

About seven years has been claimed for an entire change in the material of the human body. 2. Would it do to use sheet iron instead of plastering in a dwelling house? Our idea would be to cover it with two or three thicknesses of paper. A. Sheet iron will make a poor finish for the interior of a house. We cannot recommend it. 3. What power would be required to lift 160 pounds, using an 8 inch and a 4 inch drum on the same shaft, so that the rope winds up on the large drum while it unwinds from the small? I am an invalid and am trying to invent an apparatus to lift me. A. It requires 80 pounds at periphery of the larger drum. 4. How many pounds will a 1/4 inch, also a 1/2 inch rope lift without breaking? A. The breaking strain of a rope 1/4 inch diameter is very uncertain, from the value of material, and make 1/2 inch from 75 to 100 pounds, 1/2 inch from 300 to 400 pounds.

(4405) N. W. asks: 1. What use is made of old steel rails? Can they be rerolled into good new rails? I asked this question about three months ago, but no reply. A. There is a good market for old steel rails for rerolling and for forgings for heavy machinery. 2. Is there any good coking coal or anthracite coal in sufficient quantity for extensive mining purposes in the United States west of the Mississippi River? If so, where located? A. Good coking coal is found in Missouri, Kansas, Indian Territory, Colorado, New Mexico, Montana, and Washington. The coke manufacture is fast increasing in those States. There are small beds of anthracite in Colorado and Arkansas.

(4406) C. W. N. writes: Tell F. W. S. No. 4337 that if he will take an ordinary three-cornered file and grind it to a point, keeping the edges sharp a little way back of the point, he can bore a hole in plate glass with it by simply turning it with a brace and lubricating it with turpentine. Operate as though about to bore a hole in a bit of wood. I have a single gas burner that reaches out into the room from the wall and have made a queer discovery while playing with it. When turning off the gas very slowly the other evening, and when the flame had almost disappeared, only a thin line of blue remaining, it commenced to buzz like a big fly. What was the cause of the noise? Ask your readers the significance of the peculiar shape of the prow of the gondola. A. The gas burner produced what is known as the musical flame. The sound is due to a series of explosions occurring regularly.

(4407) O. S. J. asks: Are there any cheap substances which might be used for bleaching bagging, which do not require to be washed out afterward? Permanganate of potassium is said to be used, and the color of the manganese oxide discharged by means of sulphurous acid. A. Gaseous chlorine largely diluted with air might do the bleaching. It should be followed by treatment with gaseous sulphurous oxide. 2. Are there any cheap preparations besides rubber and gutta-percha which when applied to bagging would make it waterproof and at the same time flexible? A. To make it really waterproof under the conditions stated, India rubber is about the only effectual application. 3. I should also like to know of a substance like the above, but white. A. Palmitate of aluminum has been recommended for waterproofing, but seems to have met but limited application.

(4408) E. R. J. asks: By what formula may I find quantitative analysis of a silver 25 cent piece, knowing the qualitative contents of the alloy, without the slightest injury, or altering of, by cutting or scratching the silver piece? I worked out a very simple specific gravity and algebraic formula, but lost it years ago. A. If only two constituents and of known specific gravity are in the coin, proceed as follows: Weigh the coin in air and then in water. Let a = weight in air in grammes. b = " " water " c = specific gravity of silver. d = " " copper. z = weight of silver in coin.  $dca-dcb-ac$  Then we have  $x = \frac{dca-dcb-ac}{d-c}$

(4409) E. E. L. asks: What can I add to crude coal tar naphtha that will effectually disguise its odor or will deodorize it, and will not be expensive? A. Deodorization will be difficult. One method is to distill, rejecting the first and last portions of the distillate. Another is to treat it with a mixture of oil of vitriol and potassium bichromate, decant, wash and distill if necessary.

(4410) J. P. says: Please let me know what is the velocity of light and the velocity of electricity? Which travels faster, as I would like to know on account of a dispute which arose on that subject? Could you let me know how it is proved, and by whose theory? A. Light has a velocity of about 187,000 miles per second. Electricity is supposed to be a phase of ether disturbance and its velocity as a current is the same as that of light. It however takes some time for a current to attain full strength at the end of a length of conductor, and hence arise the different estimates of its so-called velocity. See Ganot's "Physics," \$5 mailed, for experiments and theory.

(4411) W. D. H. asks how draughtsmen make white letters on black ground. A. Take flake white and mix with water to the thickness of ink. Use with a pen.

(4412) A. L. W. asks: Which will bear the most weight, a hollow bar of round iron or a solid bar, each of the same size in diameter? If the hollow iron is the strongest, why is such the fact? A. The solid bar of iron is the strongest and will bear the greatest load. Pipe is only strongest for equal weights. The additional size required for equal weight gives a pipe greater stiffness and stability for almost any use.

(4413) I. L. W. says: I desire to obtain a rule which is simple and practical, without recourse to trigonometry, for the measurement of the pitch of a propeller wheel of the screw pattern. I am unable to find two rules alike, or two persons who use like rules, or who obtain exactly the same results in similar cases. A. To measure the pitch of a propeller screw approximately and near enough for all practicable purposes

for small boats, take a carpenter's rule and lay one leg on the outer edge of the propeller blade and move the other leg parallel with the shaft and with this angle strike off two lines which shall represent the angle of the blade. Then multiply the diameter of the screw by 3.1416, which will be the circumference of the revolving blades. With this distance, measure at right angles to the line representing the shaft, to meet the angular line representing the track of the blade. The distance from this line along a line of the axis to the angular intersection first drawn is the pitch of the screw.

(4414) W. L. K. asks: Is there a way to print in bronze, or gold gilt direct, without having to use a brush or bronzing pad? I see a great deal of such work which looks as though it had been printed direct from type or rule. What puzzles me the most is to know how to print badges and do a nice job. A. We know of no way to print in bronze or gold gilt without using the bronzing pad. Most badges are printed in gold leaf on a bookbinder's press. You can make a fair-looking job by printing with a good quality of gold ink.

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

May 31, 1892,

AND EACH BEARING THAT DATE.

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

Table listing inventions with names and patent numbers. Includes entries like 'Addressing machine, G. S. Couch', 'Alarm, automatic, burglar, H. M. Man-waren', 'Automatic alarm, N. Rubenstein', etc.

Table listing inventions with names and patent numbers. Includes entries like 'Cock or tap, Andre & Durand', 'Comb, See Curry comb', 'Compressor, roller, J. L. Myers', etc.

Table listing inventions with names and patent numbers. Includes entries like 'Lasting machine, C. P. Lawrence', 'Latch, A. & F. E. Richardson', 'Leaf stripping machine, J. L. Myers', etc.

Table of advertisements and prices. Includes items like Toaster, Tobacco hoisting device, M. & C. W. Guerra, etc.

DESIGNS. Advertising coupon, G. H. Drew, Badge, M. C. Barbero, Baker, potato, C. H. Beeman, etc.

TRADE MARKS. Anesthetic for painless extraction of teeth, local, Howe & Dills, Antiseptics, Clinton Pharmaceutical Company, etc.

A printed copy of the specification and drawing of any patent in the foregoing list, or any patent in print issued since 1863, will be furnished from this office for 25 cents.

Advertisements. Inside Page, each insertion - - 75 cents a line. Back Page, each insertion - - - \$1.00 a line.

LATHE advertisement with image of a lathe and text: 'Seneca Falls Mfg. Co. 695 Water St., Seneca Falls, N.Y.'

Improved Screw Cutting LATHES advertisement with text: 'Sebastian Lathe Company, 44-46 Central Ave., Cincinnati, O.'

The Sebastian-May Co. Improved Screw Cutting LATHES advertisement with image of a lathe and text: '165 to 167 Highland Ave., SIDNEY, OHIO.'

THOMAS ALVA EDISON.—A BIOGRAPHICAL sketch of the great inventor, with full-page portrait from a recent photograph.

TOOL AGENTS WANTED advertisement with text: 'E. D. OTIS, 1028 N. HALSTED ST., CHICAGO, ILL.'

Lightning Plater advertisement with image of a plating machine and text: '\$5 to \$15 per day, at home, selling LIGHTNING PLATER and plating jewelry, watches, tableware, etc.'

2nd MACHINERY advertisement with text: 'N. Y. Mach'y Depot, Bridge Store 16, Frankfort St., N. Y.'

The Shimer Cutter Heads advertisement with image of a cutter head and text: '45,000 SOLD. To work Car Siding, Flooring, Ceiling and Ship Lap; to Mould Doors, Sash and Blinds. Cope Heads to match.'

THE TRASK WATER MOTOR advertisement with text: 'THE TRASK WATER MOTOR, the best motor on the market for running light machinery of any kind.'

USE GRINDSTONES? advertisement with text: 'If so, we can supply you. All sizes mounted and unmounted, always kept in stock.'

SMITH'S Cling Stone Peach Cutter and Stoner advertisement with image of a peach cutter and text: 'is now on the market. Patented 1873, 1887, 1892.'

JENKINS' UPRIGHT CUSHIONED POWER HAMMER advertisement with image of a power hammer and text: 'Users of this hammer sustain us in saying that it has no equal in all good working qualities.'

LIGHTNING WELL-SINKING MACHINERY advertisement with image of a well-sinking machine and text: 'Hydraulic Jetting, Artesian, Diamond Prospecting Tools, Engines, Boreholes, Wind Mills, Pumps, Encyclopedias, 1,000 engravings, Earth's Strata, Determination quality water; mailed, 25c.'

"THE TRIUMPH" BOILERS BEST & CHEAPEST advertisement with image of a boiler and text: 'SMALL SIZED STEAM HEATERS, HOT WATER HEATERS AND STEAM GENERATORS. SEND FOR CATALOGUE. RICE & WHITACRE MFG. CO. CHICAGO.'

Pneumatic Tire Bicycles. Every One Guaranteed. Send for Catalogue. Agents Wanted. KIRKWOOD, MILLER & CO. 16 South St., Peoria, Ill.

Fine Taps, Dies, Reamers, etc. LIGHTNING advertisement with image of a tap and text: 'Lightning and Green River Screw Plates, Tap Wrenches, Bolt Cutters, Hand and Power Drilling Machines, Punching Presses, and other Labor Saving Tools.'

WOODEN TANKS advertisement with text: 'FOR RAILROADS, WATER WORKS, MILLS, FACTS, COLLEGE STOCKS OF LUMBER, ETC. W. CALDWELL & CO. No. 217 E. MAIN ST. LOUISVILLE, KY.'

SPECIAL NOTICE! advertisement with text: 'Two handsome photo-engraved display sheets entitled "Recent Improvements in Air Compressors," "Recent Improvements in Rock Drills," mailed free to any one who will cut out this advertisement and mail it to us with his name and address.'

CATALOGUES FREE TO ANY ADDRESS advertisement with image of a catalog and text: 'GOODNOW & WIGHTMAN, BOSTON'

"THE SINTZ" GAS AND GASOLINE ENGINES advertisement with image of an engine and text: 'Stationary and Marine. Makes its own supply of gas from gasoline, and at less expense than any other engine.'

CLARK SINTZ, MFR., Springfield, Ohio. advertisement with image of an engine and text: 'RIFE'S AUTOMATIC HYDRAULIC ENGINE OR RAM SUPPLYING WATER FOR Irrigation, Small Towns, Railroad Tanks, Factories, Steam Mills, Dairies, Country Residences, Stock Yards, etc.'

RIFE'S AUTOMATIC HYDRAULIC ENGINE OR RAM advertisement with image of an engine and text: 'Rife's Hydraulic Engine Mfg. Co., Roanoke, Va.'

ROCK DRILLS AIR COMPRESSORS & MINING TUNNELING advertisement with image of a rock drill and text: 'RAND DRILL Co 23 PARK PLACE NEW YORK'

THE MAN OF SCIENCE: HIS METHODS and his Work—An address before the fraternity of the Sigma Xi. Cornell University. An interesting review of the status of science and of the work that has been and is to be done by the scientist. Contained in SCIENTIFIC AMERICAN SUPPLEMENT, No. 835. Price 10 cents.

NICKEL AND ELECTRO-PLATING Apparatus and Material. THE Hanson & Van Winkle Co. Newark, N. J. 81 LIBERTY ST., N. Y. 28 S. CANAL STREET, CHICAGO.

GRAINING.—Wall's "Practical Graining" contains the different woods imitated in graining, together with practical descriptions. Price \$2.50. Send for descriptive circular. House Painting Co., P. O. Box 1113, Philadelphia, Pa.

THE PREMIER CAMERA advertisement with image of a camera and text: 'IS THE BEST IN MARKET. Simple of Manipulation. Plates or Films are used. The Shutter is always set. PRICE \$18.00.'

ROCHESTER OPTICAL COMPANY, 14 S. Water St., ROCHESTER, N. Y. advertisement with text: 'WE MAKE ALL KINDS OF CAMERAS.'

STEEL, IRON, COPPER, ZINC, BRASS, TIN, And all other Metals Perforated as Required for Grain Cleaning and Mining Machinery, Woolen, Cotton, Paper and Pulp Mills, Rice, Flour and Oil Mills, Sugar and Malt Houses, Distilleries, Filter Presses, Stone, Coal and Ore Screens, Brick and Tile Works, Filters, Spar k Arresters, Gas and Water Works, Oil, Gas, and Vapor Stoves, Coffee Machinery, etc., etc. THE HARRINGTON & KING PERFORATING CO., Chicago, and 244 Pearl Street, New York.

NOISELESS ROTARY FANS. These fans can be fastened to ceiling, and driven by a round belt directly from a Backus Water Motor, Steam Engine, or other power. By changing angle of blades amount of air can be regulated. Two or more fans can be connected on ceiling. The Backus Patent Fans are noiseless, and found invaluable in meat markets, restaurants, dining rooms, bakeries, hotels, etc. They will keep your place cool and free from flies. Write for special circular to Backus Water Motor Co., Newark, N. J., U.S.A.

ARTIFICIAL INCUBATION.—A Description of the French process of raising chickens. With 7 figures. Contained in SCIENTIFIC AMERICAN SUPPLEMENT, No. 778. Price 10 cents. To be had at this office and from all newsdealers.

ROTARY VENTILATING FANS. MECHANICAL AIR MOVERS. TURK WATER METER CO., FULTON, N. Y.

THE ZELL SAFETY BOILER advertisement with image of a boiler and text: 'IMPROVED SAFETY BOILER MANUFACTURED BY THE CAMPBELL & ZELL Co. BALTIMORE, MD.'

WANTED: an English Engineering Firm, a good invention to manufacture and push. First-class references. Send particulars to X. X., The International News Company, Breems Building, Chancery Lane, London, England.

GOLD PLATED ONE YEAR TRIAL FREE advertisement with image of a watch and text: 'A watch that cannot stand the test is dear at any price. We send with this watch a printed agreement giving you the privilege of returning the watch at any time within ONE YEAR if it does not give perfect satisfaction in every respect.'

INVENTORS' IDEAS put into practical working shape by MILLIKEN & D'AMOUR. COR. JOHN AND DUTCH STREETS, NEW YORK CITY. Machinists, Pattern and Model Makers.

HAVE YOU READ Experimental Science?

This new book, by Geo. M. Hopkins, is just what you need to give you a good general knowledge of Physical Science. No one having the spirit of the times can afford to be without the kind of scientific information contained in this book. It is not only instructive, but entertaining.

EXPERIMENTAL SCIENCE advertisement with image of the book and text: 'Over 700 pages; 680 fine cuts; substantially and beautifully bound. Price by mail, \$4.00. Send for illustrated circular.'

MUNN & CO., Publishers, Office of the SCIENTIFIC AMERICAN, 361 BROADWAY, NEW YORK.