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the sand, and also the gravel, should be washed. 3. Dr. Youmans says : "Beach sand will attract dampness," How is this? A. Because of the salt with which it is more or less impregnated. 4. In the absence of broken stone and the like, will gravel and sand do? A. Yes, if the gravel is of good size. 5. Will such a wall be damp? If so, would it need furring, or should it be hollow, as recommended by Gilmore, in his work on "Mortar and Cements"? A. Yes, it would need to be protected on the inside in some way against the condensation of water from the air in winter. 6. How are the parts proportioned, by weight or measure? A. By measure. 7. Drs. Chase and Youmans recommend freshly burnt lime; you recommend cement. If lime, being cheaper, will do, no one will use cement or water lime (which, I think, is the same). Suppose we take 3/4 freshly burnt lime and 1/2 water lime, how will that do? A. Pure cement of the best quality should be used. We presume that this is what you mean by "water lime." No common lime should be mixed with it if you want a permanent wall. 8. In using cement lime, are the proportions taken before slaking or after? A. Before. 9. How are sills, caps, and cornices made? A. These may be cast in molds

(29) S. A. & S. ask: What will prevent the forming of vitriol crystals on the outside of telegraph battery jars? We use stone jars, which become entirely coated on the outside in a short space of time. A. A good way to prevent the fluid from creeping over the tops of the jars and crystalizing on the surface is to paint the top of the jars for half an inch.

(30) R. S. asks: What is the solution used by sugar refiners in the centrifugals to give to sugar the bright yellow straw color? A. This color, we believe, is obtained during the bleaching process, and sometimes by the addition of small quantities of dye stuffs, such as turmeric, etc.

(31) W. R. says: I. In a Holtz induction machine, where the revolving plate is supported by a thick glass plate, held horizontally between two insulated plates, of what material is it best to make the axle of the revolving plate? A. Wood and glass are frequently used. Perhaps an ebonite axle would answer best. 2. If ebonite be substituted for this horizontal glass plate, can as good electrical results be obtained? A. We believe some experimenters give ebonite the preference. 3. If coatings of paper or foil be attached to the sector plate, and these have projecting rows of pin points, and the edges that hold these pin points are opposite collecting combs of conductor, is it necessary to have windows or holes cut in sector plate to relieve the bound electricity? A. In the improved Holtz machine neither windows nor armatures are used. Two plates are mounted horizontally and both revolve, the direction of one being opposite that of the other. Four collecting arms are placed, at equal distance apart, around the plates, two above the upper and two below the under plate, and the order alternating, so that if the first is an upper arm the next is under, and so on. The first upper and under arms are connected metallically, as are also the third and last. Sometimes also an extra arm is used, which brings an upper and under arm together in one place. This arrangement appears to improve the action of the machine. 4 To steady the revolving plate, should its edge or circumference rest or turn in grooved pulleys, fastened on the small wooden pillars or posts that support the sector plate, these posts passing from horizontal supporting plates to sector? A. Grooved pulleys are best, unless, as is often done with the old style machines, the fixed plate is perforated at the center, and the revolving plate mounted on an axis passing through it.

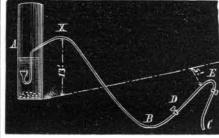
(32) D. W. W. asks: What substance can I use to illuminate the dial of a watch sufficiently to show the hour in the dark? Will the small glass tube with phosphorus and oil do? A. We do not consider it practicable nor advisable to attempt the application of the phosphor lamp in the way you mention.

(33) N. S. W. asks. Is the first six months (vol. 1) of the SCIENTIFIC AMERICAN SUPPLEMENT furnished bound? If so, price? A. We furnish the first volume of SCIENTIFIC AMERICAN SUPPLE-MENT, stitched in paper covers, for \$2.50. In boards, \$3.50. Probably few persons appreciate the great scope and remarkable cheapness of the work we are carrying on under the title of our SUPPLEMENT. The first volume, lately completed. is illustrated by over 1,000 engravings and figures covering all the most recent and interesting scientific information of the day. It includes the history and progress of the Great Exhibition. The compact form, and embrace such an enormous variety of subjects, that if printed in ordinary book form they would occupy 3,600 pages, or volumes of 500 pages each. In the domain of Science, nothing comparable to the SCIENTIFIC AMERICAN and SUPPLEMENT, in the matter of economy of price, has heretofore been given to the public.

are nearly all alike, running a short distance lengthwise and then directly around the tube, cutting it off. I took the piece he gave me; and after cleaning with water and drying it, I laid it on a bench with a piece of iron wire and another of brass wire laid loosely through the tube. In a few hours it broke into three pieces, and in the course of the next night into half a dozen pieces, all the fractures having the direction as stated above, and some of the pieces being interchangeable on account of the striking similarity of the ends. To ascertain whether imperfect annealing had to do with the breaking, I took a piece two inches long under the blowpipe and heated it so hot that it fiattened by its own weight, without any tendency to fiy to pieces. A. These tubes are usually made of the hardest glass, and carefully annealed; but from the fact of your ability to soften the tube as you represent, it appears to have been otherwise in this particular case. There may have been flaws in the glass, which were further aggravated by the careless use of emery or otherwise, but we think it probable that there were some facts connected with this peculiar breakage which you have failed to discover or meution.

(36) J. I. asks: What is the best cheap solvent for ordinary tar? A. Benzine.

(S7) R. M. says: I take water by siphon from a well distant from my house about 950 feet. I first laid ½ inch lead pipe, through which the water flowed nicely for a year or more, when the pipe was burst by frost. After repairing it I could never get it to work satisfactorily. With a view to improving it, I substituted a ¾ inch pipe from the well, A, to the lowest part of the siphon, B, the 1/2 inch pipe from that point to the house being in good condition. I now find that, by filling the pipe by either force or suction, the water will continue running for from ½ an hour to 12 hours, when itstops. I sometimes imagine that it runs only long enough to allow what water there may be in the pipe from upper part of siphon to the outlet to flow out. I wish to ascertain if you can suggest where the defect is, and give the remedy. The pipe is perfectly airtight. I have thought that by using a ½ inch pipe from well to the high-



est point of the siphon, X, the difficulty might be overcome. The water has to rise from bottom of well to this point about 13 feet. I have a fall of 5 feet from bottom of well to the highest point of discharge, E. I have experimented and thorough-ly exhausted all the local hydraulic knowledge, and now apply to you. Can you tell me what further means I can try with it? A. The end of the pipe at the strainer in the well may be stopped up with dirt, or there may be some obstruction in the end at the house. If this is not so, it would seem to imply that the pipe is not airtight; this point should be tested thoroughly. Sometimes air bubbles from the water will collect at the highest point of the siphon, and trap it there, but this is not likely to occur in so short a time; the probability is that the pipe either leaks or is stopped up.

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

E. C.-No. 1 is a piece of slate with chalcopyrite, sulphide of copper, and protoxide of copper. No. 2 is coal.-G. V. H.-It is iron pyrites in clay.

J. C. M. says: I have seen a musical instrument in which the sound was produced by a crank in the end of the instrument, the notes being produced on keys along the side. How is the inside of the instrument arranged ?-J. G. W. asks: What is the construction of the Langstroth beehive?

### COMMUNICATIONS RECEIVED.

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

On Ornamental Machinery. By E. On a Theory of Electricity. By J. N. L. On a New Electric Battery. By W. R. H. Also inquiries and answers from the following : w. B. A.-G. B.-E. B.-A. L. F.-W. G.-C. H. C.-C. H. B.-E. B.-G. W. D.-F. S. D.-H. S.-G. H.-R. R.-L. F.-A. T.-H. P.-W. S. V.-G. W. D.-E. -T. H. L.-W. E. F.-W. S.-H. S. W.-B. R. H.-H. C. R.-G. B. Y.-J. M. N.

the cheapest photographic apparatus ?" 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 July 18, 1876, 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, pleasestate the number and date of the patent desired, and remit to Munn&Co., 37 Park Row, New York city.

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' All such	Goldores, etc., purifying, B. F. Penniman 180,058
vill be ob-	Grain dryer, K. Schroll
nd Person-	Halter, J. Cronin
ned at the	Harness pad, W. H. Bulkley 179,999
sired infor-	Harness pad, M. V. Longsworth
y obtained.	Harrow, riding, Harris & Bowne 179,915
	Harrow cotton planter, J. A, Brent, Jr 179,996
	Harvester, R. Eickemeyer 180,014 Hatchway, self-closing, H. Rees
IONS	Heat deflector, A. J. Donle
	Heater and filter, S. A. Shoaff 179,966
tes were	Hinge, stop, W. Wilson, Jr
ing	Horses, attaching and detaching, A. Eberle 180,018
-	Horseshoe machine, C. Briggs 179,997
ATT	Hose attachment, <b>D</b> . G. Trembley
DATE.	Inhaler, J. S. Letts 180,043
nts.]	Inhaler, R. L. Steen
nnexed list,	Inhaler and disinfecter, J. R. Harper
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VYork city.	Kilns, grate for brick, B. Hall
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180, #72 180,027	Lock, door, C. Guild
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180,015	Match safe, C. Frankish 179,850
180,052	Match safe, etc., I. C. Cowles 179,897
180,030 179,984	Mechanic's implement, D. Goodnow, Jr 179,853 Millstones, dressing, W. Coplin 180,006
179,908	Mitering machine, A. T. Nichols
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179,964 179,852	Mucilage holder, J. V. Browne
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180,061	Pianoforte tension device, J. D. Elliott 179,903
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180,075	Pipes, coiled metallic, E. C. Hubbard 179,856 Pistol, spring air, G. A. Walker
179,889	Plaiting machine, L. H. Olmsted
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179,888	Planters, corn, G. D. Haworth (r)
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179,956	Planter, seed, F. J. Underwood
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179,949	Printing press, J. L. Firm (r)
0,073, 180,074	Privy vaults, etc., emptying, J. Bradley 179,993 Pump and funnel, H. A. Guignon 179,911
-982,- 179,983	Pump bucket, W. Beauchamp 179,838
179,980	Pump bucket, chain, W. Peckham
179,851 7,232	Pump, oil and liquid, H. M. Parshall 179,864 Pumps condenser for steam, F. E. Saxby 180,069
179,965	Radiator, steam, A. L. Ide 180,033
180,086	Railway cars, etc., warming, Grandjean et al 180,022 Railway rails coll for reworking L MaCaffrey 180,000
179,936 179,942	Railway rails, roll for reworking, J. McCaffrey. 180,049 Railway signal, Fish & Miller
179,873	Railway signal, J. E. McCarty 179,935
179,986	Railway tie, G. W. Williamson 180,084
179,886 179,869	Reaper and mower, A. J. Cook 180,004 Registering apparatus, J. C. & O. Jenkins 179,922
179,973	Resin, etc., production of, A. Rock
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180,005	Safe, pigeon hole, H. F. Ufford 179,880
180,009	Saw buck. L. Hawkins
180,021 179,958	Saw, scroll, P. G. Giroud
179,968	Separator, grain, W. H. Rickard 180,068
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179,927	Shaft coupling, G. E. Rider 179,957
179,926	Sharpening machine, A. Reitze 180,067
179,963	Shoe, M. R. Bodkin
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179,939 180,045	Speaking tube catch, W. R. Ostrander 180,0.5 Spindles, clamp bobbin for, W. C. Burch 180,000
179,985	Sprinkler, lawn, G. H. Copping 180,007
179,858	Stable, F. M. Dixon
180,082 179,836	Stack cover, Tuck et al 179,976 Stave-dressing machine, A. Luckhaupt 179,932
179,845	Steamer, J. B. Moffatt 179,862
179,846	Steamer, feed, W. Pierce 180,060

(34) P. F. asks: How can I dissolve soda in oil? A. You do not state what kind of oil. Except in the fatty oils, containing free glycerin or acids, it is nearly insoluble. In any case, an elevated temperature increases solubility.

(35) W. E. H. says: A friend of mine recently bought me a piece of glass tubing of  $\frac{8}{2}$  inch internal and  $\frac{8}{2}$  inch external diameter, about 1 foot in length. He stated that it formed part of a gage tube to show the hight of water in a mill flume, and that, getting dirty, the engineer in charge took it down to clean it, which he accomplished by wiping with waste and emery flour on the end of a pine stick. The tube, which had been in use for years, was then laid down in the engine room temporarily, when in a few hours it broke spontaneously into a dozen pieces. The fractures

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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.

Enquiries 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 makes carbons for batteries? Who sells gutta percha? Who sells incubators? Whose are the best leather belts? Who makes

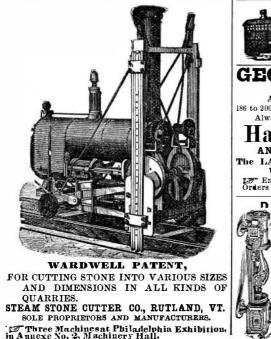
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Engine, valve motion, G. Klug 180,040	Stove, coal oil, Raschke & Jones 179,865
Engine, variable exhaust, Dunbar & Foss 180,011	Stove, cooking, E. Bussey 180,001
Envelope, sample, C. E. Sawyer 179,871	Straw cutter, J. Laughlin 180,045
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Fruit dryer. S. W. Hope 179, 921	Wagon bolster, Stubebaker & Hinds 180,076
Fruit dryer, H. Kelly 179,857	Wagon-loading apparatus, A. Taylor 179,972
Furnace, A. L. Holley 180,028	Wagon, milk, A. L. Fish 179,904
Furnace, steam boiler, D. P. Beard 179,857	Wagon seat, W. G. Savage 179,870
Garment strap, elastic, R. Gibbons (r) 7,233	Wash board, W. Todd 179,974
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