RECENTLY PATENTED INVENTIONS. Engineering.

DRAWBRIDGE.-William L. Sampson, Occan Grove, N. J. A bridge of comparatively light weight, and which is strong and durable, and may be quickly opened and closed, has been devised by this inventor. The draw spans each consist of a framework traveling on wheels on tracks laid in the bed of the waterway, the spans being moved to open or closed position by a rope or chain passing over a pulley in the bed of the waterway and around a drum on shore, the latter being operated by any convenient source of power. When the draw is open the approaches to the draw span present an upward incline designed to prevent accidents by the attempted passage of teams or passengers,

Electrical.

INCANDESCENT LAMP.-Forest W. Dun lap and John R. Quain, London, England. This invention provides an improved light refracting and magnify ing envelope to concentrate the light rays downward on as required, but without causing shadows in the opposite direction. With this view the bulb is inclosed by a closely wound spiral of glass rod of circular or other section, having throughout its length the property of a biconvex lens or prism, producing a concentrating and magnifying effect. When not required to apply the covelope to the entire lamp, the upper or the lower half may be employed as desired.

Bicycles, Etc.

BICYCLE PROPELLING MECHANISM.-Erling Slippern, Anaconda, Montana. Besides the usual foot-propelling mechanism, the handle bar, according to this invention, is made with each side separate and with gear or toothed connections, whereby the up and down motion of the two sides of the handle bar may be communicated through a link to a sprocket wheel mounted on the forward part of the frame, this wheel being connected by a sprocket chain with the main crank shaft The arrangement is such that the motion of the handle hars will be opposite that of the pedals, the right handle bar rising while the right pedal is descending.

ELASTIC TIRE.-William F. Williams, London, England. This tire is made of a band of rubber or rubber and canvas in which are embedded juxtaposed transverse spiral springs, the band having lateral extensions stiffened by non-coiled prolongations of the springs, and being transverselyarched when applied to the wheel rim, on which it is retained by engagement of the lateral extensions. The device is designed to combine the advantages of a pneumatic tire with the durability of a solid rubber tire.

Mechanical.

WARPING ROLLER - John Cocker. Philadelphia, Pa. This invention provides an improved sectional drum for beam warping machines, arranged to permit of conveniently replacing a worn out or broken drum with new parts instead of procuring an entire new drum when renovating a machine. The drum shaft car ries one, two or more rimmed webs, a drum rim formed with internal bosses or flanges registering with the web rims, and set screws in the web rims for adjusting and supporting the drum rim concentric to the shaft. Drum rims of different diameters may be used, and placed in position by the set screws on the webs, for the same warping machine, according to the work under treat ment.

ROLLER COTTON GIN -Frederick L. Montgomery, New York City. This invention covers an improvement on a formerly patented invention of the same inventor, providing an improved gin arranged to properly strip the seed from the lint of upland or other cotton without danger of tearing or pulling the fibers apart and without crushing or otherwise injuring the scoil. A fixed stripper plate has its inner face concave and in close proximity to the peripheral face of the ginning roller, the upper end of the plate being formed into a knife edge and a movable stripper operating over the plate, while under the plate is a drawing device with rollers, one in front of the other, and held in peripheral contact with the ginning roller.

Agricultural.

CATTLE GUARD. -James Hensey, Warren, Ark. To prevent cattle or other animals from passing over railroads or other dangerous places, this inven tion provides a simple and inexpensive guard or gate mounted to swing transversely of the track, across which is extended a rock shaft carrying a lever, there being a link connection he tween the lever and gate arms extended from the shaft, and a platform bearing on the arms. The platforms may extend any desired distance at both sides of the gate or guard, and the arrangement is such that, by an animal stepping upon one of the platforms, the gates are drawn to closed position.

the paper and then through the carbon, a free space being left for the filtered water to collect in. The filtering shells and internal receptacle are joined together by flat rings and closing devices adapted to retain all parts in position

PENHOLDER.-Wellington Blend, Yonkers, N. Y. To give increased elasticity at the holding end of the penstock and thus render an ordinary stee pen less rigid than usual, enabling one to execute fine penmanship with greater freedom and beauty of shading than can be ordinarily attained with a steel pen, this invention provides for an elastic coiled wire ferrule on the penholding end of the penholder, an elastic holder plate being also attached to the penstock and projected outward into the ferrule.

FOUNTAIN PEN.-Carl J. Renz. New York City. To provide for the control of the ink from the barrel to the pen by a slight movement of a controlling valve or stem, the valve opening and closing the barrel close to the feeder, and the feeder being formed continuous with the valve, are the main objects of this invention. The feeder is placed loosely in the barrel nozzle, allowing a more than usual free circulation of air, but allowing for a gentle vibration of the feeder, whose stem extends the length of the barrel, so that when the pen is in use a greater flow of ink is obtained in rapid writing and a lessened flow in slow writing. The construction is such that the pen may be readily and conveniently placed in position on the feeder or detached therefrom

GAS BURNER. - George I. Woolaver, Quincy, Mass. A burner designed to utilize the expansion and contraction of metals to regulate the flow of gas has been devised by this inventor, the burner being intended to stop or nearly stop the flow of gas when the flame is put out. Standing on the casing or body portion of the burner is an expansion tube, to the upper end of which and extending through it is attached a gas-con-ducting tube, the latter having a bypass, while a valve held by the lower end of the gas-conducting tube is seated on the casing or body portion. The burner has the usual cock, but on the extinguishment of the gas, without turning this cock, the flow of gas is so far diminished as to prevent asphyxiation or an appreciable waste of gas.

KITE.-Claison S. Wardwell, Stamford, Conn. This is a kite of simple and inexpensive con struction, arranged to be conveniently folded. It is of substantially diamond shape, with a longitudinal stick and a bow or cross stick, the bow of the cross stick being maintained by a tightly drawn cross wire connecting its ends, while the ends of the sticks are connected by bounding cords or wires which carry the cover. The two sticks are preferably held in position by blocks and a binding cord.

HITCHING POST. - Elmer J. Sellers, Kutztown, Pa. A post adapted, when not required for use, to be dropped into a chamber or recess below the level of the ground is provided by this invention. The post is hollow, and is slidable in an embedded tube, in which are guides, there being means for locking the post in both its raised and lowered positions, and the ar rangement being such that, by means of springs, the partial elevation of the post is automatically accomplished by depressing or otherwise operating a trigger or catch, making it unnecessary to stoop to the ground to reach the post.

NECK YOKE COUPLING. - Lord O. Snell, Athens, Pa. A coupling which permits the easy adjustment of the yoke bar on the pole after or before attachment to the harness is provided by this invention, the coupling not being liable to become accidentally detached in case of a broken whiffletree or harness. The coupling consists of a head with shank for attachment to the pole, the head extending above the shank and having a segmental guideway in which is free to move and turn the ball-shaped head of a link pivotally connected by a clip to the yoke har.

BROOM SAWING.-Frederick A. Buck and Joseph D. Valentine, Urbana, O. To hold a broom edgewise or parallel to a saw blade while the handle is being acted on by a band saw, jig saw or other suitable saw, to cut a curve or slit lengthwise through any portion of it, these inventors have devised a novel form of support by which the body is movable freely on the table to permit the kerf to be waved and to reduce friction.

CLOTHING BOILER.-William P. Rysuds boiling over the exterior of the boiler.

Business and Personal.

The charge for insertion under this head is One Dollar of line for each insertion; about eight words to a line Advertisements must be received at publication office as early as Thursday morning to appear in the follow ing week's issue.

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HINTS TO CORRESPONDENTS.

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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.
In quirles 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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Special Writteen Information on matters of personal rather than general interest cannot be expected without remuneration.
Scientific American Supplements referred to prome to proce.

Minerals sent for examination should be distinctly marked or labeled.

(7332) C. H. asks: 1. How can I coat copper with quicksilver? A. Clean the copper by dipping it into dilute sulphuric acid, and then put it mto the mercury, or else pour the mercury upon it and rub it around. 2. Give me the address of some electric supply house in Chicago where I can get the material to make the battery described in SUPPLEMENT, No. 792. A. Any dealer in Chicago will supply you. See our adver tising columns. 3. How many volts will one Bunsen cell 5×7 give? A. About 1.7 volts.

(7333) W. C. P. writes referring to query No. 7321: The article I have seen sold for making a transfer of a picture to a white paper resembles parafine, colored to disguise it. I have used an ordinary paraffine candle for the purpose with entire success. The transfer cannot be made very well after the ink of the picture is dry. An old print could not be transferred. Of course, the picture is reversed in transferring. The right hand becomes the left. People with articles in their hands look left-handed in the transfer.

(7334) S. C. McKay asks: 1. Is there manufactured a mechanism by which current (either the alternating or an intermittent commuted current) from a regular telephone magneto dynamo is utilized to make and break a local battery circuit ? A. We do not know any such appliance on the market, but there is no diffi lander, Temple, Texas. This boiler has in its upper culty in making the current make and break another cirportion brackets on which rests a cover having a cuit in the same manner as it rings a bell by a vibrating central opening, and above this cover is supported a armature of an electro magnet. 2. Please explain the perforated upper cover, there being in the lower portion seeming change or loss of polarity exhibited in the comof the boiler a false conical perforated base from which mon noncentrally pivoted magneto ringer. One may a pipe leads upward to a soap box in the lower cover, find the clapper persistent in hanging over to one side, from which also a surrounding perforated pipe leads downward. The soap is thus added to the water as the "stick" to the other side. Lightning sometimes makes boiling proceeds, and there is no danger of the water or this change, but I find that it often occurs in winter when there is no lightning (visible). A. In a magneto bell a It would seem to be a betterway to carry the battery to the polarized magnet is generally used. The armature is electricity, rather than to carry the electricity to the batapt to stick on one side or the other. The shifting may tery. 3. Can 16 candle power lamps be manufactured to hold furniture provided by this inventor comprises a bedue to some slight change of adjustment brought use as low at 15 voits? A. Yes. Correspond with the about by atmosp! eric changes. 3. I have repeatedly, by putting my car to the transmitter of a telephone, heard talking that was going on over the line, my hook being down at the time. This happens with carbon phones using either the carbon or the metal diaphragm. Also those with the extension arm. Is this not caused by the waves of sound being imparted to the body of the phone and thence to the diaphragm by the ringer coils? A. LOCK. - Henry D. Smith and Josiah When the receiver is harging on its hook, the circuit of receiver and transmitter is open, and the circuit of the magneto and the bell is closed. The talking may be caused by induction from the bell coils as you suggest. (7335) B. P. B. asks: 1. Can a common nagneto generator be changed in windings, commutator, or otherwise so that it can light a small (say i candle power) lamp? Or is the current gotten out of one either the wrong kind to light lamps, or, if it is the right kind, too weak ? I refer to common battery lamps. A. If your magneto generator gives sufficient current, it would light a lamp. No special kind of winding or commutator is required. 2. If one of the generators will

used ? If so, please tell me what kind? A. No. 3. Will you please describe, in this issue of your paper, how an electric needle, used to kill the roots of hairs, is made and operated, and by what kind of batteries, etc. ? A. This question was answered in SCIENTIFIC AMERICAN, vol. 77, No. 20, query No. 7230. A platinum needle should be used.

(7336) G. L. asks how to apply Rum korff's condenser to the medical coil described in SCIEN-TIFIC AMERICAN SUPPLEMENT, No. 569, also the number of sheets of tinfoil and the area of each. I would also like to know the difference, if any, between an induction and spark coil. A. The condenser for your coil should consist of 20 sheets of tinfoil, each 4×5 inches. Allow the sheets to project on the ends 1 inch, and the effective surface of foil will be 4 inches square. Join one side of the condenser to the plus wire from the battery and the other to the negative wire. A spark coil is an induction coil with a condenser. Both the spark and the induction coils are explained in Sloane's "Electrical Toy Making," price \$1 by mail. Or we can send you for \$5 the " Electrical Library.'

(7337) G. A. K. writes: I am about to construct a telephone line (metallic circuit), and wish to run electric light wires on same poles for a distance of 7 miles, bare copper. Will want to carry sufficient current for about 600 to 800 16 candle power incandescent lights. What sized wire should I use, and will it require a 3-wire line or will a 2-line wire do for alternating current ? How much current will twenty 16 candle powerlightsconsume in one hour? Will there be any appreciable loss of cirrent transmitted through 7 miles of bare copper wire if well insulated? A. You can use single phase alternating current system, using two wires, each of No. 6 B. & S. gage, generating the current at 2,000 volts, transforming it to 5,100 volts for the line and again stepping down to 110 volts for the lamps. It would not be safe to use bare wire on account of the high potential. There will be a loss of about 10 per cent in transmission under the above conditions. The amperes of current represent the rate of flow, and depend upon the voltage as well as the efficiency of the lamp. Twenty 16 candle power lamps, at 110 volts, would consume about 10 amperes. If used for one hour, it would be equivalent to 10 ampere hours. If the lamps were 55 volte, the current would be twice as great.

(7338) G. E. C. asks : 1. Is there a more lasting battery than the plunge battery described in the SCIENTIFIC AMERICAN of August 31, 1889, for running the simple electric motor described in March 17, 1888, number, or a more efficient motor than that one for running a sowing machine? I think of making one, and want the best A. You can try the Edison-Lalande, some types of which will give as high an efficiency as the bichromate; but you must consider that you cannot have power without consuming materials, and if a battery vicids a good amount of current, it will consume its materials rapidly. 2. How would 8 cells of dry battery work, as it would be much cleaner and handier? A. You cannot use dry cells for running motors. Dry cells are for open circuits and intermittent use only. They run down very rapidly on a closed circuit. 3. And would the motor need to be so large for 1 machine as it is said to run 2 or 3? A. While a smaller motor might run 1 machine, it is not wise to have the motor so small that there is little excess of power to meet a heavier load than the average. 4. Would 18 or 20 wire answer for smaller one? A. Yes. 5. Is electricity of any value medically, if so, how should it be used for catarrh and neuralgia and rheumatism, or where can I get information on that subject? A. For the medical use of electricity, consult your physician. It is the only safe course. 6. Where can I get the gutta percha sheets, if I have to make the plunge battery; also, the carbon and zinc plates? A. These materials can be had of any dealer in electric supplies in your city or New York. Glass jars can be used for the battery in place of gutta percha, and will be less expensive.

(7339) S. W. E. asks: 1. Can a storage battery of 25 cells, each cell giving when charged 21 volts, be charged by a 2 light dynamo producing 52 volts? If so, in what manner? A. Twenty-five storage cells require $25 \times 2\frac{1}{2}$ volts = 62 $\frac{1}{2}$ volts pressure in the charging currrent. You would need to divide the battery into two parts in multiple to charge it with your 52 volt dynamo. You should also arrange a wire resistance-iron wire is good enough-to take up the rest of the drop. Thus: $13 \times 2\frac{1}{2} = 33$ volts nearly. 52 volts are about $1\frac{1}{2}$ times 33, and you will require wire enough to have a resistance about 1/2 as great as that of your 13 cells. What that is we cannot tell you. The charging will be very slow, as your dynamo gives but 2 amperes of current; and the charging will be at that rate per hour. Thus: If the cells are 30 ampere hours, a current of 2 amperes will require 15 hours to charge them; and similarly for any other capacity. The better way is to use a heavier current, and so reduce the time of charging. 2. Can it be charged through one mile of No. 12 galvanized iron wire? A. Yes, if there is current enough; but we do not see why any one should waste current on a mile of iron wire.

BEE CATCHER. - Edward Arrington. Wilkesville, Ohio. To facilitate taking and placing bees in the hive without danger of the operator being stung, this invention provides a suitable slide frame with grooves in which may be reciprocated a sliding door, controlling the entrance of a receptacle. the whole being pivotally mounted on a bracket on an extensible pole. Flexible pieces are provided to enable the operator to slide the door to open or close the receptacle while the latter is held in elevated position or near a tree limb, the agitation of the latter causing the bees to fall into the receptacle. The receptacle may be held in any desired position with respect to its support, and raised close to the swarm of bees.

Misceilaneous.

FILTERING APPARATUS. - Charles Prevet, Paris, France. This invention provides a simple and inexpensive filter, designed to be made in small pocket form for the use of soldiers, sportsmen, etc., or in larger sizes. The filter proper is composed of two shells of unsized filtering paper, between which is interposed a lens-shaped piece of perforated metal or of porous material, preferably carbon, the arrangement being such that the water will be first passed through of this paper.

HOUSEHOLD FURNITURE.-Charlie E. bench adapted to be used to support tubs in washing or for other purposes, a step ladder, a child's crib and a support for an ironing board or similar article, the invention covering a novel construction and combination of parts, including end frames with pivoted locking diagonal braces, removable sides and a removable slatted bottom, etc.

W. Batcheller, St. Louis, Mo. A lock especially designed for use on freight cars has been devised by these inventors, whereby the doors may be securely closed by a lock located within the car, with only its operating spindle appearing at the outside. The lock is provided wit a dial or disk containing a combination, which, together with the handle or knob, may be quickly and conveniently removed from or placed in engagement with the locking spindle to bolt or unboit the lock.

NOTE.-Copies of any of the above patents will be furnished by Munn & Co. for 10 cents each. Please send name of the patentee, title of invention, and date

(7340) R. C. F. writes: Will you please give an answer in the next issue of your valued publication to the following problem which we clip from local paper and which has created a discussion : "We have a problem which we would like some of our readers to send us an intelligent answer to. No. 1: A is a farmer who sells a horse to B for \$90. The following day he buys the horse back from B for \$80 and sells him to C for \$100. What are A's profits in the three transactions ?" A. The profit of all the transactions is the difference between the price of the first sale and what A had at the close of the operation, which amounts to \$20. A gained \$10 by the repurchase and \$10 by the second sale over the first sale, or he received \$110, the first sale being \$90. The apparent discrepancy between the repurchase and last sale is misleading at first glance, and the difference between the first sale and the last sale only should be credited to the second sale, which shows the actual amount gained in the three transactions to be \$110 - \$90 = \$20 profit. In commerlight a lamp, does a special kind of lamp have to be cial affairs, profits are not counted on purchases alone.

The selling advance is the real profit, which in this case will be \$20, the difference between the purchase and the sale.

(7341) A. E. H. asks: 1. How long will a zinc last in an ordinary gravity battery of four cells, charging storage cells in parallel? The zinc being cov ered with copper deposit, it is difficult to tell just when it is completely worn out A. A zinc of regular weight will last for six months in a gravity cell. Take it out once in a while and scrape or wash off the muddy coating. 2. Is it not better to amalgamate the zincs in the above gravity cells ? A. The zincs are not usually amalgamated in the gravity cell. They are made, however, of an amalgam, so that the mercury extends throughout the whole mass. Such zincs are called composite zince and are in the market. 3. What is the right density of the solution around the zincs (specific gravity) in a gravity battery to obtain the maximum current; and does a small percentage of iron sulphate, which is con tained in commercial copper sulphate, affect the output of the battery? A. The solution around the zinc comes saturated in a short time, and the excess of zinc sulphate then crystallizes out at the top around the sides the glass. This should be removed occasionally. 'The iron has no effect. The largest current will be had with a very weak zinc sulphate solution, say sp. $gr_{.}=1.02$. but this cannot last long, since the action of the cell will raise the density of the solution around the zinc and reduce the current. An equally important condition for large current is to keep the zinc clean. This, too, is equally difficult to maintain, even if the zinc be amalgamated.

(7342) A. F. S. writes: I am building an arc lamp with a carbon $\frac{1}{16}$ inch diameter, to be used on a 110 volt circuit. I want to feed the carbon in the usual way, i. e., by a break and magnet to reduce the same. 1. Is it proper to connect the magnet in parallel with the lamp? A. Yes; that is the usual way. 2. Of what resistance shall it be, what size wire shall I use to get the same? The coil is 2 inches long by 1 inch diameter, core 3% inch diameter. A. Give the shunt coil 100 times the resistance of the direct circuit through the carbons. With 3% inch carbon the resistance of the arc is 5 or 6 ohms; hence, you will require 600 ohms in the should make many a youth an amateur astronomer. A shunt circuit. Use No. 30, wind your spool full and put beautiful instance of simplifying subjects which maypuzthe rest in a separate coil within the lamp. 3. Would zle the student is the tub and hoop experiment to illusyou recommend an extra resistance coil to be used in rate precession of the equinoxes, described and illus addition to that of the magnet? A. Yes, as above. 4, trated on page 128. From the very beginning the prac-What is the resistance of an arc flame at a gap of 1/2 tical value of astronomy is made evident, and a conspiinch; also that of 1/4 inch with 1/5 inch carbons ? A. For 1/8 inch arc, about 7 ohms; for 1/4 inch arc, about 6 ohms.

your book, "Experimental Science," there is decribed a battery, concerning which I am in want of some information. First: What is the precise chemical change which takes place between the solution and the zinc and iron elements? Second: What is the office of the black oxide of copper, placed within the cell? Third: Will wrought iron serve as well ascastiron? and, fourth, When this battery becomes exhausted, to what is this exhaust tion due? I want a battery to run a small motor, and was attracted to this one by the simplicity of its construction and the statement that it "will operate several months without replenishing." I have tried a bichromate battery, but the frequent renewals necessary compelled me to abandon it. A. The cell in question is the Lalande Chaperon cell, which has been improved in the United States under the name Edison-Lalande cell. You will find the chemical changes fully worked out in "Primary Batteries," H. S. Carhart; price \$1.50, bymail. Briefiy, the action of the cell is to break up the caustic soda, zind taking the place of the hydrogen in it. The hydrogen then takes oxygen from the copper oxide at or near the Iron, the negative plate forming water, and leaving the copper in a metallic state. The object is to get rid of the hydrogen, which, if allowed to accumulate on the negative plate, would stop the current in a short time. The copper oxide is put there to furnish its oxygen for the hydrogen. Wrought iron is used in some forms of those heretofore in use, and a new method designed this cell. In this, as in all other cells, exhaustion is due in practice to give reliable results under all conditions. to the chemical decomposition of the materials. Here the zinc is changed into a sodium zincate, Na2ZnO2 and the copper oxide $CuO+H_2$ becomes H_2O+Cu . When all the inaterials are changed, the battery stops its working There is in it no source of energy remaining. The iron is not affected by these changes, and an iron pail will last indefinitely, so far as the electric action is concerned. It will be exposed to rust from the action of the water in which the soda is dissolved.

(7344) A. J. L. asks for a formula for a polish for polishing the nickel on bicycles, or if you have already published such a formula hefore, please give the number of the paper that it was in. A. Rub the bright parts with rouge and lard oil. You can purchase from any dealer in bicycle sundries preparations for cleaning the nickel parts of a bicycle in an expeditious and safe manner. The polishing cloths now on the market answer admirably to keep the nickel bright. (7345) C. A. C. asks: How canvas can be made mildew proof without injuring the fabric. A. Dissolve 1 pound of zinc sulphate in 40 gallons of water ; then add 1 pound of sodium carbonate; when dissolved add 2 ounces of tartaric acid. This holds the partially separated zinc carbonate without neutralizing the excen of the alkali used. The canvas, etc., should be soaked in this solution for 24 hours and then dried without wringing.

NEW BOOKS, ETC.

THE SOCIAL MIND AND EDUCATION. By George Edgar Vincent. New York: The Macmillan Company. Pp. 154. Price \$1.25.

To give "greater unity and clearer purpose to our higher education" is the design suggested in "barest outline" in this book. It treats social philosophy as the science of sciences," notes the development of social and of individual thought, and discusses "the integration of studies," and a "tentative curriculum." from the view point of a professor of sociology in the University of Chicago, the author endeavoring to bring conceptions from social philosophy to bear upon the problem of education

TODD'S NEW ASTRONOMY. By David P. Todd, M.A., Ph.D., Professor of As-tronomy and Director of the Observatory, Amberst College. New York, Cincinnati, and Chicago: Auterican Book Company. Pp. 500. Illus-trated. Cloth, 12mo. Price \$1.30.

This small textbook which Prof. Todd has just prepared is an elementary work for students. The clearness of explanation and profuseness of illustration, together with the care which has been taken to give a thorough and accurate conspectus of the latest advance all along the lines of recent investigation, which includes such a wealth of new knowledge in every department, and notably in that of astrophysics, render this worknot only an ideal textbook for beginners, but the best comprehensive review of astronomy up to date for those who have studied that science before the spectroscope and the latest immense telescopes had contributed their quota of information as to the structure and composition of the universe. The beautiful pictures of the sun, moon and planets convey lessons to the youngest reader; and the simple and practical methods of making elementary experiments of observation, such as the find ing of the true north pole (pp. 22, 116), and all the points of the compass. and the measuring of the diameter of the sun (p. 259) and moon (p. 239), without costly apparatus cuous application of science to everyday use is found in chapter viii, on the Astronomy of Navigation ; in which the author applies the science particularly to the voy age of the yacht "Coronet," in which he sailed for Japan (7343) D. O S. writes: On page 408 of age the yacht coroner, in Annual The book is in 1896, to observe the eclipse of the sun. The book is dedicated to the Messrs. James, who provided this yacht and one of whom accompanied Prof. Todd in it to Japan

INTRODUCTORY COURSE IN MECHANICAL DRAWING. By C. J. Tracy and E. H. Lockwood, Instructors in Shef-field Scientific School, Yale Universi-ty. With numerous illustrations and full page plates. New York : Harper & Brothers. Pp. 115. Price \$1.80.

This is a book for beginners, to prepare students for a nore extended course, assuming a working knowledge of the elements of geometry, but omitting machine and bridge drawing, and the more advanced applications of mechanical drawing. The book also has a chapter comprehensively treasting of perspective.

THE BAROMETRICAL DETERMINATION OF HEIGHTS. By F. J. B. Cordeiro, Surgeon United States Navy. New York: Spon & Chamberlain. Price \$1.

This brief monograph affords a practical method of barometrical leveling and hypsometry for surveyors and mountain climbers, presenting formulæ therefor which are free from errors, which cannot be said of some of

THE SUN'S PLACE IN NATURE. By Sir Norman Lockyer. London and New York: Macmillan Company. Pp. Pp. 360. Price \$2.75.

The interest in this book will be greatly heightened by the fact that its author has been at the head of one of the expeditions sent out to India to observe the recent solar eclipse, and the care which was taken to equip the party of which Sir Norman was the head is but the result of hislong series of studies in this special line, the volume before us being only one of his numerous contrioutions on the subject. Since the author's publication in 1887, of "The Chemistry of the Sun," when approximate estimates of the temperature of the sun's photosphere were carefully considered, there has been such greatimprovement made in the instruments used, and such a large accumulation of independent observations, that the basis on which the problem is approached has been very much broadened, and yet without giving us sufficient data upon which to reach satisfactory conclusions. All of the more recent authoritative investigations touching this subject are here considered, in connection with numerous examinations and analyses of spectra of the sun and different stars and photographic representations of nebulæ. The meteoritic hypothesis is especially considered in its many bearings as affording the most ample data for fixing the place of the sun among its fellow stars.

the subject became at once matter of general comment. Bicy During the two years of Col. Waring's administration of the office the death rate showed a large decrease-a fact Bic which leading physicians attribute mainly to the better condition of the streets. As to the disposal of the city's wastes, which is also treated of in this volume, our readers will remember the full illustrations and descrintion of Col. Waring's plant and process which appeared in the SCIENTIFIC AMERICAN Of August last. It is interesting to note that Col. Waring estimates that in the near future the revenue derived from the city's wastes will pay half the expenses of the work.

OIL ANALYSIS. By Augustus H. Gill. Philadelphia: J. B. Lippincott Com-pany. Pp. 139. Price \$1.50. Boo Boo Bot

To meet the needs of a professor teaching oil and gas analysis in the Massachusetts Institute of Technology was the primary object in preparing this monogram, in which onlythe more commonly occurring oils are discussed, considering their preparation, properties, analytical constants, uses and adulterants. It is an excellent book for one desiring right elementary guidance in the judging of oils, or for beginning the study with the view of becoming an expert.

ARITHMETIC OF THE STEAM ENGINE. By E. Sherman Gould. New York : D. Van Nostrand Company. Pp. 77. Price \$1.

Theauthor, a member of the American Society of Civil Engineers, presents here a collection of simple and ac-Car Car Car curate facts and rules in readily accessible shape for practical use, touching the fundamental principles of the practical operation of the steam engine.

- Car Car Cas Ceil Cen Che **REPORT UPON SALMON INVESTIGA-**А TIONS IN THE COLUMBIA RIVER' BASIN AND ELSEWHERE ON THE PACIFIC COAST IN 1896. By Barton Warren Evermann and Seth Eugene Cide Ciga Ciga Ciga Cist Clan Meek, United States Commission of Fish and Fisheries. Washington. 1898.
- Clas Clay Clea Clot THE FISHES OF THE KLAMATH RIVER BASIN. By Charles H. Gilbert, United States Commission of Fish and Fisheries. Washington. 1898. Clo Clo
- Coel Coll Coll Colt Con THE FISHES FOUND IN THE VICINITY OF WOOD'S HOLL. By Hugh M. Smith, United States Commission of Fish and Fisheries. Washington. 1898. Cra
- THE JACK RABBITS OF THE UNITED STATES. By T. S. Palmer, M. D., United States Department of Agriculture, Division of Biological Survey. Washington. 1897. Pp. 88.

OUTLINES OF RURAL HYGIENE. By Harvey B. Bashore, M.D. Philadelphia: The F. A. Davis Company. Pp. 84, Price 75 cents.

The author, an Inspector of the Pennsylvania State Board of Health, here sets forth, for physicians, students Dire and sanitarians, the conclusions reached through his own experiences relative to water supply and waste disposal, the soil, habitations, and disposal of the dead. An appendix on "I'he Normal Distribution of Chlorine" is contributed by Prof. Herbert E. Smith, of Yale University.

The wonderful variety and the great beauty of many of the specimens of calendar work brought before the public with the commencement of each new year is a marked feature of the development of modern processes of illustration. The National Chemigraph Company, of St. Louis, Mo., Charles B. Woodward, president, send us a beautiful sample of their work in this line, the year's calendar consisting of six large plate pictures, 18 by 22 inches each, and each well worth framing, being specimens of chemigraph photo-reproduction. The same company also send us a beautiful bass relief of the Davenant bust of Shakespeare.

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An experience of nearly fifty years, and the prepara-tion of more than one hundred thousand applications tion of more than one hundred thousand applications for patents at home sand abroad, enable us to understand the laws and practice on both continents, and to possess unequaled facilities for procurns patents everywhere. A synopsis of the patent laws of the United States and all fereign countries may be had on application, and per-sons contemplating the securing or patents, elther at home or abroad, are invited to write to this office for prices, which are low, in accordance with the times and our extensive facilities for conducting the business. Address MUNN & CO., office SCIENTIFIC AMERICAN, 361 Broadway, New York.

INDEX OF INVENTIONS For which Letters Patent of the United States were Granted

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Cock, ball, L. H. Brinkman. 988,133 Collar fastener, horse, S. E. Burke. 588,233 Collar fastener, horse, S. E. Burke. 588,233 Collar fastener, horse, S. E. Burke. 588,330 Corset, O. M. Chesney. 588,330 Condeusing engine, compound, J. S. Briggs. 598,451 Corset, O. M. Chesney. 598,451 Coultry Buid supply device for traveling. 598,429 Crate, shipping, T. F. McBride. 598,429 Cultivator, J. B. Greer. 598,429 Cuttor, wheel, H. C. Young. 598,429 Cutter, tor, alternating, A. Heyland. 598,981 Cutter, See Bolt cutter. 598,105 Cutter tor, alustable, T. S. Ferguson. 598,142 Cyanids and anmonia. making, T. P. Colin. 598,142 Cyanids and ammonia. making, T. P. Colin. 598,142 Cyanids and ammonia. making, T. P. Colin. 598,342 Decoctions and infusions, apparatus for making, 598,447 Dental appliance, J. Weiss. 598,342 Directory and bulletin, school room, J. S. Mer. 598,447 Door check, J. Scheibe. 598,447 Door closer and check. J. P. Magney. 598,447
Cock, ball, L. H. Brinkman. 988,135 Collar fastener, horse, S. E. Burke. 588,235 Collar fastener, horse, S. E. Burke. 588,235 Collar fastener, horse, S. E. Burke. 588,330 Corset, O. M. Cheener, 588,330 Condeusing engine, compound, J. S. Briggs. 598,451 Corset, O. M. Cheener, 598,451 Coulter bau, T. J. McBride. 598,429 Cate, shipping, T. F. McBride. 598,429 Cultivator, J. B. Greer. 598,429 Cuttor, wheel, H. C. Young. 598,429 Cuttor, wheel, H. C. Young. 598,429 Cutter, See Bolt cutter. 598,429 Cutter is adjustable, T. S. Ferguson. 598,429 Cutter is adjustable, T. S. Ferguson. 598,142 Cyan ids and anmonia. making, T. Y. Colin. 598,142 Cyanids and ammonia. making, T. Y. Colin. 598,245 Decoctions and infusions, apparatus for making, 598,442 Decoctions and infusions, apparatus for making, 598,442 Door closer and check. J. P. Magney. 598,442 Door closer and check. J. P. Magney. 598,442 Door closer and check. J. P. Magney. 598,442
Cock, ball, L. H. Brinkman. 988,138 Collar fastener, horse, S. E. Burke. 588,239 Collar fastener, horse, S. E. Burke. 588,239 Collar fastener, horse, S. E. Burke. 588,330 Condeusing engine, compound, J. S. Briggs. 598,351 Corset, O. M. Cheenery. 598,612 Coulter bank, T. J. MoBride. 598,429 Crate, shipping, T. F. MoBride. 598,429 Cutitivator, J. B. Greer. 598,429 Cuttor, wheel, H. C. Young. 598,406 Cutter, it, adjustable, T. S. Ferguson. 598,106 Cutter is adjustable, T. S. Ferguson. 598,142 Openciens and infusions, apparatus for making. 598,423 Decoctions and infusions, apparatus for making. 598,424 Dental engine, J. D. Weiss. 598,232 Dental engine, J. D. Kewis. 598,424 Directory and bulletin, school room, J. S. Mc. 598,404 Discleaner, W. I. McCaus
Cock, ball, L. H. Brinkman. 988,138 Collar fastener, horse, S. E. Burke. 588,239 Collar fastener, horse, S. E. Burke. 588,239 Collar fastener, horse, S. E. Burke. 588,330 Corset, O. M. Cheenery. 588,430 Coract, O. M. Cheenery. 588,430 Coract, O. M. Cheenery. 588,429 Crace, shipping, T. F. McBride. 588,429 Cultivator, J. B. Greer. 588,429 Cultivator, N. Hesler 588,429 Cultivator, Wheel, H. C. Young. 588,429 Cultivator, Wheel, H. C. Young. 588,429 Cutter isolae, A. Lowe. 589,106 Cutter, See Bolt culter. 588,429 Cutter isolae, A. Lowe. 589,106 Cutter isolae and cutter, F. E. Dalzell. 588,325 Ogan ids and anmonia. maing, T. Y. Colin. 588,435 Operating on the scions, and anmonia. 588,435 Dew B. Spinner, J. Weiss. 588,335 Direct acting engine, W. J. Lewis. 588,335 Direct acting engine, W. J. Lewis. 588,335 Direct acting engine, W. J. Lewis. 588,335 Direct acting engine, W. J. McCausisand. 588,337
Cock, ball, L. H. Brinkman. 988,133 Collar fastener, horse, S. E. Burke. 588,233 Collar fastener, horse, S. E. Burke. 588,233 Corset, O. M. Chesney. 598,301 Corned, O. M. Chesney. 598,301 Cornes, O. M. Chesney. 598,429 Crate, shipping, T. F. McBride. 598,429 Catter barris. 598,429 Catter, Shipping, T. F. McBride. 598,429 Cultivator, J. B. Greer. 598,429 Cuttor, wheel, H. C. Young. 598,429 Cuttor, tailustele, T. S. Ferguson. 598,142 Cutter bit, adjustable, T. S. Ferguson. 598,142 Cutter bit, adjustable, T. S. Ferguson. 598,142 Cyanids and anmonia. making, T. Y. Colin. 598,429 Decoctions and infusions, apparatus for making, 598,429 Decotions and infusions, apparatus for making, 598,429 Discorry and bulletin, school room, J. S. Mec 598,432 Directory and bulletin, school room, J. S. Mec 598,432 Door check, J. Scheibe.
Cock, ball, L. H. Brinkman. 988,138 Collar fastener, horse, S. E. Burke. 588,239 Collar fastener, horse, S. E. Burke. 588,239 Corset, O. M. Chesney. 588,300 Condeusing engine, compound, J. S. Briggs. 598,429 Corset, O. M. Chesney. 598,429 Crate, shipping, T. F. McBride. 598,429 Cultivator, J. B. Greer. 598,429 Cuttor, wheel, H. C. Young. 598,429 Cutter, is adjustable, T. S. Ferguson. 598,142 Cutter, is adjustable, T. S. Ferguson. 598,142 Cyanids and ammonia. making, T. P. Colin. 598,142 Cyanids and ammonia. making, T. P. Colin. 598,142 Cyanids and ammonia. making, T. P. Colin. 598,342 Decoctions and infusions, apparatus for making. 598,342 Dertal engine, J. D. Smith. 598,342 Directory and bulletin, school room, J. S. Mec 598,442 Door closer and check, J. P. Magney. 598,442 Door closer and check, J. P. Magney. 598,407
Cock, ball, L. H. Brinkman. 988,133 Collar fastener, horse, S. E. Burke. 588,233 Collar fastener, horse, S. E. Burke. 588,330 Condeusing engine, compound, J. S. Briggs. 598,351 Corset, O. M. Cheener, 598,451 Coulter band, T. J. Mancill. 598,451 Coulter, Stand, T. J. McBride. 598,429 Crate, shipping, T. F. McBride. 598,429 Cultivator, J. B. Greer. 598,429 Cutter on twois, alternating, A. Heyland 598,042 Cutter to, adjustable, T. S. Ferguson. 598,142 Cutter is, adjustable, T. S. Ferguson. 598,142 Cyan ids and anmonia. making, T. F. Collin. 598,142 Cyan ids and anmonia. making, T. F. Collin. 598,142 Cyan ids and anmonia. making, T. F. Collin. 598,142 Cyan ids and anmonia. making, T. F. Collin. 598,245 Decoctions and infusions, apparatus for making. 598,447 Decoctions and infusions, apparatus for making. 598,447 Decortions and infusions, apparatus for making. 598,447 Door check, J. Scheibe. 598,447 Door check, J. Scheibe. 598,447 Door closer and check. J. P. Magney

(7346) C. B. W. asks how the paper is prepared of which dresses of dolls are made so that the color changes with the weather. A. Cobalt chloride dis solved in alcohol applied to artificial flowers or to the dresses of dolls to which you refer turns the paper or fabric pink when the air is humid ; when the air is warm and dry, the paper will be purple or blue. A solution of the same constitutes one of the sympathetic inks.

(7347) T. P. B. says: Can you tell me if the phenomenon of lightning during a snow storm is possible ? A. The phenomenon to which you refer has occurred when the atmosphere has become suddenly warmed above the season's average normal temperature. Lightning never occurs in cold weather without a current of warm air in the upper atmosphere.

S'IREET CLEANING, AND THE DISPOSAL OF A CITY'S WASTES. By George E. Waring, Jr. New York : Doubleday & McClure Company. Pp. 230. Drice #105 Price \$1.25.

It is not too much to say that the late Commissioner of Street Cleaning of the City of New York has made for himself a world-wide reputation in this particular line. Coming to the task of the supervision of the cleaning of the streets of New York at a time when they were sadly in need of thorough and energetic work, and when the department had been for a long time suffering from a want of anything like efficient organization, he introduced system and order into the business, and effected such an immediate change in the looks of our thoroughfares that

INDEA OF INVENTIONS	Fences, tool for applying wire stay locks in. D. C. Addicks 598132
For which Letters Datent of the	Fibrous materials, machine for opening and
FOR WHICH LECCERS FACENCE OF THE	working, A. A. Coburn. 598;284 Fifth mhool entirettling derice, H. C. Smon
United States were Granted	File document, R. C. Derby
	Filter, M. J. Lynn
FEBRUARY 1, 1898,	Filter, J. W. McLean 598,254
, , .	Filter, H. A. POOLER
AND EACH BEARING THAT DATE.	Filter, W. H. Wilcox
	Filtering device, H. J. Murney
[See note at end of list about copies of these patents.]	Fire alarm, circuit and signal box, electric, L. G.
	Fire and burglar alarm system, C. P. Bostian 598.410
Acid, apparatus for making sulphuric, A. Staub 598,351	Fire escape, J. Hagel 598,370
Advertising device, E. Steinhauser	Fire escape, G. H. Petersen 598,110
Air compressor J. H. Hoadley 598 149	Fire extinguisher, R. Wensley, Jr. 598,188
Air compressor governor valve, N. A. Christen-	Fire truck, R. J. Voelker
sen	Fireproof construction, W. Orr
S Richardson 508 488	Fish Kinfe and scaler, W. C. Foster
Animal trap, A. Plahn	Flooring or ceiling, composite, J. W. Piver 598,437
Annunciator, self-restoring, J. Steiner 598,276	Flues, cap for closing stovepipe, A. Sahlstrom 598,161
Asphait, manufacture of, A. Hannemann 588,147	Filding hox C Ingrev 598 344
Whiting	Foot, artificial, Roberts & Bevan
Baby support, T. W. Southington 598,164	Frame. See Embroidery frame.
Bag. See Punching bag. Telescope bag.	Fruit picker, A. M. Terrill
Bank protecting device, G. J. Hinkle	Ore roasting furnace.
Basket cover fastener, C. B. Porter 598,274	Garden tool, J. Brendner 598.173
Bearing, antifriction, E. Flannigain	Garment, A. S. Best
Bearing, ball, W. Diebel	Gas generator, W. Sams
Bearing, ball. W. J. Tripp 598,402	Gas generator, acetylene, C. L. Wilson et al 598,213
Bed, R. B. Coffman	Gases velve and gage for administering oxygen
Beer pipes, etc., apparatus for cleansing, V. Bon.	or other. J. R. Crane
zagni	Gate. See Fence gate. Vaulting gate.
Belaying grip. W. E. Sargent	Generator See Gas generator
Bell, polarized signal, F. R. McBerty	Gold and silver, apparatus for electrodeposition
Beveling machine, V. Royle	of, E. Andreoli 598.193
Bicycle, U. S. Beebe	Grates, chopper or agitator for shaking, J. Kea-
Bicvcle, A. W. Hall	Grinder, blade, F. B. Allen