

(24) W. T. asks how to make asphalt pavements or walks. Are they expensive? Where can the material be obtained? Is it durable? What is the best mixture for walks that will stand hard usage? A. Ordinarily gravel screened to various sizes is stirred up with asphaltum liquefied by heat until the pebbles become well coated with the material. The road bed having been excavated to a depth of 6 or 7 inches and walled at the sides with inch planks, a layer of the coarser gravel is laid down and compacted by heavily rolling. Other layers of tarred gravel grading to fine sand at the surface are then put down in a similar manner. These walks are much cheaper than flagging, but they do not stand the weather in this climate very well. Good hydraulic cement mixed with about twice its weight of very fine sharp quartz sand and one one-hundredth part of silicate of soda dissolved in water makes a good walk when properly hardened. For materials see our advertising columns.

(25) T. H. S. asks: Can you inform me if there is any paint or other material which can be depended upon to make a wooden cistern watertight? If cement is used will it adhere better to brickwork than to wood? A. Try the following: 1. Boiled linseed oil, 3 parts; asphaltum, 4 parts; rosin, 12 parts. Melt and stir together over a gentle fire for an hour. Try a sample by cooling under water; if not sufficiently firm add more asphaltum and resin. Apply to the dry wood hot (not too hot). 2. Litharge, plaster of Paris, and dry white sand, each 10 parts by measure powdered; 1 part finely powdered resin. Mix into a stiff paste with warm boiled oil. Use at once and give three days to harden before wetting.

(26) J. M. A. writes: The front glass of my aquarium, one-sixteenth inch thick, 13x23, has cracked across the narrow part. There is no support for the top of the glass, but a strip is laid on. How can it be made secure without trouble of replacing the glass? The fracture is very neat, so that it scarcely leaks. A. Clean the glass with a little soda, and cut a piece of thin glass an inch wide and as long as the crack. Smear both glasses with the following warm solution: Fine isinglass and gelatine, each 1 dram; bichromate of ammonia, 12 grains; water, 2 ounces; filter. Slide one glass upon another so as to carry off all but a film of the cement, which exposure to light soon renders perfectly insoluble in water.

(27) J. A. B. asks: What is the process for making the article called pumpkin flour? A. The cleaned and pulped fruit is dried by exposure to currents of warm dry air, then ground in a mill.

(28) G. B. asks for directions for embossing designs on glass ware, that is, goblets and shade globes. We understand the work is printed on by impressions taken off brass plates, then transferred to paper and from that to the glass, and then the glass is put in a bath containing white acid. A. Print from engraved plates on soft paper and immediately place the printed paper smoothly on the glass to dry. Moisten the back of the paper with a sponge, when it will come off, leaving the design on the glass. Then dip the surface in hydrofluoric acid until properly etched, rinse in water, and take off the fatty design by soaking in benzole.

(29) T. C. asks: What is the composition of the charges used for charging small fire extinguishers? A. The vessel is partially filled with a saturated aqueous solution of bicarbonate of soda. Over the liquid, near the top of the vessel, is suspended a lead bottle of oil of vitriol, in such a manner that when its stopper is withdrawn by pulling up the rod at top the bottle inverts and the acid is thrown into the bicarbonate solution.

(30) H. S. C. asks how to make and apply self-luminous or calcium sulphide paint. A. Boil together for an hour 2 1/4 oz. caustic lime, recently prepared by calcining clean white shells at a strong red heat, with 1 oz. of pure sulphur (floured) and a quart of soft water. Set aside in a covered vessel for a few days, then pour off the liquid, collect the clear orange colored crystals which have deposited, and let them drain and dry on bibulous paper. Place the dried sulphide in a clean black lead crucible provided with cover. Heat for half an hour at a temperature just short of redness, then quickly for about 15 minutes at a white heat. Remove cover, and pack in clay until perfectly cold. The addition of a small quantity of pure calcium fluoride to the sulphide before heating it is made. It may be mixed with alcoholic copal varnish.

(31) E. I. asks: 1. How can I make a lacquer for polished brass, etc. Can it be purchased? How is it applied? A. Seedlac, dragon's blood, annatto, and gamboge, each 4 oz.; saffron, 1 oz.; spirits of wine, 10 pints. Put all together in a covered vessel and stand the vessel in hot water and stir the contents occasionally until dissolved. Such lacquers are purchasable. Lacquering is done in two ways, called hot and cold lacquering. In the latter the lacquer is laid on evenly with a camel's hair brush, and the work is then placed in an oven or on a hot stove for a few minutes to set the lacquer. If heated too strongly the lacquer is discolored; if not enough it does not set properly. By the first method the metal is heated to the temperature of a flat iron as used by the laundress, and the lacquer is quickly brushed over it in this state, the work being subjected to the heat of an oven after or not, according to the judgment of the lacquerer. The article, if very small, will require this, because it will have parted with much of its heat in laying on the lacquer. If heavy, it will retain sufficient to perfect the process. A knowledge of the exact degree of heat required can only be attained by experience. 2. What is the best article to polish small tin articles about the size of a button? We have a good many of these to do. A. Use a small circular scratch brush attached to a lathe. 3. How can we give cheaply? A. See article on electro-gilding, page 116, current volume.

(32) N. P. H. asks: What will make a glue that will be strong and yet be thin? A. Heat the solution for some time in a Papin's digester at 300° Fah.

(33) W. P. M. asks for the best method of coating sheet iron pans to keep them from rusting. I want some cheap varnish. A. Asphaltum, 5 parts;

fine black lead (graphite), 1 part. Dissolve the asphaltum in oil of turpentine and stir in the graphite.

(34) E. E. W. asks (1) if the telephone, in SUPPLEMENT 142, will work five miles on No. 12 wire. A. If well made it would probably work through that distance, but the sound would necessarily be weak. Better results are obtained by using some form of transmitter. 2. How are the insulators attached to the bracket, or, in other words, what is the composition used to fasten or glue them on? A. The insulators are generally screwed on the brackets, an internal thread being formed in the insulator for that purpose.

(35) A. J. K. asks: What can be added to fluid ink made of gall and iron to make it jet black at first writing? Having night work I cannot see the writing until next day, when it then turns black. Does it injure the writing by any addition, and will it be as thin as before the addition is made? A. Try the addition of a small quantity of fine logwood extract dissolved in a little hot water.

(36) W. H. S. asks: 1. When do water pipes burst, when freezing or when thawing? A. In freezing. 2. Does water when forming into ice contract or expand? A. It expands. See Tyndall's "Heat a Mode of Motion."

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

S. W.—It is a light fine silicious sandstone. Useful for some polishing purposes.—A. L. C.—The sediment is composed chiefly of a fine micaceous clay and sulphate of lime. Not specially injurious to cattle or steam boilers.—T. B. T.—A good marl—useful for fertilizing purposes. Its marketable value can only be determined by an analysis.—L. H. D.—Hornblende.—W. B.—The metal is iron and iron protosulphide. The shale contains much carboniferous matter, but no graphite.—A. U. G.—It is hornblende-schist—of little value.—T. E. T.—Mica schist—of no commercial value.—E. M. B., Jr.—1. Copper glance—sulphide of copper and iron pyrites—sulphide of iron. 2. Pyrrhotine—magnetic iron pyrites—may contain a little nickel. 3. Impure limonite—brown hematite iron ore.

COMMUNICATIONS RECEIVED.

- On a Lunar Halo. By L. B. O.
On a Parhelion. By D. H. D.
On a Lunar Halo. By J. D. H.

OFFICIAL.

INDEX OF INVENTIONS FOR WHICH Letters Patent of the United States were Granted in the Week Ending February 15, 1881, AND EACH BEARING THAT DATE.

[Those marked (r) are reissued patents.]

A printed copy of the specification and drawing of any patent in the annexed list, also of any patent issued since 1866, 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. We also furnish copies of patents granted prior to 1866; but at increased cost, as the specifications not being printed, must be copied by hand.

Alumina, purifying sulphate of, W. Chadwick et al. 237,516
Awnings, device for raising and lowering, D. Fey 237,817
Axe box, vehicle, D. T. Applewhite 237,718
Axe, car, C. H. Rhett 237,906
Axe skien, T. H. Rogers 237,778
Barrel, H. Willard 237,943
Bed bottom, spring, S. Calhoun 237,726
Bed bottom, spring, D. Edgar 237,679
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Billiard cue tip, G. C. Barney 237,719
Bit stock, N. Spoford 237,780
Blind, rolling, H. H. Hilgen 237,864
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Boot, Ketchum & Skilton 237,880
Boot and shoe shave and bead cutter, H. S. Rogers 237,907
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Bottle washing apparatus, C. Callahan 237,727
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Bracelets, die for making, S. Cottle 237,823
Breast strap slide, W. B. Hayden 237,663
Brick machine, I. Cullen et al. 237,729
Bridge, A. Fink (r) 9,575
Buckie, Kelsey & Courtright 237,879
Calendar, J. Cussons 237,825
Can, H. Acker 237,795
Cap, naval or military, H. F. Jenks 237,685
Car brake, G. W. Laraway 237,758
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Carburetor, gas, P. Keller 237,752
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Carriage bow, H. F. Wilson 237,713
Cartridge, H. Kink 237,886
Cartridge shells, machine for trimming, T. G. Bennett (r) 9,568
Cask for beer, etc., Mainzner & Singer 237,884
Castanet, E. A. Fisher 237,850
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Churn, P. D. Horn 237,868
Churn, L. B. & I. Wilson 237,792
Churn dasher, J. E. Finley 237,735
Circuit breaker for relays and sounders, J. C. Reed 237,776
Clevis, plow, J. W. Powers 237,772
Coach pad, E. R. Cabonne 237,725
Cock, faucet, etc., R. P. Garsed 237,854
Coffee pot, W. H. Sweeney 237,783
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Condenser, surface, J. D. Brooks 237,674
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Corn sheller, L. P. King 237,755
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Cotton chopper, E. P. Tyson 237,961
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Engraving and chasing machine, C. Chevalier 237,818
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Fireproof shields, fabric for, J. S. Brooks 237,805
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Knob, door, B. D. Stevens 237,923
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English Patents Issued to Americans.

From February 11 to February 15, 1881, inclusive.
Buttons, decorating, C. G. Dobbs, New York city.
Coast defenses, F. R. Timby, Rockland, N. Y.
Electric light (2), T. A. Edison, Menlo Park, N. J.
Pianos, A. K. Hebard, Cambridge, Mass.
Polychromatic printing, G. Schwarzwald, N. Y. city.
Soap compound, J. F. Tyrell, New York city.
Steam engine, W. F. Goodwin, Stelton, N. J.
Violins, E. R. Mollenhauer, New York city.