

away, and then return the condensation back to boilers, both feed and return pipes to be carried underground. What fall will be necessary to return the water? Also, will it be necessary to have the feed and return pipes laid with expansion joints, and what is the best material to cover with? A. Very little fall is necessary to the pipes to return the water of condensation to the boiler. A few inches will be sufficient in the distance you mention. The inclination of the pipes of the coil in the dry house ought to be about half an inch in ten feet. The pipes do not need to be connected with expansion joints. Some persons declare they are more plague than profit. If necessary, provide for expansion and contraction by a U bend. The material used for covering pipes is generally calcined plaster of Paris, and often mixed with asbestos. To use the plaster, mix with water and apply before it hardens. As it is liable to crack and peel off, it would be well to cover it with some kind of box or jacket. A method is in use here in New York city which is to encase the steam pipe in a larger pipe, made of sheet iron or cast iron; the steam pipe is supported centrally in the large pipe by means of disks of wood through which it passes. These disks can be sawed from long pieces after they are bored. Slip these disks on the steam pipe as it is being connected, and then encase in the outer pipe. It will be necessary to have the outer pipe airtight.

(43) L. S. D. says: I am about getting up a design for a poorhouse, and desire to heat it with steam or water and steam. How large an apparatus do I want to heat a building 40 x 75, two stories high, and cut up in suitable rooms? A. See SCIENTIFIC AMERICAN p. 123, vol. 34, of February 19, 1876, paragraph (32); also, p. 74, vol. 34, January 29, 1876, paragraph (13); also, p. 123, vol. 36, February 24, 1877, paragraph (7).

(44) N. H. D. says: I am about to make a small windmill, the wheel of which will be 30 inches in diameter, having 8 equal arms, the broad part being 9 inches wide at the top, 6 inches at the bottom, 9 inches long, the wheel and its shaft being geared to a perpendicular rod, and small gear wheel being 1 inch, large one being 1 1/2 inches. Give the size of water pump that can be used, and size of air pump. A. See SCIENTIFIC AMERICAN, vol. 32, No. 15.

(45) A. W. C. says: I have a 20 foot x 50 inch tubular boiler, iron chimney 42 feet high, size 28 inches. My draught is poor. I am about to put on a fan blast over my water butt; will it increase my draught sufficiently to attach a pipe to the fan and connect it to the chimney? If not, what length of chimney will I have to put in, in order to insure a good draught? A. The details are not sufficient to enable us to form a definite opinion. It seems probable, however, that the boiler is imperfectly set. 2. What shall I use in my boiler to remove scale? A. If you can freshen the water by the use of a heater with sediment collector, the scale will be gradually removed. The third question seems to be a query for judicial decision.

(46) L. P. M. says: 1. I have a Daniell's battery and am trying to do a little electrotyping, but not with very good success. I have set up my name and residence with type and taken a wax mould of it, and have covered the letters with good plumbago and connected it with a battery. The copper deposits thick on the wire and the smooth part of the mould, but does not take hold of the letters, or only a thin film around them. Can you tell me the reason? A. See that every point of the matrix is covered uniformly with an unbroken film of the plumbago, and then, after blowing off the excess of dust with a small hand bellows, lay the mould face upward, pour a little water over it, and see that the water enters freely every letter; careful manipulation with a small camel's hair brush will remove air bubbles. Then immerse in the bath and proceed with the plating. 2. In "Muspratt's Chemistry," issued by Mackenzie, p. 799, in speaking of Daniell's constant battery, says: "m and n are brass rods fixed longitudinally over the trough; to the former, m, are suspended the moulds, to the latter, n, sheets of copper exactly facing the moulds. The zinc of the battery is connected with the rod, n, and the copper of the battery with rod, m." The diagram shows the reverse of this. Which is correct? A. Join the cathode or rod to which the moulds are affixed to the zinc pole of the battery; a wire then joining the coppers of the battery with that of the bath properly completes the circuit. 3. On p. 788, in charging the battery, it says the copper cylinder is filled with sulphate of copper acidulated with 1/2 of bulk of sulphuric acid. Would not the latter have a tendency to eat the copper? A. It is not advisable to add sulphuric acid; a little sulphate of zinc is commonly used instead, or, what is better, after charging with copper sulphate, short circuit the battery for a few hours, at the expiration of which time it will be found to have attained its full power.

(47) T. M. says: I. I. says large reservoir, 20 feet deep, 200 feet fall, 2 pipes equal in size and length, one at bottom the other near top (does not say how near top), which will discharge most water 2 miles distant. Suppose we drop the 250 feet fall, insert the pipes one at bottom and the other at 6 inches below the surface enough to be sure and fill the upper pipe and a constant head. It is plain, without calculation, which will discharge with the greatest velocity, and of course the greatest quantity; now we will add the 200 feet fall by laying the pipes to the town. The extra fall cannot, it seems to me, decrease the velocity of water at bottom of reservoir; now does not the lower pipe have the advantage of an initial velocity, due to the head of 20 feet at reservoir; and discharge at the town a correspondingly greater quantity? A. In case of the pipe near the surface, it would be necessary to add to the 200 feet fall the difference of level between the two pipes.

(48) J. F. says: I am running or have charge of a stationary boiler of the locomotive type. The water I am feeding the boiler with is very hard, leaving a scale on the tubes and crown sheet from 1/8 to 1/4 thick, and so hard that it will take a very sharp chisel and a smart blow with the hammer to pierce it. At one time I put a box of concentrated lye in the boiler to see if it would have effect on the scale. It did not even make the boiler prime, and on examination the scale was about the same as before. Since then I have been putting "Cataqua" in, pumping it in with the feed. It makes the water prime or foam, but not so as to deceive

me. One week ago I examined the scale in the boiler. In places on the crown sheet I found broken pieces 1/8 and 1/4 of an inch thick. Was it the strong action of the fire at times, or was it the sudden contracting of the iron after all the water was blown out, that caused the scale to break off in places? A. Probably the scale was broken off by sudden contraction. It is a bad plan to blow off a boiler as soon as the fire is hauled. Let the water remain in the boiler until it has become quite cool, and then run it out. By pursuing this course the scale will frequently be softened so that it can readily be removed.

(49) J. B. says: What is the best and cheapest method of making axle grease? A. One part of fine black lead, ground perfectly smooth, with four parts of lard.

(50) A. G. S. asks: Is there any way to color meerschaum pipes otherwise than by continued smoking? A. See SCIENTIFIC AMERICAN No. 12, vol. 35, p. 185 (40).

(51) W. M. asks: What will make a good black paint for painting boiler heads, smoke stacks, etc.? Is there a fireproof cement for laying brick in lining furnaces? A. See No. 3 present volume SCIENTIFIC AMERICAN, p. 43 (45), and No. 4, p. 59 (14).

(52) T. B. S. asks: Will you give me some information regarding the "Rose of Jericho"? A. This name is given to an oriental plant which is found in northern Africa, Syria, and Arabia. It is an annual and grows in sandy wastes. The stem is very short, with branches a few inches long spreading in all directions. After the plant has flowered, and when the pods begin to ripen on the approach of dry weather, the branches drop their leaves and begin to curl inwardly, and in time the whole resembles a ball of wickerwork at the top of a short stem. When the rain falls, or the plant is placed in moist situations, the curled and dried leaves unbend, and become as a green plant. In its native country it is surrounded by various superstitions. In Palestine it is called *rosa Mariae* and *raf Maryans* or *Mary's flower*. It is sometimes called the Resurrection Plant.

(53) W. T. asks for information about making soap, and says: I undertook the manufacture of common washing soap for clothes. I succeeded in making a soap of good quality, but altogether too soft, and not capable of hardening although exposed to the air for a long time? A. If you were to obtain "A Practical Treatise on the Manufacture of Soaps," published by John Wiley & Son, New York city, or "A General Treatise on the Manufacture of Soap," by Professor Dussauce, published by H. C. Baird, Philadelphia, you would find all the information you require.

(54) T. C. asks for information about making black ink: A. The following recipe is said to make a very fine and durable ink: Aleppo galls (bruised) 12 lbs.; soft water, 6 gallons; boil in a copper vessel and add water to make up that lost by evaporation; strain, and again boil the galls with 4 gallons water for half an hour; strain and boil the third time with 2 1/2 gallons water. Mix the liquors and while hot add 4 1/2 lbs. coarsely powdered green copperas and 4 lbs. gum arabic. Agitate until dissolved, and strain for use. Product, 12 gallons fine and durable ink.

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

J. S.—It is galena—a sulphide of lead. Galena usually contains a little silver.—R. F. G.—(Minerals in red box). It is marcasite or white iron pyrites. See article on p. 7, vol. 35.—J. M. G.—It contains silicates of alumina, soda and alumina, and sulphate of lime. It may be used in the manufacture of pottery, etc., and on the farm.—C. B. K.—This substance is nearly pure metallic lead. It is possible that the small granules (some of which approach crystalline form) may be native lead—a substance almost unknown. It is, however, far more probable that they were at one time musket balls. The coating is plumbic carbonate and sulphate. You should send larger quantity if possible.

COMMUNICATIONS RECEIVED.

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

- On an African Continental Railroad. By A. W.
On Sizes of Safety Valves. By R. H. T.
On a Simple Way to Make Ice. By —.
On a Thread Snake. By A. B. A.
On the Divining Rod. By J. L. H.
On Carrying a Bar of Iron. By S. B. E.
On Speed of Rafts, etc. By C. G. C.
On Snakes Catching Fish. By W. S. B.
Also inquiries and answers from the following:
E. T. L.—J. M., Jr.—A. M. S.—C. H. W.—E. T. L.—C. P. W.—H. P.

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.

Correspondents whose inquiries fail to appear should repeat them. If not then published, they may conclude that, for good reasons, the Editor declines them. The address of the writer should always be given.

Inquiries relating to patents, or to the patentability of inventions, assignments, etc., will not be published here. All such questions, when initials only are given, are thrown into the waste basket, as it would fill half of our paper to print them all; but we generally take pleasure in answering briefly by mail, if the writer's address is given.

Hundreds of inquiries analogous to the following are sent: "Who sells instruments for mining engineers? Who sells long staple cotton gins?" All such personal inquiries are printed, as will be observed, in the column of "Business and Personal," which is specially set apart for that purpose, subject to the charge mentioned at the head of that column. Almost any desired information can in this way be expeditiously obtained.

OFFICIAL INDEX OF INVENTIONS FOR WHICH Letters Patent of the United States were Granted in the Week Ending June 26, 1877, 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.

Accordion, F. Zogbaum 192,478
Animal catcher, J. L. Wiggin 192,552
Axle box, F. Keiser 192,436
Baby walker, J. L. Butler 192,413
Bale tie, J. M. Goldsmith 192,430
Bale tie, W. A. Wright 192,477
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Barrel cover, D. F. Dodge 192,326
Barrels, J. F. Budke 192,358
Bee hive, J. P. Long 192,520
Beer cooler, J. Staugler 192,533
Blowpipe, D. R. Porter 192,452
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Boiler, Barber & Porter 192,481
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Car coupling, C. Hall 192,503
Car coupling, F. P. Shorey 192,464
Car coupling, W. J. Trimble 192,544
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Card screen, S. S. Getchell 192,423
Ceiling, W. E. Worthen 192,400
Chair, W. Lovell 192,380
Chair, A. B. Stevens 192,467
Chest garment, C. A. Fuller 192,366
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Chisel, E. Carney 192,323
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Cooking cereals, L. S. Chichester 192,362
Copper, separating, W. B. Young 192,401
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Corn flour, A. L. Murdock 192,525
Corn marker, H. C. & W. T. Sharp 192,534
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Cradle, C. Barlow 192,406
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Cultivator tooth, G. D. Rowell 192,390
Cultivator, J. Poetz 192,387
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Dress supporter, G. Schwab 192,532
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Fire escape, L. Meyer 192,339
Fire escape, A. Warth 192,548
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Lubricator, P. Bloomsburg 192,357
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Pavement, Rock & Phillips 192,349
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Spinning machinery, B. Saunders 192,391
Spinning ring holder, W. F. Draper 192,450
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Steam generator, J. A. Reed 192,389
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Stump elevator, Dunnebach & Linen 192,421
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Vent bung, Pentlarge & Hirsch 192,386
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Wagon hound, etc., C. F. Whipple (r) 7,769
Wagon spring, A. W. McKown 192,383
Washing machine, F. N. Griffith 192,330
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Window blind, T. A. Smits 192,353
Wire-straightening machine, I. A. Kilmer 192,437
Wool-combing machine, L. Smith 192,352
Wrench, tap, C. Elterich 192,423

DESIGNS PATENTED.

- 10,068.—CASKET HANDLE LUGS.—C. Barmore, Cincinnati, Ohio.
10,069.—CASSIMERES.—O. F. Chase, Thompson, Conn.
10,070.—TOBACCO BAGS.—W. J. Cussen, Richmond, Va.
10,071.—CARPETS.—E. Daniel, Paris, France.
10,072 and 10,073.—ORGAN CASE.—S. Hayward, Boston, Mass.
10,074.—COVERS FOR SMOKING PIPES.—J. Kirschbaum, Waterbury, Conn.
10,075.—CRADLES.—L. E. Minott, Sheboygan, Wis.
10,076.—GROUP OF STATUARY.—John Rogers, New York city.
10,077.—MILK JUGS.—T. C. Smith, Greenpoint, Brooklyn.
10,078.—FUNERAL ORNAMENT.—W. M. Smith, West Conn.

[A copy of any one of the above patents may be had by remitting one dollar to MUNN & Co., 37 Park Row, New York city.]