hardened on one side? A. Probably it can be done with potassium.

M. R. B. asks: How can common cast iron be plated with tin? A. Clean the iron, cover it with muriate of zinc, and dip into melted tin.

T. S. says: My house burnt down, and some \$20 gold pieces were tarnished by scooping them up, carrying them in an iron pot, and cooling by pouring cold water on them. Has the said gold been injured, and should the banks require a discount on such gold? How can I remove the brown color to give them the same appearance as before? A. Your gold has not been injured. You can remove the tarnished appearance by rubbing with jeweller's rouge, until there is a silk polish.

P. T. S. asks: The cast iron water back in my range, which has been in use about six months, continues to rust the water badly. The manufacturers of the range state that they never knew such a case. Can you suggest any remedy? The water used is soft water, rain water from a lead cistern. Would it be practicable to galvanize or nickel plate a new water back? Would not such treatment effectually prevent rust? A. If the water back is in constant use, it seems likely that the trouble arises from some outside connection. It would not cost much to galvanize the water back. Probably any good plumber could have it done for you.

C. F. M. asks: What is the best solvent for India rubber, and what (if any) for tanned leather? A. There are various solvents for rubber. One of the best and cheapest is bisulphide of carbon. We are not aware that tanned leather has ever been reduced to solution by any chemical solvent.

N. R. asks: How much water would a wooden pipe discharge per minute, under a head of 30 or 40 feet, the pipe being from 4 to 10 miles long? A. See our article on "Friction of Water in Pipes" on p. 48, vol. 29, for formula applicable to all cases.

A. H. asks: Where do fleas breed? A. Chiefly in dust, the fine of textile fabrics, oldrags, etc. Cleanliness in the household and fresh air will hinder their multiplication. Oil of pennyroyal will drive them from any particular locality.

R. F. asks: What is infusorial earth? A. It is earth which contains the remains of minute animals.

J. W. asks: What power can I obtain by using an undershot water wheel, 10 feet wide, with 3 1/2 inches fall? What are the most economical proportions for such a wheel, namely: diameter, number of buckets, and depth of shrouding? A. You should consult a water wheel manufacturer.

M. M. asks: Will the applying of brakes to driving wheels of engines have greater tendency to check the speed of a single engine than if applied to the trucks of the tender? If the power now applied to the trucks of the tender be applied to the driving wheels, will the speed of the engine be checked any quicker? A. We think it would be better to apply the brake to the trucks of the tender.

W. H. asks: 1. Of what is non-explosive gunpowder composed? 2. Can you tell me of a good renovating mixture for cloth clothing? 3. What is meant by a saturated tincture? 4. What does this mean: "Add water three ozs., and ammonia till slightly in excess?" A. 1. A process of rendering gunpowder temporarily innoxious has been tried in England. It consisted in mixing fine glass dust with the powder. What you refer to may be something similar. 2. A little curd soap dissolved in water and mixed with a little clarified ox gall is a good cleaning mixture for clothes. 3. A tincture in which the alcohol will dissolve no more of the solid or liquid in solution. 4. In chemistry, generally, a body is said to be in excess when more has been added than is necessary for a given reaction, solution, or decomposition.

COMMUNICATIONS RECEIVED.

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

- On Nail Biting and Finger Sucking. By C. M.
On Steam on the Canals. By A. and by W. M.
On Creeping Rails. By H. H. P.
On Magic Squares. By E. W.
On Machinists in the Navy. By J. Q. A.
On Devil Fish. By J. T. N.

Also enquiries from the following: J. C. V.-A. N. P.-C. L. Z.-W. T.-J. R. D. W.-T. J. McC.-G. G. P.-J. W.-W. S. S.-R. M. P.-R. U. S.-N. W. Y.-J. N. P.

Correspondents in different parts of the country ask: Who makes machines for molding candles? Who makes rodometers? Who makes machines for cutting tobacco? Who is the best coal heating apparatus? Who makes milliard table cushions, that can be attached to a common table? Who makes shoe peg making machines? Who makes a wheel for grinding bayonet grooves? Who sells a family flour sifter? Makers of the above articles will probably promote their interests by advertising, in reply, in the SCIENTIFIC AMERICAN.

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 IN THE WEEK ENDING December 30, 1873,

AND EACH BEARING THAT DATE.

[Those marked (r) are reissued patents.]

Table listing inventions with names and dates, including Air, compressing, J. Ericsson; Alarm, burglar, J. J. Kane; Baletle, cotton, L. Well; Barrels, forcing hoops on, J. Greenwood.

Table listing inventions with names and dates, including Bed bottom, spring, H. A. Hight; Bevel rest, J. E. Seavey; Bit stock, L. Feely; Blade for agricultural implements, W. Scott; Boiler connection, sectional, J. B. Root.

Table listing inventions with names and dates, including Safe and vault, J. Crump; Sash fastener, J. D. Shewell; Sash holder, S. Chard; Saw filing machine, W. W. Parsons; Saw, scroll, J. B. Wright; Sawing machine, D. R. Pratt.

Table listing inventions with names and dates, including Applications for Extensions; Trade Marks Registered; Designs Patented; Schedule of Patent Fees; Canadian Patents; List of Patents Granted in Canada.

Table listing inventions with names and dates, including 2,974.-W. O. Grover, Boston, Suffolk county, Mass.; 2,975.-G. Calcott, Thorold, Welland county, Ontario; 2,976.-N. P. Slade, Rockford, Winnebago county, Ill.

Table listing inventions with names and dates, including 2,987.-R. S. Jarvis, Toronto, Ontario; 2,988.-W. Dunlop, Toronto, Ontario; 2,989.-B. T. Nichols, Rassel, Union county, N. J.; 2,990.-F. E. Dixon, Toronto, Ontario.