keep good for years. This paste is of extraordinary adhesive power, and may he used for leather, paper or cardboard with great success.

(8) St. J. asks: 1. Will you please tell me how I can waterproof some straw board, cheaply and quickly, in a small way? A. Either one of the following may suffice: 1. Take of white wax and spermaceti, each, 1 oz.; mutton suet, 4 oz.; melt in 1 pint of olive oil. Or, 2. Beeswax and yellow rosin, 2 oz. each; melt in 1 pint boiled oil. The solution should be applied warm. 2. Also if either of these hair dyes would be efficient and harmless: Red wine, 2 oz.; sulphate of iron, 18 grains? A. Will probably have no injurious effect. 3. 1 drachm sugarlead; 1 drachm lac sulphur; 1 oz. oil glycerine, and 1 pint soft water? A. Not to be recommended, as one of the constituents is plumbic acetate,

(9) H. L. B. writes: In answer to the query of H. L. V., I will inform him the steamer Mary Bell was built at Metropolis city, on the Ohio River, in 1875. She was 325 feet long, and carried 12,000 bales of cotton, being the largest boat on the Mississippi at the time. She was burned at Vicksburg when six months old.

(10) J. A. H. asks: 1. Is there any advantage in what lightning rod men call "circuit" rods—that is, two ground rods to one point? What do you think of such rods put into the ground 8 or 10 feet, ground tolerably dry? A. The only advantage in such an arrangement is that it affords a better ground surface. If the ground connections terminate in dry earth, the lightning rod will not prove effective. 2. Are horse shoe magnets better than common points, or should points be magnetized so as to lift small needles? A. There is no advantage in a magnetic point. 3. What is your opinion of tin roofs as a protection against lightning? How should they be connected with the ground? A. Tin roofs, if connected with the lightning rod having good ground connections, may prove an additional protection. The ground end of the rod should be forked and buried in earth that is continually moist. The effectiveness of the rod may be increased by filling the hole around the rod with pounded coke or charcoal. The ground end of the rod should be bent away from the house. 4. Is it safe to put a rod into a well? A. Yes.

(11) J. M. asks: 1. What is the best means of fastening rubber on an iron pulley? A. Use a cement composed of equal parts of pitch and gutta percha melted together at a moderate heat. 2. I know that a belt will run to the large part of a pulley; but if a wide belt is shorter on one side than the other, will the short side work to the crown of the pulley? A. Yes. 3. What would be the effect if the pulley was flat on the face? A. In either case the short side will do the work until it is stretched. 4. What is the crown sheet of a boiler? A. The sheet or plate immediately over the grate bars. 5. What work could you recommend for general information on the use and care of machinery, *i. e.*, size and speed of pulleys and their proper place on shaft, where tighteners should be used, etc.? I want a work for information on the simple principles of machinery as well as the most scientific. A. We know of no one work that will meet yonr wants.

(12) F. D. R. asks: What is best to use to clean a person's hands of red color, such as used in coloring leather—chief ingredients of color, logwood? A. You may try weak solution of ammonia.

(13) G. M. A. writes: I have a gun which has all the browning off. Not wishing to go to the expense of putting it on again, what cheap substitute could I use to protect it from rust? A. Apply a thin coat of shellac varnish.

(14) J. W. B. asks: Can you give me a receipt for making fly paper? A. Consult SCIENTIFIC AMERICAN, page 171 (12), vol. 39.

(15) A. L. H writes: 1. I wish to make an electro-magnet for a burglar alarm. How many feet of silk covered wire should I use on each spool? 2. How large should the coil be? A. As you do not intimate what sort of a burglar alarm you intend to make, it will be impossible for us to give you any definite information. Try ⅜ cores, 1½ inch long, wind them with six layers of No. 20 wire. 3. Will one cell of a gravity battery be sufficient, there being not more than twenty feet of wire connecting the battery and alarm? A. It is probable that one cell might do; but two would render the action of the apparatus more reliable.

(16) F. N. P. asks how to mount prints or engravings and colored prints on cloth so that they may be framed without a glass in front of them. A. Tack or glue a damp piece of cotton cloth to the edges of a suitable frame; cover the cloth with good paste; apply paste to the back of the print, and lay it smoothly on the cloth. When the print is dry coat it with a varnish made by diluting ¼ lb. of Venice turpentine with a gill of alcohol.

(17) R. J. F. asks: Which would penetrate wood farthest, a ball from a pistol held 4 inches from the wood or one from a pistol held 10 feet distant? A. The ball from the pistol held 4 inches distant would penetrate the farthest.

(18) W. & H. ask if whitewood is a hard wood, to be classed with oak, maple, etc., or a soft wood, like pine, hemlock, etc.? A. Whitewood (tulip tree, botanically Lirodendron tulipifera) is a deciduous tree, like the oak, maple, etc. It is not classed botanically with pine, hemlock, etc. In color the timber (having heartwood and sapwood the same color) is classed with white pine as whitewood; and in texture the wood is classed with soft woods.

(19) "A Subscriber" states that the largest steamer on the Ohio River is the U. P. Schenck, which is 5 feet shorter, but 4 feet more beam, than the Golden City, is 1,500 tonnage, and owned by Captain A. J. Schenck, of Vevay, Ind.

(20) E. C. J. writes: There are many of us mechanics in this city who own our homes, and we have a little yard and garden patch attached, but the soil is very strongly impregnated with alkali in low places, so much so as to show white on the ground; in higher places only enough to slightly discolor the soil. What will best neutralize this alkali and be the most practicable to use? A. A heavy top dressing of manure intimately mixed with clay. The decomposition of the manure forms acids. The alkali unites or neutralizes the acids as they are formed. In consequence of this the soil becomes sweeter or more propitious to vegetation, while at the same time it will cause the vegetable matter to disappear more rapidly than would otherwise be the case. The addition of the clay is to reduce the strength of the mixture, and otherwise prevent injurious action of the strong stimulants upon growing vegetation.

(21) B. B. asks: What is the difference of the electric current produced by Daniell's, Grove's, and other cells; is it in intensity or in quantity? A. The electro-motive force of the Daniell cell is 1·079 volt, and the various sulphate of copper elements are about the same. The Grove 1·956, Bunsen's nitric acid 1·964, Bunsen's chromic acid 2·028, Faure's 1·964, Grenet 1·095. Electro-motive force and intensity are the same thing,

(22) W. H. B. asks: Can you inform me what will keep a solution of paraffine with linseed oil in a liquid state, and not destroy its drying qualities? A. Turpentine spirits, since in it paraffine is soluble.

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

J. H. B.—No. 1. Judging from your description they are probably quartz crystals containing crystals of tourmaline.—No. 2. It is doubtless banded agate; some of these stones are of value.

COMMUNICATIONS RECEIVED.

On Squaring the Circle. By G. O. v. R.
On Vehicle Wheels. By G. A. H.
On Scarlet Fever. By T. B. McC.
On the Metric System. By G. J.
Better Late than Never. By A. R. C.
On Suspended Animation. By G. F. S.
A Voice from the Dominion of Canada. By J. G.
Telephone Circuit. By F. W. W.
On Squaring the Circle. By W. D.
On Electric Light. By W. A. S.
On Solar Circulation. By E. F. D.

[OFFICIAL.]

INDEX OF INVENTIONS

FOR WHICH

Letters Patent of the United States were Granted in the Week Ending

April 22, 1879,

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.

Aerial machine, H. Badgley 214,546
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