RECENTLY PATENTED INVENTIONS. Engineering.

STEAM SHOVEL —Jake M. Boudrie and Thomas McManus, Rulo, Neb. This improvement provides for the shovel a platform consisting of flat cars with means whereby the shovel may be made to travel from end to end of a train of cars, thus dispensing with the heretofore necessary side track in the loading or unthe loading of a train may be commenced at one end, and no possibility of overheating the powder chamber. as each carreceives its proper load, the shovel may be carried to the next car, and so on, until the desired number of cars has been loaded. The shovel is so placed upon the flat carthat when the shovel is in operation it may be rigidly had upon the car.

FURNACE TAP .- Edward P. Mathewson, Pueblo, Col. According to this improvement a water-cooled tube is adapted to extend into the furnace to pass into the molten slag nearly to the matte level, the outer end of the tube being adapted to discharge into a slag spout arranged on the outside of the furnace. The Invention relates to a former patented invention of the same inventor, and provides asimple and durable construction arranged to converiently separate and quickly run off the slag at all times.

Itailway Appliances.

CAR COUPLING.—William F. Donnell, Rush Tower, Mo. The drawhead, according to this improvement, has arearwardly curved hook on its front end and a longitudinal slot at each side of the hook where a link may hang pendent, while there is an inclined tilting plate to the rear of the hook, the latter being loosely engaged by coupling link. The device is designed to automatically couple two approaching cars, and effective means are provided for uncoupling, either from the top or sides, the construction being very simple and

RAIL SHOE AND BRACE.—Andrew B. Snider and William H. Roberts, Bartholow's, Md. This device consists of a plate having on one side a hookshaped rail base flange and on the other side a shoulder, forming a rail seat between them, with spike holes at the edge of the shoulder and opening into the rail scat, the plate being extended horizontally upon one side and 'City, N. J. 'This is an adjustable fastening device com having spike holes on the extended side only. The de-vice is especially devised to effectively hold the rails on the link being offset to bring the contracted end of the curves where they are subjected to excessive pressure in one direction.

ELECTRIC RAILWAY SIGNAL. - José Ortega y Espinosa, Mexico, Mexico. This invention provides a signaling system consisting of two independent electric circuits, one extending along the line of the road-bed and provided with electro-magnets controlling the connection of contact faces and current-shifting devices with automatically operated signals at the stations, and the other circuit being carried by the car, having a sig- readily opened to be cleaned from the inside. Pivot nal bell and terminating in electrical contacts adapted to come iuto hearing with those on the roadbed. 'The system is designed to notify not only the stations of the road, but also the engine running over the road that another engine is coming in the opposite direction, thus lessening the liability to collisions.

ELEVATED RAILWAY.—John N. Vallev, Jersey City, N. J. This is an improvement in a line with several similar inventions by the same inventor relating to a class of railways in which the track is supported from posts, the track rail being suspended from a longitudinal stringer. The invention provides a ready and simple means of grading the track rail to compensate for irregularities of the ground, there being an adjustable support for the track whereby the point of connection with the posts may be made higher or lower as desired, the grading being thus effected by unskilled labor.

Mechanical.

COMBINATION TOOL.—Charles Becker, Little Berger, Mo. A tool especially adapted for use as a pipe wrench and cutter has been designed by this inventor. By its use a pipe may be firmly gripped and turned without injury, and it may also be quickly adjusted to cut a pipe of any size, while by separating the head from the remainder of the tool it may be made into a convenient hammer and screw driver.

TOOL HANDLE FASTENER.-Leon R. Ligier, Douglas, Wyoming. This improvement is especially designed for fastening the handles on picks, nearly to the eye of the tool, and the collar is then connected by braces with the tool proper at each side of the eye, very firmly securing the tool to its handle.

PLIERS.-Frank C. Neuhaus, Kinkler, Texas. In this tool the gripping faces of the jaws have a longitudinal ridge and a corresponding groove, with opposite meeting faces on each side of the ridge and groove, thus forming a tool adapted to bite and kink a wire in a novel and superior manner, and one well adapted to facil- and Levi B. Kellum, Cripple Creek, Col. This is a meitate the stretching of wire in building wire fences.

BRICK MOULD. - Charles A. Shultz. Rondout,'N. Y. According to this improvement, bricks with rock faces may be made in any of the ordinary brick machines, and as economically and rapidly as bricks of the ordinary pattern. The mould is divided into compartments, each of a size to form a double brick, but with a rib marking the normal line of separation, and when the double brick has become partially dried the parts are separated on the line of the rib, form ing an uneven face where the portions are broken away from each other.

PRINTING PRESS. - Hynek Breuer, New Prague, Minn. This is a hand press in which the impression is made by the cylinder being rolled across the bed and the invention provides therefor an automatically rocking tympan, whereby, as the impression i made, the type will contact only at the point at which the impression is taken, the tympan automatically carrying the paper or other material printed immediately | different States of the United States revised to May 31, away from the face of the type after receiving an impression. The press is also adapted to print a clear, sharp, and fine impression, effectually preventing smndging, and doing the Work rapidly.

Miscellaneous.

POWDER AND FUSE WARMER.—Albert Price, Marysville, Montana. A case is divided into partitions having at the top a powder tray, at the sides fuse compartments, and centrally a heating compartment. A metallic candle holder supports the candle to be burned in the latter, and the partitions are perforated, thereby affording a dry heat for thawing or softening powder, loading of flat cars. Means are also provided whereby fuses, or anything containing nitroglycerine, there being

> Horseshoe. — Arthur E. Ogden, Ashley, North Dakota. This shoe has two sections of unequal length pivoted together, each section having an inwardly and upwardly extending flange, the longer section with a recess at its pivoted end and the shorter section with a latch head entering the recess, a rod passing through apertures in the ends of the sections. The shoe also has removable calks, readily placed or semoved, the shoe being adapted to fit the foot perfectly and so shaped that the weight of the animal will hold the calks in position.

> WIRE STRETCHER AND HOLDER .-John R. Brabston, New Bell, Miss. A chain having a hook plate on its free end is shackled to a forked handle bar, another chain in two sections being shackled to the bar near its opposite end, a snap hook connecting the chain sections, and there being a claw hammer head on the straight end of the bar. The implement is especially adapted to hold a wire taut while being secured to a post, to hold loosened wires in position while a post is emoved, and also to readily remove fence wires, serving also as a reel shaft when old wire is to be reeled for use again,

> CLOTHES PRESS.—Huldah A. Shepard, Nelsonville, Ohio. This is an apparatus for pressing clothes to remove the moisture, and is especially designed for laces, table linen, and clothing which may be evenly folded. It has an outer and inner vessel, the bail of the latter having a central bearing for a hand-operated screw on the lower end of which is a follower, by means of which pressure can be brought to bear on the clothes folded and placed between boards, or double perforated hollow partitions or spaces.

> Door Check. — John Speirs, Jersey eye at an angle to its larger portion, while a separate chain moves freely through the larger portion of the eye. but interlocking with the link when in its contracted end. It is not only adapted for use as a door securer but may be employed for suspending and lowering ships boats from the davits and for other purposes.

> WINDOW.-William Wallace, New York City. A perfectly air, water and burglar proof window has been devised by this inventor, the window being also plates or bearings on the sash have adjustable pivots enteringsockets in the frame, and the weather strips have a ridge entering a recess in the sash and an opposite ridge overlapping the edge of the window frame

> HANGER.-William H. Case, South Oil City, Pa. This is a simple and inexpensive device designed to conveniently support a normal length shade roller and curtain pole, irrespective of the width of the window. It is made of a single piece of wire formed at its ends with integral brackets, provided with curtain roller and shade roller brackets, the wire between the brackets being corrugated vertically to provide for kngthening or shortening the hanger.

> BOOKBINDER.-John B. Johnston Malta, Ill. This device comprises grooved strips having lugs at each end adapted to clasp a cover and through which binding wires are adapted to be passed, the ends of the wires being turned down in the strips and held by cap pieces. It is an extremely cheap and simple binder, readily applicable to newspapers, magazines, etc., and for holding covers on periodicals, while it may he made quite ornamental.

DRUM. - Morton E. Converse, Winchendon, Mass. This invention relates to the head sections of drums, which are so made as to be readily re moved from the body, the chines and flesh hoops remaining as securely connected as when each head section is upon the body, thus enabling the drums to be dismounted and the heads and bodies rested for shipment.

EXHIBITING DEVICE.—Edwin B. Lunhammers, etc. A collar slides over the tool handle beck and Clarence P. Cummings, Monte Vista, Col. This is an exhibitor especially adapted to hold and advantageously display mineral specimens. It comprises a blank of spring metal formed with struck up tongues whose free ends form notches, one of the tongues be ing bent to operate in connection with an adjacent tongue, and the blank being fastened to a suitable supporting base or in position in a case.

BUCKING BRONCHO TOY. - Elmo F. , chanical toy representing the broncho and its rider, and as the platform on which the animal is mounted is drawn forward or pushed backward, the animal automatically assumes alternately a normal and a bucking position.

Note.-Copies of any of the above patents will be furnished by Munn & Co., for 25 cents each. Please send name of the patentce, title of invention, and date of this paper.

NEW BOOKS AND PUBLICATIONS.

THE SNOW-CHURCH COMPANY'S LEGAL AND BANKING YEAR BOOK FOR BANKERS. LAWYERS, AND THE BUSINESS PUBLIC, 1893. Collection laws revised to May 31, 1893. New York: The Snow-Church Surety Co. Pp. 1315. Price \$5.

This extensive work contains the collection laws of the 1893. The laws are arranged under alphabetical heads, and separately for each State, so that it forms an exceedingly convenient summary for use by business men. Various useful tables, such as those of area and popula-

tion of different States and of points accessible to banking towns, are given. It is designed not necessarily to supplant legal concultation, but in many cases may precede the same with advantage.

ADDRESSES DELIVERED BEFORE THE WORLD'S RAILWAY COMMERCE CONGRESS. Held in Chicago, Ill., June 19-23, 1893. Official report. Chicago: The Railway Age and Northwestern Railroader. 1893. Pp. v, 265. Price

The railway law and legislation, railway management and operation, railway employes and railway history and development are the topics covered in some 25 papers and divisions of this work, as representing the main advanced thought of the railway men of this and other conntries. The book is to be highly recommended.

COMPOUND LOCOMOTIVES. By Arthur Tannatt Woods. Second edition.
Revised and enlarged by David
Leonard Barnes. Chicago: The
Railway Age and Northwestern
Railroader. 1893. Pp. xiv, 330. Price

Cornell University, of which Mr. Woods is a graduate, is in a certain sense identified with compound engines This excellent treatise, with glossary, satisfactory index and appendices illustrated liberally, should, at the pres ent day, be peculiarly welcome to engineers when the movement in favor of compound engines on railroads is so very prononneed. The important subjects of conden sation in cylinder and the starting power of locomotives both of so much importance in compound locomotive engines, are specially treated. Three and four crank compounds and antomatic starting gears are examples of the author's topics, while a short chapter is devoted to the reasons why economy obtains in compound locomotives a subject very little nnderstood by many, perhaps even by many of their advocates.

AN ELEMENTARY TREATISE ON THEO-ELLEMENTARY TREATISE ON THEO-RETICAL MECHANICS. By Alexander Ziwet. Part II. Introduction to Dynamics. Statics. New York and London: Macmillan & Co. 1893. Pp. viii, 183. No index. Price \$2.25.

The second part of Professor Ziwet's treatises is devoted to the introduction of dynamics and to statics. The calculus and higher mathematics are used throughout and at the end of the book are given the answers to the

SCIENTIFIC AMERICAN BUILDING EDITION

DECEMBER, 1893.-(No. 98.)

TABLE OF CONTENTS.

- Elegant plate in colors showing a colonial residence at Stamford, Conn., recently erected for C. Cooper Clark, Esq., at a cost of \$9.500 complete. Floor plans and two perspective elevations. An excellent design. Mr. Augustns Howe, architect, New York.
- Plate in colors showing the residence of Thomas C. Wordin, Esq., at Bridgeport, Conn. spective views and floor plans. Cost \$5,000 complete. A very attractive Queen Anne design. Mr. Henry A. Lambert, architect, Bridgeport, Conn.
- 3. A dwelling erected for Edward W. Alling, Esq., at New Haven, Conn. Perspective and interior view and floor plans. An excellentdesign. Cost \$4,500 complete. Messrs. Stilson & Brown, architects New Haven, Conn.
- very attractive residence recently crected for R. Bnrton, Esq., at Hartford, Conn., at a cost of \$7,800 complete. Floor plans, perspective view, etc. Mr. Henry D. Hooker, architect, New York An excellent design.

 Engravings and floor plans of a suburban residence
- erected for II. McKay, Esq., at Boston, Mass., at cost of \$2,400 complete. Mr. Austin W. Pcase, architect, Boston, Mass. A very attractive design.
- dwelling recently erected for P. H. Lucas, Esq., at Chester Hill. Mt. Vernon, N. Y., at a cost of S7.000. Floor plans and perspective elevation, also minterior view. Mr. Louis H. Lucas, architect, mark et or labeled. Mt. Vernon, N. Y.
- A cottage at Mystic, Conn., erected at a cost of \$3,000 complete. Elevation and floor plans and an interior view. Mr. John S. Rathbone, architect, New London, Conn.
- A dwelling recently completed at Staniford, Conn., at a cost of \$3,500 complete. A picturesque design. Two perspective views and floor plans. Messrs. Munn & Co., architects, New York.
- 9. Miscellaneous Contents: The education of customers.-How to catch contracts.-Hints to readers.-The latest and best designs for houses.-Labor Day -Tests of paving materials.-The World's Columbian Exposition, a general view.—The builders' friend.—A durable and ornamental roof, illustrated.-An improved woodworking machine, illustrated.-The Pasteur filter, illustrated. -The Roch ester parlor heater and improved oil stove, illustrated.—A stovepipc radiator, illustrated.—An electric passenger elevator at the Exposition, illustrated. Woodworking machinery at the Fair.-A new building material.—Torsion braided wire mattresses, pillows, cushions, etc., shown at the Expo sition, illustrated.

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Microbe Killer Water Filter, McConnell Filter Co., Buffalo, N. Y.

Wanted-Light machinery or specialties to build. P. G. Fleming's Machine Works. Elizabeth, N. J.

Pipe frame truck baskets, steel and wooden trucks, etc. L. M. Moore, Rochester, N. Y. See page 399.

Steam Hammers, Improved Hydraulic Jacks, and Tube Expanders. R. Dudgeon, 24 Columbia St., New York.

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The "Olin" Gas and Gasoline Eugines, from 1 to 10 horsepower, for all power purposes. The Olin Gas En-

gine Co., 222 Chicago Street, Buffalo, N. Y. Send stamp for circular of castings and parts if the dynamo-motor advertised on page 336, Scientific Ameri-

can. Elbridge Electrical Mfg. Co., Elbridge, N. Y. The best book for electricians and beginners in electricity is "Experimental Science," by Geo. M. Hopkins, By mail. \$4; Munn & Co., publishers, 361 Broadway, N. Y.

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Names and Address must accompany all letters, or no attention will be paid thereto. This is for our information and not for publication.

References to former articles or answers should give date of paper and page or number of question.

Inquiries not answered in reasonable time should be repeated; correspondents will bear in mind that some answers require not a little research, and, though we endeavor to reply to all either by letter or in this department, each must take his turn.

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houses manufacturing or carrying the same.

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Books referred to promptly supplied on receipt of price.

(5638) C. W. B. asks: 1. What adhesive substance can be used to hold firmly glass mounted on wood? Must be strong enough to resist the suction of rollers on printing press. A. Scaling wax. 2. Wha. can be used to prevent hydrofluoric acid from etching on glass, i. e., for relief work? A. Beeswax or paraffine wax.

(5639) C. E. N. asks: 1. Could a 1/4 horse power motor be run by Leclanche batteries, if not run ver 1 minute at a time and not more than ten times a day? If so, how many would it take? A. It would require about 200 cells. 2. Also, how can I make a silver ing solution? A For electroplating see our S PLEMENT, No. 310, 10 cents by mail.

(5640) S. G. asks: 1. At what temperature will sulphur suhlime? A. About 752° F. 2. What cantharidin? A. It melts at 425° F. to 450° F., and sublines freely below 450° F. 3. Can I extract cantharidin from cantharides by sublimation? A. Extract with ether. Do not try to sublime it directly. 4. Will dry salt sublime, either alone or with other dry substances? If so, what is it? A. Yes; at a white heat, unmixed. 5. Can I make clear glass bottles answer for retorts? A. No: use regular retorts or round-bottomed chemister flasks. 6. Is there any publication on the use of retorts? A. Not on this subject alone. We send you our book catalogue, whence you can order anything the meets your ideas. 7. Will you please tell me how a sand bath s prepared? A. It is a plate or tray filled with sand and kept hot over a fire.

(5641) F. R. D. asks what treatment to give horn (scrap) in order to get in condition for moulding in steel dies with hydraulic pressure. A. llorn scrap can be softened for moulding by heatingto a temperature of 275° to 300° Fah., by steam or a lineced oil bath. For steaming, a strong tank with quick-opening door, equal show no characteristic color, and the coal will show to a steam pressure of 120 pounds per squars inch, will may be used. The heating is to be done by a Bunsen

(5642) C. M. W. asks: In selecting coke for cupola purposes, how may the first or best quality be known from poorer grades, without trying it in the cupola, and why is it that the poorer grades resemble so closely in appearance the better grades, making it thereby so difficult to know anything about it without a cupola test? A. The carbon element in coke is the key to its quality for furnace work; 5 to 10 per cent difference in the amount of silics or ash cannot be discovered by surface inspection. An analysis only will show it. The only practical way is to obtam the coke from known sources of good quality by trial. The Colorado cokes appear to have more fixed carbon than the Connellsville $\,$ cokes. Their faultiness may be in excessive sulphur and phosphorus. The Crested Butte field is said to be the best coking coal.

(5643) G. R. asks: How much work, foot-pound-minute, is the ordinary two horse tread power capable of developing, the tread power being the ordinary portable one as used in the country for thrashing? How much work, foot pound and minute, does the average two horse power gasoline engine exhibit in a friction bruke applied to the driving pulley? A. The capacity of the horse treadmill depends much on the weight, strength and steadiness of pull of the horses. The friction absorbs probably 25 per cent of the power, the actual power named in its size, or 33,000 foot pounds

(5644) J. S. P. says: Will you please give the velocity of steam or the distance it will travel per minute? A. The velocity of steam flowing into a vacuum is about 1,600 feet per second.

(5645) W. J. B. asks (1) for a good formula for liquid glue. A. Two ounces gelatine, 4 ounces water; when the gelatine has fully swelled, add 2 ounces glacial acetic acid. It is used for mending china, glass, etc. 2. I have made a drum armature for the hand power dynamo (Supplement, 161), but I have used iron wire instead of brass wire for binding on the wire, as is generally recommended. I have tried it, but it does not work very well. Would the iron wire around the armature cause this? A. The iron winding will do no harm You must settle the position of the brushes by experiment. They should be on opposite extremities of the same diameter. As far as your drawing is intelligible, it would appear that all the bells in the case given would

(5646) R. W. O. asks: Can a sailing ves sel sail faster than the velocity of the wind at the time? What is the fastest time ever made by a sailing vessel faster than the wind under any conditions. The Ameri-1851; the Dreadnought, New York to Liverpool in 1859, 18 days 8 hours, 3,000 miles; the same in 1860, Sandy Hook to Queenstown, 2,700 miles, 9 days 17 hours,

(5647) C. M. G. asks: Is there any electrical connection between the primary and secondary coils in an induction coil? A. There is none. For induction coil connections see our SUPPLEMENT, No. 160. 2. Also why is it that a needle laid gently in water will not sink for some time? A. It tloats in virtue of the surface tension. The surface film supports it somewhat as a thin sheet of Indiarubber would. There is no question of porougness

(5648) I. A. M. asks: The best month to cut hickory, so that the worms will not cuter the wood when cut. A. January is the best month

A large variety of air pumps of various forms have been described and illustrated in Scientific American Sup-PLEMENT. See Nos. 224, 303, 629, 630, 631, 10 cents each work, coloring, hronzing. etc., in the "Scientific American Cyclopedia of Receipts,"\$5 by mail.

(5650) W. B. asks for some process by which printing ink may be removed from paper, such as the page of a magazine, etc., without injuring the paper. A. Apply sulphuric ether to the ink with a little cotton wool ball, gently rubbing and using white blotting paper to absorb the ink; continue the operation until the ink is nearly all removed. The process is not very satis-

(5651) E. H. P. writes: I wish to make a spark coil and all else that I can toward lighting my gas by electricity, some four or five burners. A. For a spark coil use a core of pieces of soft iron wire eight inches long made into a bundle about one inch thick Wind it with four or five pounds magnetwire No. 18; a battery in open circuit with it, special electric burners, and a switch or push button are required. Address any dealer . electric supplies for fittings.

(5652) W. K. S. asks: Can a Crowfoot battery be made strong enough to run a motor with any power. A. Yes; but, owing to its high resistance and low voltage, a very large number of cells are required.

(5653) C. T. D.—The specimen sent has oeen identified by ProfessorC. V. Riley as being a large Muria pod-spirobolus mar qinatus, which, aithough dan gerous in appearance, is quite harmless.

(5654) J. V. W. asks: 1. Will the chloride of manganese fume on charcoal before the blowpipe? What color is the flame? Are there any colors left on the coal? A. Not to any extent, The flame will "Insect Life," vol. v., pp. 219-226.

brown color, not characteristic. 2. What diluted acids be required. An air-tight iron box heated in an oven to can be used to dissolve the phosphate of manganese? the required temperature may be used for small operations. Again, for buttons and small work heated dies will appear? A. Hydrochloric acid or other mineral acid will dissolve it, giving a light pink solution. S. What solution of manganese will stay green or blue? How prepared? A. None; the alkaline permanganates are dark violet or purple. 4. What is a neutral solution of peroxide of iron? A. A solution containing no free acid and not basic; for each equivalent of ferricoxide six bonds must be supplied by the acid. 5. Will a solution of hyposulphite of soda dissolve the phosphate of silver A. Phosphoric acid dissolves it.

(5655) W. C. Mfg. Co. asks what the resistance of No. 22 and No. 24 German silver wire is per thousand feet. A. German silver varies in resistance You may take 215 and 3420hms respectively for 1,000 feet of No. 22 and No. 24 wire.

(5656) H. M., Jr., asks if east iron rings can be used in armature of dynamo described in Supple-MENT 600. A. No. Use softest possible iron.

(5657) E. S. & S. ask: How would you change the winding of your 110 volt dynamo to produce a potential of 50 volts? A. Use half the number of turns on the armature, with wire of twice the diameter of that given. Wind field for one half the resistance and same

(5658) B. B. K. asks for the required amount of storage batteries to light fifteen 16 candle power 50 volt lamps, with plates of storage batteries 3 inches by 7 inches and ten plates to one cell; also how so that the actual power delivered by two good horses long it would take to charge them with a three light 110 may be 1 1/2 horse power. The gasoline engine should have volt dynamo. A. You will need 10 parallel series of 25 cells each. The dynamo, giving only a small amperage, will charge them very slowly—several days being needed to charge after exhaustion.

(5659) J. E. M. writes: I have the SCIENTIFIC AMERICAN SUPPLEMENT, April 14, 1888, No. is about 1,550 feet per second at atmospheric pressure; at 641, in which you give plan and figures for making a dy-10 atmospheres about 1,780 feet per second. When flow namo? Cannot this plan be enlarged to make adynamo ing through a hole in a plate into the atmosphere at 15 of two horsepower to run on an arc circcuit? A. Yes pounds pressure per square inch, the velocity is 650 feet; Wind your motor for the amperage of the circuit as if and at 20 atmospheres or 300 pounds pressure the velocity, it were a dynamo to develop voltage equal to 746 imes 2 imesamperage in question. The amperes in arc circuits vary according to the system used.

> (5660) S. E. L. C. asks whether two 2,000 candle power lights will throw their rays of light, farther than one 2,000 candle power lamp of the same voltage. A. In general terms, the more powerful lights would be seen farthest.

(5661) C. C. N. writes: 1. How long would it take to charge 200 storage cells, each one being $2 \times 2 \times 4$ feet, with a 10 horse power dynamo? A. The dynamo would give a current of about 16 amperes. Divide the amperage of a cell by this figure and multiply by 10 for time of charging. 2. How long would it take to discharge them? A, Allow a rate of 6 amperes per square foot of positive plate. S. How many horse power would they ve on a motor? A. Multiply their amperage by 400 and livide by 746, and deduct 10 to 20 per cent for waste. 4. How often does the fluid have to be changed in storage cells wherethey are used tenhours each day, and how is crossing the Atiantic? A. A sailing vessel cannot sail the fluid made? A. It is dilute sulphuric acid, and occasionally needs slight additions of wateror of acid. 5. can clipper Flying Cloud made 374 miles in one day in What was the size of the storage cells used in the World's Fair electric launches? A. Address Electric Light and Navigation Company, 44 Broad Street, New York.

> (5662) M. S. S. asks: 1. Can gravity batteries be used to light an incandescent lamp? A. Not practically. 2. If so, how many will it take to light a lamp of 10 voltage and 8 candle power? A. About 60 cells. 3. Should the number of the cells be increased if the candle power of the lamps is increased? A. Yes.

(5663) W. E. C. says: I have a cylinder. dimension 2½ inches by 10 inches, and wish to force 150 cubic inches of gas in with the air the cylinder contains. How much pressure will ittake? Also how much pressure per square inch will the explosion of the gas in the cylinder exert? Does the gas comme the nir? If so, what change takes place when the cylinder is opened? A. To (5649) J. J. A. D. asks: 1. The simplest put the quantity of gus into the cylinder as stated, the way to make an air pump for experimenting. A. pressure on the pump will gradually increase from 0 to 44 pounds per square inch. It will not be explosive, as there is too much gas in proportion to the air. For the best explosive mixture, 6 parts of air should be mixed mailed. 2. What is the process used in dipping and with 1 part of gas, when, by exploding, the pressure may lacquering brass? Is there more than one way? A. rise to 120 to 150 pounds personare inch. When ex-There are many receibts for dipping and lacquering brass | ploded, the product is nitrogen and carbonic acid gas, with a little steam formed by the union of the hydrogen of the gas with part of the oxygen of the air.

> (5664) B. M. K. says: Some time ago we dug a new well, the water being soft when found. Since that we have walled the well with limestoneand the water is very hard. Did the stone cause this? Will it be permanent? What would be the remedy? A. The limestone is probably the cause of the hardness. By drawing a larger quantity you may modify the hardness to a con siderable extent; or if there is a deep water soil beneath the well, a drive pipc in the well and pump should give you soft water from the lower stratum.

> (5665) T. A. C. savs: I herewith inclose species of scale insect infesting our persimmon peach, and orange trees. Some know it as "hutton smutscale." Will you let mcknow its species and any known remedy? This scale leaves a "smut" similar to that of "white fly." The latter is doing great damage in Central Florida, and is spreading rapidly, coming south at rate of about forty miles each season. Reply by Professor Riley .- The scale insect sent, and to which you apply the popular term "button smut scale," is the Florida Ceroplastes, also called the white scale and the wax scale (Ceroplastes Fioridensis, Comstock). A full account of this insect will be found in Hubbard's "Insects Affecting the Orange," pp. 56-59. A perfectly satisfactory remedy consists in spraying with dilute kerosene soap emulsion at the time when the young batch. The principal hatching times are first in April and May, second in July and August, and third in October and November. A full account of what is called "white fly" is to be found in

TO INVENTORS

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