ENGINEERING INVENTIONS.

A valve gear has been patented by Mr. Joseph Ralstin, of San Jacinto, Ind. This invention re-lates to reversing gear for plain slide valve engines, and covers a novel construction and arrangement of parts.

... AGRICULTURAL INVENTIONS.

A grain drill has been patented by Mr. Samuel H. Koble, of Hickman Mills, Mo. This invention covers certain novel features in the construction and arrangement of parts to promote convenience in operating and controlling grain drills, and to secure uniformity in the distribution of seed.

A check row planter has been patented by Mr. Charles R. Dollarhide, of Paris, Ill. By this invention the seed dropping mechanism is operated by an endless chain, which is made to travel on suitable wheels by means of projections on the chain, which are placed in contact with the ground, the device having also various novel features of construction.

A self-dropping corn planter has been patented by Mr. John A. Johnson, of London Mills, Ill. The self-dropping slide is connected with the axle of the drive wheels by a wheel on the axle, and provided with cams operating upon a vibrating frame, pivoted at one end of the carriage frame, and connect ed at the other end by a wire or attached to the seeddropping slide, so the slide is operated by the revolution of the axle, with other novel features.

MISCELLANEOUS INVENTIONS.

An improvement in fences has been patented by Mr. Charles C. Hinkle, of Hazleton, Ind. This invention relates to portable board fences, the con-struction being such as to make a frictional joint between the panels, with various other novel features.

A fitting for gas brackets has been patented by Mr, Henry P. Drew, of New York city. This invention covers a novel construction and arrangement of parts to prevent gas from escaping, strengthen the brackets, and prevent the swings from being turned too far.

A steam boiler has been patented by Mr. George W. Shealey, of Marshalltown, Iowa. The object of this invention is to provide an economical food cooker and boiler for steaming food for stock, and the device is one which has great working capacity, is easily operated, and is adapted to various kinds of fuel.

A fire escape has been patented by Mr. Edward Painter, of Easthampton, Mass. It is constructed of two endless chains or cables passed over notched wheels mounted on shafts journaled at the top and bottom of the building, the chains being united by cross rods, and buckets being hung on the chains.

A door signal has been patented by Mr. Alonzo L. Doru, of Chicago, Ill. It consists of a con trivance to disclose a word signal and to sound a bell in connection with the unlatching wire extending from the front door to the interior or upper portion of the house, to admit people without descending the stairs.

A balanced stack roof has been patented by Mr. Frederick W. King, of Farmington, Iowa. It has slotted posts and rafters covered with boards and shingles, with ropes attached to the roof, passing over pulleys pivoted in the upper part of the slotted posts, with balancing weights attached to their ends, so the roof can be readily raised and lowered.

A hand elevator for packages has been pa tented by Mr. Frank Schumann, of Memphis, Tenn. This invention provides a rod with an adjustable and a pivoted clamping arm, making a device for use in depositing packages and small articles upon elevated shelving, or for taking them down, thus dispensing with the use of a step ladder for such purpose

A log binder has been patented by Mr. John Flynn, of Roscommon, Mich. The invention consists in a lever with a grab and a locking latch pivoted to a frame connected with one end of the chain or some fixed object, one link being placed in the grab, the chain drawn taut, and the lever locked on the frame by means of the latch.

A spring holder for napkins has been patented by Mr John C. Tutt, of Kansas City, Mo. This invention combines with the end of a spiral spring a sharp pointed hook with a rigid cross bar, one at each end of the spring, so the contraction of the spring draws the hooks together, and holds the napkin, handkerchief, or other garment to the desired adjustment.

A trace carrier has been patented by Messrs John C. Glaser and Charles A. Cummings, of Monticello, Iowa This invention consists in a metalets adapted to fit and slide upon a lic loop with soch metallic bar or slide secured to the skirt of the saddle, a thumb screw being screwed into the slide to limit the movement of the loop. A padlock has been patented by Mr. William W. Richards, of Washington, Ga. The invention consists mainly in the peculiar form of locking bolt and its combination with a spring, a tumbler, and key, the revolving tumbler barrel swiveling on the case, and the key having bits adapted to engage with and pull down the bolt. A fender for wagon bodies has been patented by Mr. Christian L. Haubeil, of Waverly, Ohio. This invention relates to guards or chafing irons for wagons in which rollers are arranged to project on or from the body of the vehicle to prevent the wheels from chafing the body, and covers a novel construction of the rollers and means for supporting them.

A friction balanced spring roller has been patented by Mr. James H. Russ, of Providence, R. I. This invention covers an improvement on a former patented invention of the same inventor, making a roller which is cheap, durable, and reliable, and in some cases, for very heavy window shades, a rubber washer is employed upon the spring head.

A gearing for windmills has been patented by Mr. Charles W. Roberts, of Oskaloosa, Kan. There is a combination of double gears and shafts for transmitting rotary motion from the wheel shaft of the mill to the line or driving shaft, with provision for certain of the driving gears to run idle in a back direction when the mill shifts or turns in the wind.

A railroad switch has been patented by Mr. Ahraham Agres, of New Yorkcity. This invention relates to that class of railroad switches which are operated by the weight of the horses drawing the cars, the switch tongue being shifted by the movement of a rocking frame, thus securing ease of movement and reliability in action.

A wagon spring and gearing has been patented by Mr. Joseph Allan, of Carrolton, Miss. This invention covers a novel construction and arrangement of main and auxiliary springs in wagons, making a gearing that is substantial and comparatively inexpensive, combined with which is a fifth wheel that relieves strains on the king bolt.

A button attaching implement has been patented by Mr. Milton H. McNair, of Meadville, Pa. This invention relates to improvements in a magazine implement where the fastenings pass through the eyes of the buttons, and consists in a novel construction and arrangement of parts, and the implement may be operated or the mechanism organized for use with treadle or other power.

A pail, tub, or barrel of novel construction forms the subject of a patent issued to Mr. James W. Weston, of New York city. The invention consists in the combination, with head sections and key, for closed or headed receptacles, of a removable support or follower, to close the openings of the adjacent head sections, and there is also a novel device of sampling hole and plug.

A lead press has been patented by Mr. William A. Shaw, of Pittsburg, Pa. This invention covers a novel construction resulting in a duplex machine in which one charge of metal cools to proper consistency in position in its holder or cylinder, while another is being forced through the die of a different cylinder, so that no time is lost by the attendants in vaiting for successive charges

A carriage pole or shaft has been patented by Mr. James M. Dille, of Cooperstown, Pa. The invention covers a novel construction of devices for a part of the thills or pole to so attach the horse that he will have free and unobstructed movement of bis limbs, and to relieve both the horse and the occupant of the carriage from shocks when the carriage wheels meet obstructions,

A boiler for beating buildings has been patented by Mr. William H. Byram, of New York city. It is composed of independent' sections arranged one above the other, the connections being fitted together by tongue and groove joints, and the sections secured together by bolts, to make an efficient and economical sectional boiler, maintaining a positive circulation, and comparatively or whonly free from leakage.

A bicycle has been patented by Mr. William Clemson, of Middletown, N.Y. In combination with the wheels and fork, levers at or near their centers on the cranks, bars connecting the front ends of the levers with the fork, there being springs on the levers and foot rests on their rear end, to give greater leverage and enable the bicycle to be more easily worked.

A fire extinguisher has been patented by Mr. James McGwin, of Fulton, Mo. A revolvable perforated, bottle holding cylinder is suspended within a vessel, and there is a shaft for revolving the cylinder, the shaft being also arranged to liberate acid and mix it with the contents of the vessel, making a simple portable fire extinguisher, which can be quickly brought into action.

A combined lint room and press has been patented by Mr. William B. Padgett, of Batesville, Ark. This invention pertains to attachments for cotton gins, and provides an improved contrivance for tramping the cotton in the press case, avoiding the former laborious and unhealthy method of tramping by the feet, while doing the work more efficiently and with less expense.

A harness has been patented by Mr. Cicero C. Ferrill, of Shubuta, Miss. This invention relates to a former patented improvement of the same inventor, and consists in part in adapting the ordinary breast collar to be used in connection with devices for attaching thills to a pair of hames directly, all other parts of a harness except a collar and breeching, the latter attached to the thills.

A milk cooler has been patented by Mr. Francis S. Hartzell, of Bean Pa. The object of this invention is to cool milk rapidly and uniformly, to raise cream in the shortest time, and for this purpose is provided an outer and inner metallic tank of special construction, so that the water spaces furnish a very large cooling surface, and the contents of the can are quickly and uniformly cooled.

A photographic camera has been patented by Mr. Walter Clark, of New York city. The invention provides a camera partition in front of the adjustable reflector and compartment or chamber in which the sensitive plate is exposed, thus dividing the hox into two sections, whereby provision is made for inclosing the lens case and working mechanism within the box, and doing away with objectionable outside exposure of parts, with other novel features.

The manufacture of solidified compound metals forms the subject of a patent issued to \mathbf{Mr} . Fer-dinand E. Canda, of New York city. This invention contemplates the grinding or pulverizing of two or more metals or alloys, and then coating the particles with tin or Babbitt metal or other alloy melting at a low temperature, after which the mixture so made may be treated in a die or mould, after having been suitably heated.

Business and Lersonal.

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plies of all kinds. Greene. Tweed & Co., 118 Chambers St., New York,

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HINTS TO CORRESPONDENTS.

HINTS TO CORRESPONDENTS. Name 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 encleaver to reply to all, either by letter or mail, each must take his turn. Special Information requests on matters of personal rather than general interest, and requests for Prompt Answers by Letter, should be accompanied with remintance of \$1 to \$5, according to the subject, as we cannot be expected to perform such service without remuneration.

Scientific American Supplements referred to may be had at the office. Frice 10 cents each. Minerals sent for examination should be distinctly marked or labeled,

(1) G. H. asks: On what part of the boiler does scale mostly collect-on shell or flues? A. It depends upon construction and way of operating. An examination of the particular boiler only will determine.

(2) Mrs. T. P. J. asks if there is any way of removingrust from cut steel ornaments. A. There is no way but to repoilsh them with a buff and rouge.

(3) W. B. asks a recipe for making the liquid used in the brilliant gold paint manufactured in Baltimore, or a liquid that would do. A. We do not know what is used in the preparation of the paint you mention, but benzine and paraffine are sometimes employed for this purpose.

(4) F. A. J. asks what the fulcrum of a safety valve is. A. The fulcrum is the center on which the lever moves. 2. What is meant by an automatic engine? A. An automatic engine is one governing its speed by the work it does, or having cut-off governors.

(5) A. S. B. asks what to put in hard water to keep lime from forming in his water pipes that feed his bathroom. A. A little caustic soda put into the tank will tend to break up the lime scale in the hot water pipes. About an ounce to the cubic foot.

(6) J. H. says: We have four sections of dry docks here in the Manatee River which are raised by hand pumps; why is it that the pumps work so much harder when we raise a large schooner than when we raise a light one? It looks as if we were pumping water from a reservoir, and the weight should have no effect on the pumps. A. Your pumps work harder on account of the increased height of the column of water you have to raise,

(7) S. H. B. asks for a good formula for making sticky fly paper. A. In a tin vessel melt together one pound of resin and add two fluid drachms of linseed oil. While the mixture is warm dip a spatula into it, and spread what adheres to the blade on foolstureand introduce. Lexington Mfg. Co., Lexington, Ky. cap paper. Different samples of resin require varying

A process of marking cakes of soap bas been patented by Mr. James M. Craig, of Brooklyn, N. Y. The cakes are cast in moulds, around dies placed upon a rod, and when the soap is hard the rod and dies are withdrawn: the cakes are then placed in a mould covering the ends of the die apertures, and liquid soap of a different color is poured into the uncovered end of the rod aperture.

A fire escape has been patented by Mr. Joseph M. Hodson, of Amherstburg, Ontario, Canada, It is formed of a casing on which a drum is pivoted, on which a wire is coiled, the wire being passed through apertured lugs or brake levers pivoted in the casing, the wire also passing between transverse pins or rods in the casing, the friction preventing the apparatus rom descending too rapidly.

A workbox has been patented by Mr. Hugh S. Dickson, of La Harpe, Ill. This invention covers an improvement on a former patented invention of the same inventor, consisting of a workbox decreasing in depth from the bottom to the top, and having a cover increasing in depth from the bottom to the top, shelves being held in the cover from which inclined pins for holding spools project.

A device for unloading vessels has been patented by Mr. James H. Teubert, of Coal Valley, W. Va. A stationary inclined railway track is supposed to be built on the bank of a river, and the barges or vessels are to have hopper shaped receptacles for cargo from which discharge openings are arranged directly over the tracks, with sliding gates.

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If an invention has not been patented in the United States for more than one year, it may still be patented in Canada. Cost for Canadian patent, \$40. Various other foreign patents may also be obtained. For instructions address Munn & Co., SCIENTIFIC AMERICAN Patent agency, 361 Broadway, New York.

(8) J. H. S. asks: Is there a mine in Pennsylvania requiring pipe strong enough to stand a pressure of 1,500 pounds to the square inch, for the purpose of pumping out water? A. No The pressure is sometimes nearly reached in the pipe of "oil lines," so that pipe and fittings have to be tested to 2,000 pounds.

(9) D. T. W.-To run water mixed with air through glass tubing, the water, colored or otherwise according to one's fancy, is allowed to drop quickly into a little funnel at the top of the glass tube. This carries air in with the drop, and may be managed so as to represent a string of colored or silver beads.

(10) C. H. K. asks if any of the readers of the SCIENTIFIC AMERICAN have lany knowledge or information of that ill-fated American inventor, J. W. Starr, who about forty years ago cxhibited, in conjunction with a Mr. King, an electric light of great merit, of said Starr's contr' vance?

(11) E S.-There i no general rule as to the width or richness in lotal in gold bearing veins. It is said that the great Fareho voin in California was 6 feet wide at the outcrop and increased in width and value to a depth of over 1,300 feet. Sometimes the fissures are found to divide, and finally vanish in several directions.

(12) C. B. S.—The paint peels off the smoke stack because it is too thick. Use plumbago, lampblack, and boiled linseed oil. Thin with turpentine. Scrape off the old paint. If the brass of the boiler head is always hot, you can clean it with washed emery moistened with kerosene oil.

(13) W. P. asks: What is the best wood to make a banjo with, and what kind of wood is used by the makers? A. We believe that the kind of wood used in a banjo has very little influence on its tone. Curled or pin maple is largely used. Any strong wood capable of being steamed and bent may be used for the hoop, and the kind of wood employed for the neck is merely a matter of taste.

(14) C. G. R.-We know of no reliable method of plating with nickel without a battery, or its equivalent in the shape of a dynamo. You can tin articles by cleaning them thoroughly, and dipping them in melted tin covered with wax or tallow.

(15) T. R. asks how to make a solder that will come off easily without being heated after being puton. A. We know of no solder that will auswer this purpose

(16) W. D.-We know of no solder that can be used on tin without resin, acid, or some other form of flux. Oil is sometimes used instead of resin

(17) G. B.-The lenses of a magic lantern willanswer for a camera; it is not uncommon to use camera tubes for magic lanterns. Magic lantern tubes. as a general thing, are non-achromatic, and a tube of this class would make an inferior camera.

(18) H. C. B.-The phonograph cannot be applied in the manner suggested by you. It is necessary to speak very loudly in the mouth piece to produce any effect. The phonograph is the only instrument now known that will record articulate sounds.

(19) P. McC. says: I have a triangular box wood scale that is dull in appearance and loses distinctness by use. How can I varnish it so that it will remain bright and yet not soil my drawings? A. A thin coat of French spirit varnish would improve your scale.

(20) J. K. C. asks the focal distances of the different glasses in the eyepiece as shown in Fig. 10, SUPPLEMENT, No. 399. A. Beginning at the eye end, the focal lengths are respectively 1 inch, 2 inches, 1% inches and 11/4 inches.

(21) E. F. McR. asks the proper method to clean oily waste. A. Place the waste in a solution of water and sal soda, and then blow steam through the mixture.

(22) W. B.-"Boiling coal tar" thickens it and makes it set quicker by evaporating part of its volatile element.

(23) J. M. asks how long it takes a train to come to a standstill when the Westinghouse brakes are put on, and what causes them not to act sometimes? A. A train running forty miles an hour can be stopped inside of 500 feet on a level. The train will not stop so quickly if the brakes become locked on the wheels

(24) R. W. asks if the condensing of steam in an ordinary locomotive boiler, after the fire is put out at night, will cause a sufficient vacuum to draw water from a tank, the water in which is but little below the level of the water in the boiler, or will it cause a vacuum at all? A Yes; it will draw the boiler nearly full if the valve on the feed is not closed, provided that the safety valve, gauge cocks, etc., are tight, and also depending somewhat on the temperature of the atmosphere. More apt to do so in winter than in summer.

(25) L. J. S. writes: We have an artesian well about 1,100 feet deep and 6 inches bore, tubed down 380 feet with 3 inch pipe; the water does not come up any higher than 25 feet from the surface, and we are pumping it out. Now, about ten years ago this well was built, and was bored down 525 feet; it then flowed out of tubing at surface; one year after this it was drilled deeper, down to the present depth-1,100 feet -and the water stopped flowing and we had to pump ever since. Now I would like to fill this well up with some material or plug it so that it will only be 525 feet deep, as it originally was, and think it will then flow again. What is the best method to pursue? A. The drilled well for the distance between 525 feet and the bottom contains 112 cubic feet. As clean sharp sand nthe safest material to fill in with, we recommend it. Start by slowly filling in 25 cubic feet, and observe at the rate of 1.000 feet per second, and the ball is fired whether the water rises; if not, another 25 cubic feet, in the same direction with sufficient powder to give it so on until you have put in 112 cubic feet. Then sound also a velocity of 1.000 feet per second? A. Apart the well, and if the sand has not gone the same way from the additional friction by the train moving against that the lost water went, you should find bottom at about 525 feet, with a restoration of the old flow.

chlorate (NaClO₃) corresponding to the potassium chlorate (KClO₃)? A. There is. 2. Could it not be produced in the same way as the KClO₃? A. The simplest method of preparing sodium chlorate is by treating hydrofluosilicic acid with potassium chlorate, giving rise to free chloric acid, and then saturating the chloric acid thus formed with sodium carbonate. 3. In my Barker's Chemistry I find the formula for saltpeter to be KNO_3 . In the encyclopedia it is marked KO_1NO_5 . Why 18 this difference in oxygen atoms? Which is correct? A. KNO3 is correct; KO,NO5 is the old nomenclature. 4. Could not a temperature sufficiently high be produced (and by what) to cause the combustion of nitrogen in oxygen or air? A. Nitrogen will burn in air or oxygen when an electric spark is passed through the mixture. 5. Ought unwashed nitroglycerine to explode under the hammer? A. If pure nitroglycerine is placed upon an anvil and struck with a hammer, only the particle receiving the blow explodes, scattering the remainder. 6. In attempting to make nitroglycerine I put the three ingredients together and agitated them, when a brownish-red gas came out and left a brown liquid. What were these, and why did I not ucceed in getting the nitroglycerine? A. The gas was the vapors of the decomposed nitric acid, and the coloration of the liquid was due to the same cause. See Manufacture of Nitroglycerine on page 3874 of Scien-TIFIC AMERICAN SUPPLEMENT, No. 243. Any large book dealer will have on hand or obtain for you a work of so standard a character as Watts' Dictionary of Chemistry

(29) W. M. G. asks the reason why salt adds to the freezing qualities of ice, and if there is anything known that will draw out as much coldness withmanufacturing. A. Salt has an affinity for water, and in exerting this characteristic feature causes the ice to melt, which then absorbs beat in the action of liquefying. In the SCIENTIFIC AMERICAN for June 21, 1884, we give, in answer to query 4, a number of freezing mixtures. By consulting this you will find several substances which act similar to salt in this respect. There are various machines for making ice, and they are described in different issues of the Scientific American Supple-MENT. such as Nos. 85, 32, 73, 171, etc.

(30) H. D. H. writes: 1. We are making a No. 133; would like to ask if there is any substance betterthan mica and ferrotype tin of which to make the diaphragm? A. No. 2. What improvements have been made on the phonograph since your SUPPLEMENT, No. 133, was published? A. No material improvements have been made on the phonograph since its invention. 3. Has any invention yet been made that will duplicate the vibrations on the tin foil, so that you could transfer a copy of the vibrations on to another piece of tin foil, and make it repeat what had been said on the first? A. We think not. Possibly they might be electrotyped.

(31) D. C. S.-Every chimney, gable, tower, and salient point of your building should be protected by a lightning rod. It is well to have a ground connection at each corner of the building, and all of the me-tallic parts of the roof and tower should be connected with the rods. The lower ends of the rods should extend to a sufficient depth in the earth to reach a stratum that is constantly wet. It should be laid in a trench extending away from the house from ten to fifteen feet, and should be surrounded with metal scraps, or better with coarsely granulated coke. Rods may be of copper five-sixteenths of an inch in diameter, or of iron double this diameter. All the joints should be soldered as well as screwed together. Insulators are worse than useless. For information on finding a latitude consult SUPPLE MENT, No. 316.

(32) E. F. S. asks: 1. What telephone has the most extensive use? A. The Bell telephone is used almost exclusively. 2. What telephone would be most suitable for use in a village? A. Any of the electric telephones will answer your purpose. 3. Is a non-electric telephone good for distances of a mile or two? A. Acoustic telephones will work well for a distance of a mile in a still day. 4. Can the telephone be made to pay in a village of 2,500 or 3,000 inhabitants, and what is the usual plan of charging or receiving payment for its use? A. It would probably pay. For full information on the management of central offices, you should write to some of the telephone companies,

(33) J. P. C. asks: What speed will a cannon hall have if when fired the cannon is on a train moving the air at a speed of 1,000 feet per second, which would somewhat retard the velocity of the ball, the ball

would have a velocity due to its discharge from the

(28) R. S. N. asks: (1) Is there any sodium Discharge for 1/2 inch nozzle. 3/2 gallons per minute; do. for ¾ nozzle, nearly 2 gallons per minute; do. for ¾ nozzle, 7% of a gallon per minute. 2. Will the water meters in use reduce the pressure on the stream passed through? If so, how much? A. If the water meter is of sufficient size to pass the above quantity per minute, it will not lessen the pressure.

> (36) A. J. D. asks: What is the dark bluish crocus used by burnishers for polishing? A. It is rouge. 2. What is the best record for a 100 mile go as you please? A. The best time for 100 miles is 18 hours 8 minutes and 15 seconds, in London. The best time in United States is,150 miles 850 yards in 24 hours. Hazael made 600 miles 220 yards in 6 days.

> (37) W. R. H. writes: 1. I wish to run a sewing machine by power; would you advise weight or water power? A. We advise water power, if it is available; but if you are obliged to pump up the water to secure the power, it would be better for you to procure some form of small motor. 2. Could you give me directions for making a very small turbine wheel, say 1 inch or so, which would run my machine 2 hours with a hogshead of water at a height of about 20 feet? A. You can secure small turbine wheels from any of the oring gold the Etruscan color. A. Etruscan is made by eating the alloy from the surface of the gold by a chemical or electrical process.

(38) E. C. B. asks the number of cubic feet of water and the number of pounds of coal engines of 1, 2, 3, 4, 5, 6, 7, 8, 9, 10 horse power would need to run at 60 pounds pressure. A. Engines and boilers, in their out melting the ice. Also the ingredients used in icc modern variety of kind and economy, present so many and variable features of construction that no special data can be given that will apply to any two varieties; generally about 9,000 feet. A depth of about five miles 1/4 to 1 cubic foot of water per horse power per hour are about the extremes, using about 3 to 6 pounds coal per hour per horse power.

(39) T. H. B. writes: Suppose the cylinder of an ordinary steam engine to be lengthened out to twice its present length, no matter what that may be, and reduced to a corresponding extent in diameter, so that the cubic space in the cylinder will remain as large as before and hold the same amount of steam: will the phonograph according to instructions in SUPPLEMENT, lifting power on the end of the piston rod be the same as in the shorter and wider cylinder? A. No; the lifting power, or force upon the piston rod, is proportioned to the area of the piston. The larger diameter exerts the greater force. The length of the stroke is the measure of work done under that force.

> (40) A. E. M. asks: 1. What could I use in bookcases, closets, and wardrobes to get rid of wood lice, book worms, and small spiders, etc., which keep getting in continually? A. Use camphor gum in small boxes set upon the shelves or among the books of your case, for insects. 2. Could sulphuric acid, carbonate of potash, or some other absorbent of moisture be used safely in bookcases to prevent mildew? A. Carbonate of potash or quick lime in open glass vessels will absorb moisture. Use no acid. 3. There is an idea prevalent among the country people here that trees should be felled for timber when the moon is waning, as the sap has then descended. I, myself, am inclined to rank this among the many superstitions concerning the moon, and should like to get your opinion on the subject. A. The moon has no influence upon the time thick at bottom and 21/2 feet thick at top, front side perof cutting timber. Always cut at the wane of the sap or fall of the leaf. I wish to carry a lightning rod into a well close to the walls of the house; but I have a pump set over it which works in all kinds of weather, and I fear it would be dangerous to handle it during a storm. Do you think there would be any risk to the attendant? A. Carry the lightning rod several feet as will make solid filling between the large stone. 4. underground to the well, and then down to the bottom without touching any part of the pump. It will be safe to keep away from the pump during a violent thunder storm, and still safer to make a water connection at a distance of 2 or 3 rods from house and well. We do not know who makes the wagons you ask about.

> (41) C. M. asks: 1. Would a bullet or other missile thrown perpendicularly into the air, fall to the tection. Make an ample sluice way of plank or with point of starting with the same velocity and force as it two walls and a covering of large stone for the stream received upon starting? A. Theoretically yes; practi- while building the dam. Make the top perfectly level cally only if in a vacuum. 2. Can electricity be used for and as long as possible, for the possibilities of a flood, the purpose of heating and warming houses, and for and protect the ends thoroughly against leakage other domestic purposes? A. Heating rooms by electrici- through the soil if the banks are not rocky. Lastly, ty has not yet been practically realized, though it is a dam of this kind will be stronger if slightly arched certainly possible. 3. Would a steam boat made upon the up stream, say 4 or 5 feet in a 50 foot dam. catamaran, or double hull, plan require a greater or less force to propel it at a given velocity through the water, carrying a given load, than would be required to propel a single hull steamer with the same load on a steamer of equal displacement with the first, if both pulverized and sprinkled around the infested places. A

length. Your mirror may be much smaller than the projected image, but to get the best results you should have a condenser in the form of a double or plano-convex lens to concentrate the light on the picture. 3. Could I also copy pictures with the "blue process of copying tracings" in the camera obscura, that is, could I copy pictures by putting the sensitive paper in the box and reflecting the image on it? A. The blue process of copying cannot be utilized in this way.

(44) W. S F. asks how the water proof blacking, or more properly speaking "liquid gloss," for ladies' and children's shoes is made. Kindly give composition and quantity of each. A. A fine liquid blacking consists of ivory black and molasses, of each one pound. sweet oil and sulphuric acid, of each four ounces. Rub together the first three until the oil is perfectly killed, then gradually add the sulphuric acid, diluted with three times its weight of water. Mix well and let it stand for three hours, when it may be reduced to a proper consistency with water or sour beer. A number of recent shoe polishes and varnishes are described on page 150 of SCIENTIFIC AMERICAN. for March 10, 1883, to which we refer you.

(45) R. P. Y. asks: Does the telegraph makers who advertise in our columns. 3. Is the Backus cable sink the full depth of the ocean, which I believe water motor a plain breast flutter wheel? A. It is a is five miles, and if so, what sort of grappling maplain fan wheel. 4. Please give me directions for col- chinery is it that will work at that depth? A. There may be narrow chasms in the ocean bottom over which the cable is suspended, but generally the cable rests on the ocean bottom. We have in the back numbers of our paper described several forms of grappling apparatus for raising ocean cables. The depth of the Atlantic reported by the cable soundings between England and France and Newfoundland, was nowhere over 15,000 feet, the bed consisting of two valleys separated by a broad ridge running from the Azores to Iceland, and the depth on this ridge being has been reported south of the Grand Bank of Newfoundland, but all the cables run on the higher plateau to the north of this.

> (46) A. C. C. asks: How many cells would it take of a Grenet fluid battery, zince 5 x 216 x 16 inch thick, carbons same dimensions, to heat to incandescence 21/2 inches or 3 inches No. 38 platinum wire, and how long will each zinc last, if used 5 hours every evening? A. Six cells would probably do it. If the zincs are kept well amalgamated, they might last for two months.

> (47) T. W. H. writes: The reservoir of our water works consists of a stand pipe 6 feet in diameter and 160 feet in height. In the winter we are bothered more or less with ice forming around inside of the pipe. We have a large cylinder stove at the base; don't you think if we would run about a four inch gas pipe up through the water on the inside, then keep a good fire at the base and let all of the heat go up through. that it would keep the pipe free from ice? A. Better run a second inlet from the pump to near the top upon the inside, and pump the water to the top during very cold weather. This will keep up a circulation, and tend to prevent freezing.

> (48) G. C. P. asks: 1. Can 1 build a dam of cement and sand by making a box to hold the mortar until it hardens? A. Yes. 2. Can I use small stones to help fill up and save cement, stones to be from 3 inches to 18 inches diameter, dam to be 7 feet high, 7 feet pendicular and pond side slanting? A. Use as much large stone as possible. Make the filling with coarse sharp sand and Portland cement. 3. What proportion of small stone can I use and have it strong? The dam is to be built on ledge the whole leugth, and is on a small stream and is 50 feet long. A. Use as much small stone Which will be the best stones to use round cobble stones or ledge stone got by blasting? A. Fragments are better than couble stones, and will resist water and ice cut. The top of the dam should be capped with a layer of the largest stone that you can get, laid inclined a little toward the pond, so that ice will not push them off. Back the dam by a filling of sand and stone for several feet level with the top for flood pro-

(49) J. S. asks for a receipt for removing water bugs or red roaches. A. Borax is considered one of the very best roach exterminators. It should be boats are made of the best shape of their kind? A. solution of 1 oz. poke root boiled in 1 pint of water The steam catamaran has not thus far been shown equal until the strength is exhausted, and then mixed with es and spread on plates and placed in localities infested with these pests, is "sure death." Paris green is likewise used, but undesirable, as it is poisoning machines claim they get rid of side draught by ous. A paste made of 1 part powdered chloride of lime and 1/2 part of some fatty matter is said to be ef-· fectual in driving cockroaches away.

(26) N. W. asks: 1. What saving in fricrefer to rollers whose surfaces touch the axle and its | air. box, not to rollers which turn on axles of their own. The saving of the latter is easily calculated, but the former seem difficult because they grind against each other. A. Friction rollers should not grind against each other, but should have end bearing running in a ring, which keeps each roller in its proper place. This form has the least friction. We have not the data for the amount. 2. Haswell's work on Engineering, page 354, states that the moving friction of a locomotive is 15 pounds per ton and that of trains only 6 pounds per ton. Is this true, and if so, why so? A. The differ. dry, sandpaper down the grain toget a smooth face; and ence of friction in locomotives and cars arises from the different weight upon journals.

determining the lifting power of a magnet? A. You do not say whether you mean electro or permanent magnets. As the power of a magnet depends on so many circumstances, it would be difficult to provide a formula for determining this accurately. 2. What sized wire should be used for the primary coils of a Hughes inber 24 wire answers very well for both coils.

gun added to the speed of the train, or 2,600 feet per tion is effected by anti-friction rollers, say 1 inch second, and in one second would be 1,000 feet ahead of diameter, surrounding an axle of 2 inch diameter? I the train, less what would be due to the friction of the

> (34) W. W. H. asks: What is the best process for ebonizing wood. A. SCIENTIFIC AMERICAN SUPPLEMENT, No. 207, gives several methods for dyeing wood black. A recent process consists in pouring 4 quarts of boiling water over 1 ounce of powdered extract of logwood, and when the solution is effected add 1 drachm of potassium chromate and stir the whole well. Continue the application until the wood is dark enough. When the work has become as the work to be ebonized must be quite free from holes, oil and fill in any of them with powdered drop

black mixed in a filler. Then give it a coat of quick (27) J. C. asks: 1. Is there any formula for drying varnish, and rub down with finely pulverized pumice stone and linseed oil until a good surface is acquired. A good wholesome varnish for ebonized work is obtained by dissolving black wax in spirits of wine.

water per minute will be discharged through a nozzle to 14 inches, must my mirror also be 14 inches, or can I duction balance? What for the secondary? A. Num- of 14. %, and 1/2 inch diameter, under a pressure of 60 have it smaller? A. If your tube is large enough, it will Batteries, production of pipe line and other, W. ; pounds to the square inch, pressure fully sustained? A. answer as well as if the box were extended to that \int

to single hulled boats in the utilization of power.

(42) B. W. S. says: Many makers of mowmeans of a rod running from shoe to the whiffletree connection on pole. Will you inform me if this is good reasoning, or possible? A. If by the arrangement designated the power is applied at the center of resistance, side draught will of course be obviated.

(43) J. K. says: I have a lens 5 inches in diameter, 24 inches focus, for the camera obscura to enlarge photographs, but cannot reflect it on paper as given in one of your SUPPLEMENTS. I put the lens in a tin tube, one sliding within the other, so as to give it the right focus; my box is 12x12 inches and my mirror is 12x14 inches. Please let me know where the defect is. Is it on account of my tube being too bright? A. Your tube should be blackened inside. See direction in recent number of SCIENTIFIC AMERICAN for blackening tubes. 2. Does it make any difference if I put the 24 inches in the tin tube or in the box? Does my mirror want to be of the same size as the lens magnifies (35) R M. C asks: How many gallons of or can I have it smaller, that is, if my lens magnifies up

