

(38) "Dairy."—For description of the process of making artificial butter, see SCIENTIFIC AMERICAN SUPPLEMENTS Nos. 48 and 49.

(39) G. H. L. writes: I am having a sail boat built: 31 feet overall, about 26 feet keel, and 12 feet beam, 15 to 18 inches draught of water. 1. Would it be too large for a cat rig? A. We know of cat boats of the size you state. 2. If not too large for a cat rig, what should be the dimensions of the sail, boom, gaff, and hoist? A. Boom, 32 feet, hoist, 23 feet, peak, 35 feet high in a vertical line.

(40) W. B. K. asks: Can you give me the numbers of the SCIENTIFIC AMERICAN that have the receipts for making matches? A. Waterproof matches, vol. xxxiv, p. 251; safety matches, vol. xxxv, p. 379; composition matches, xxxvii, p. 315, of the SCIENTIFIC AMERICAN.

(41) G. M. G. asks: Do the apparent changes in the moon, namely, new moon, first quarter, full moon, and third quarter, produce any visible change in the condition of the weather, such as to cause storms or to prevent them? A. The question has never been absolutely settled: the weight of evidence, however, is rather against the doctrine that the weather is measurably influenced by the phases of the moon.

(42) J. S. asks: 1. What is the horse power of a locomotive boiler having a fire box 26x24 inches, number of flues 23, size of flues, 3 inches, length of same 6 feet, shell outside diameter, 30 inches? A. There is no standard rule for estimating the horse power of a boiler. 2. One of the flues leaked, and the flue sheet appears thin below the lower flues. Size of flue sheet at this place, one eighth to three sixteenths inch, space 4 inches, tested with cold water hydrostatic pressure to 90 lbs. to the square inch. Am I safe to run from 45 to 50 lbs. per square inch? A. We think so, if you have stopped the leak.

(43) W. E. C. writes: I wish to make a thermometer with an open end. Can I take an ordinary glass tube not blown into a bulb, fill this with mercury, and use it as a thermometer? I wish the open end for making a register. What makes the difference in different sized thermometers—the size of the tube or height of the mercury? I would like to have the mercury size 1 inch to 5 degrees. A. Yes, but the tube would require to be very long. The mean coefficient of expansion for temperatures between the freezing and boiling points for pure mercury is 0.00010085 for each degree Fahrenheit—that is, it expands about 1.9916 its volume for each degree increase of temperature. From this datum the size of tube and amount of mercury required may be readily ascertained. The rate of expansion in thermometer tubes is increased by making the bulb or reservoir larger, or the bore of the tube smaller in proportion. For large thermometers the bulb reservoirs will not answer, as much time is required for the large body of mercury to assume the temperature of surrounding bodies. In its place the tube is usually wound closely upon itself in the form of a spiral.

(44) D. J. T. O. asks: Is there any way to bore a hole through a circular piece of plate glass, for a plate electrical machine? I have tried a bow drill with no effect. A. Use a copper tube in place of the drill, and keep it charged with emery and water.

(45) F. W. M. asks if increasing the strength of the magnets in a telephone will increase the volume of sound. A. It has been determined that there is a maximum strength for telephone magnets beyond which nothing is gained by using larger or stronger magnets.

(46) A. W. E. asks: 1. How much weight will permanent magnet, 2 inches x 3-16 inch, hold up? A. It depends much upon its temper, form, and magnetization. 2. Would two fastened together be twice as strong, or should there be a space between? A. As we understand you, no; but a magnet formed by a number of thin magnets joined, like poles together, presents a much stronger magnetic field than a solid bar of the same weight under like conditions. You will find a description of a powerful magnet of this kind, invented by M. Jamin, on pp. 227-232, Science Record, 1874. 3. Can an electro-magnet have more power than a permanent magnet of the same size? A. Yes, much greater. 4. How can I make an explosive that will adhere to paper and explode by tearing the paper through it. Would it be better to add a few grains of sand? A. Reduce separately, by trituration, 4 parts of potassium chlorate, and 1 part of amorphous (red) phosphorus to powder. Moisten with water, cautiously mix the ingredients together, in small quantities at a time, and dry at a very gentle heat. Coat the paper with glue and a little sharp quartz sand. Another explosive mixture is prepared in a similar manner from 16 parts potassium chlorate, 8 parts black antimony sulphide, 4 parts flour of sulphur, and 1 part charcoal, moistened with gum or sugar water.

(47) H. C. B. asks for a receipt for making a cheap airtight and waterproof cloth. A. Boiled oil, 5 parts; wax, 1 part; turpentine, q. s., to form a uniform sirupy varnish. Through this slowly pass the cloth, first thoroughly dried and moistened with turpentine. Press out excess between weighted rollers.

MINERALS, ETC.—Specimens have been received from the following correspondents, and examined, with the results stated:

J. S. L.—The sample of clay is nearly free from iron, but contains a small quantity of lime, magnesia, and silica. If properly washed it may prove of some value for the manufacture of fine pottery, etc.

Any numbers of the SCIENTIFIC AMERICAN SUPPLEMENT referred to in these columns may be had at this office. Price 10 cents each.

COMMUNICATIONS RECEIVED.

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

- On Small Steamboats. By D. L.
Secret of the Whitehead Torpedo. By I. H. D.
On Flour Mill Explosions. By G. M.
On Electric Light. By A. G. H.

HINTS TO CORRESPONDENTS.

We renew our request that correspondents, in referring to former answers or articles, will be kind enough to name the date of the paper and the page, or the number of the question.

Many of our correspondents make inquiries which cannot properly be answered in these columns. Such inquiries, if signed by initials only, are liable to be cast into the waste basket.

Persons desiring special information which is purely of a personal character, and not of general interest, should remit from \$1 to \$3, according to the subject, as we cannot be expected to spend time and labor to obtain such information without remuneration.

OFFICIAL.

INDEX OF INVENTIONS

FOR WHICH

Letters Patent of the United States were

Granted in the Week Ending

November 26, 1878,

AND EACH BEARING THAT DATE.

[Those marked (r) are reissued patents.]

A complete copy of any patent in the annexed list, including both the specifications and drawings, will be furnished from this office for one dollar. In ordering, please state the number and date of the patent desired, and remit to Munn & Co., 37 Park Row, New York city.

Table listing inventions with patent numbers and names of inventors, including items like Accordion, Air ship, Animal trap, Aquarium frame, Auger, Bale tie, Band cutter, Bath tub, Bed bottom, Belting, Bender, Bit stock, Blasting powder, Bleaching liquids, Boiler, Boilers, Book, Book cover, Boot, Boring machine, Box fastener, Bread cutter, Breast strap roller, Button, Button hook, Can, Cap, Car coupling, Car, Car traction wheel, Carriage, Carriage curtain fastening, Cartridge, Caster, Caster, table, Catechu, Chair, Churn, Churn, rotary, Clock cases, Coffee huller, Coffin, Coin counter, Cooker, Cooler, Counter guide, Cattle fish holder, Cylinder, Detergent, Distiller pipe joint seals, Dock, Dredge, Drill, Drill and corn planter, Drill and planter, Drill, grain, Drill, rock, Dyes, Electric light, Electric light, carbon regulator, Electric meter, Electric register signal, Electrical induction lighter, Elevator, Engraving machine, Escutcheon cutter, Excavator, Fare box, Faucet, Feather renovator, Fence, Fence, metallic, Fence post, Fire and burglar alarm, Firearm, Firearm magazine, Firearm spade attachment, Fire chamber, Flour bolt, Flour hotter, Fruit and packing box, Fuel, Furnace, Furnace, portable, Gas regulator, Gas governor and recorder, Gas lighter, Gas regulator, high pressure, Gate, Gem setting, Glass, milk or alabaster, Glass, ornamenting, Grain binder, Grain cradle, Grain dropper, Grain separator, Grain separator, A. T. Thayer, Grain sifter, Guano distributor, Gun, Gun wiper, Harrow, Hat, Hat, decorated felt, Hats, Headlight, Heel stiffeners, Hinge, gate, Hinge, lock, Horse collar, Horse collar coupling, Horse collar, H. Reed, Horseshoe blank bar, Horseshoe blank gauge, Horseshoe blank tender, Horseshoe blank roller, Horseshoe nail finisher, Hose carriage, Inkstand, Ironing machine, Ironing machine, S. Huff, Lamp burner, Lamp burner, H. W. Vaughan, Lamp lighter and extinguisher, Land marker, Last, A. W. Cox, Latch, Leather skiving machine, Letter box, Liquors, carrier for bottled, Lock, trunk, Loom shuttle, Lubricator, Macaroni machine, Mail bag, Mail bag fastener and tag holder, Match splint, Metal testing machine, Mill for pulverizing ores, Mill spindle, Mower, Musical instrument, Musical instrument, mechanical, Needle swaging machine, Oatmeal machine, Oven, Paper pulp cleaner, Passenger step register, Pasteboard liner and drier, Pawl and ratchet, Pen holder and ruler, Pianoforte, Pianoforte damper action, Pistol handle checker, Planter, check row corn, Planter, corn, Planter, cotton, Planter, check row, Plow, T. E. Jefferson, Plow, W. F. & C. W. Jenkins, Plow and cultivator, Plow attachment, Press, tobacco, Pulley block, safety, Railway switch, Railway switch, H. Soule, Railway switch, Rake tooth, Refrigerator, Roofing compound, Sample exhibitor, Sandpapering polisher, Saw filing machine, Screw machine chuck, Sewing machine button hole stitcher, Sewing machine shuttle, Sewing machine fan, Shade roller, Sheet metal elbow, Show box removable cover, Sieve, adjustable, Sieve, flour, Sieve, paper hoop, Sign, street, Slate, Spader and seeder, Spinning machine spindle, Spring coupling, vehicle, Spring, vehicle, Stamp, dating and crechelling, Steam gauge, Steam generator, Steam meter, Stench trap, Stove pipe damper and regulator, Table, Tank, petroleum, Thermometer case, Tire tightener, Tobacco, chewing, Tobacco granulator, Tongas, pipe, Toy torpedo, Trough, hog, Urn and water bottom, Valve gear for engines, Valve seat for steam cylinders, Valve, tap, Velocipede, Washing machine, Water meter, rotary, Water wheel, Water wheel, current, Weather strip, Wood, manufacturing articles of, Cast iron plows, Cakes, Cigars, Cigars, Glacium & Schlosser, Cigars, Estabrook & Eaton, Cologne water, Corn shellers, Flour, Gun implements, Heaters for warming dwellings, Ladies' corsets, Medical compounds, Medicinal preparation, Medicinal preparation, F. Inglis, Medicinal preparation, F. M. Pease, Medicinal preparation, E. F. Houghton & Co., Men's and boys' clothing, Preparations of cocoa and chocolate, Ribbons, Oberteuffer, Abegg & Co., Salve, A. Ahl, Shoes, Kenny & McPartland, Sawn pipe shingles, Smoking and chewing tobacco and cigars, Smoking and chewing tobacco, Smoked herrings, Sparklin' russet cider, Steel pipe, Soap, Proctor & Gamble

Table listing inventions with patent numbers and names of inventors, including items like Tanned leather, Tips for boots and shoes, Whisky, Whips, Peck, Osden & Co, Wringing, fluting, and plaiting machines, Writing paper, Blind lifts, Coffin screws, Coverings for chairs and parlor suits, Hand bells, Heating stoves, Pulls for drawers, Radiator bases, Rocking chairs, Sash and blind trimmings, Stoves, Can I Obtain a Patent?, Address MUNN & CO., Publishers of the SCIENTIFIC AMERICAN, 37 Park Row, New York, PROSPECTUS OF THE Scientific American FOR 1879, The Most Popular Scientific Paper in the World, VOLUME XL.—NEW SERIES, The publishers of the SCIENTIFIC AMERICAN beg to announce that on the Fourth day of January, 1879, a new volume will be commenced, Terms of Subscription, Clubs, To Foreign Subscribers

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DESIGNS.
Blind lifts, J. L. Howard
Coffin screws, W. M. Smith
Coverings for chairs and parlor suits, J. H. Travis
Hand bells, J. P. Connell
Heating stoves, C. H. Castle
Pulls for drawers, etc., G. W. Tucker
Radiator bases, M. H. Crane
Rocking chairs, E. A. Fuchs
Sash and blind trimmings, J. L. Howard
Stoves, N. S. Vedder

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