

ticles in a casing and automatically delivering one bag at a time upon manipulation of any desired starting device—such, for instance, as coin-controlled mechanism; also means for preventing the delivery of more than one package at each operation of the controlling device and for heating the packages, to keep the contents warm at all times.

**FEEDER FOR SUGAR-CANE CARRIERS.**—L. M. DILL, Avoca, La. The purpose of this invention is to provide a simple and economic machine especially adapted for raking cane from a car upon the carrier which conducts it to the sugar-mill and to so construct the machine that the operator can cause the rake to move forward or backward or be raised or lowered at will.

**TRAP.**—W. E. WERD, Deer Lodge, Mont. The object of the improvement is to provide details of construction enabling convenient and safe setting of the trap, its easy and rapid release from a captive, which avoids liability of maiming the animal or bird caught, and which enables a person accidentally caught to easily release himself without suffering injury to the member held therein.

**MEAT ROLLER OR WRINGER.**—B. L. PACKARD, Denver, Col. The object of this invention is to provide an improved device in which means is provided for regulating the pressure applied to meat when passing through the device and in which means is also provided to permit the separation of the pressure rollers to allow bones to pass between them without crushing and splintering.

#### Prime Movers and Their Accessories.

**CARBURETER FOR EXPLOSIVE-ENGINES.**—J. H. JOHNSTON, 145 Rue de la Pompe, Paris, France. In this patent the invention has reference to a carbureter for explosive-engines so equipped as to allow of obtaining an explosive mixture the richness of which will always remain the same whatever may be the speed of the engine. In this case the richness depends on the speed at which the air passes around the orifice of the spray-pipe.

**HEAT-SCREEN FOR STEAM-CHESTS.**—D. C. BAILLY, Reel, Minn. The object of the invention is to prevent the condensation of steam in steam-chests, due in part to the reduction in pressure in passing from the governor to the steam-chest and the consequent loss of heat and to the further loss of heat due to the radiation from the steam-chest covering. The invention is intended to prevent this radiation.

**LIFT-PUMP.**—H. M. CROW, Oakdale, Cal. The aim of this invention is to provide a pump which may be driven by means of an engine or similar motive power, but which is adapted to be altered readily, so as to enable the well-rod to be attached to the rod of a windmill. It is especially useful in localities where windmills are used for raising water, but which cannot be depended upon under all weather conditions.

#### Railways and Their Accessories.

**LATCH DEVICE FOR DUMPING STRUCTURES.**—C. F. SHELBY, Globe, Ariz. Ter. The purpose of the invention is to provide a latch device especially designed for normally holding the dumping or rocking body of a car in carrying position on the platform and to so construct the latch that it is simple, durable, economic, and readily applied. It can be quickly and conveniently disconnected from its keeper when the body of the car is brought to its normal or carrying position.

**SPIKE-PULLER.**—T. W. HARBER, Dundenville, Mo. One purpose of the improvement is to provide a device for pulling spikes used in connection with railway-rails or bolts or common nails, even though said articles be headless, and to so construct it that the jaws may be adjusted to close properly on the articles to be drawn, and so that as it is applied the jaws automatically open and then close as the device is put in withdrawing action, tightening their grip correspondingly to the applied withdrawal force.

**RAILWAY-SWITCH.**—A. A. SHAW, Arkadelphia, Ark. The object in this case is to provide a compact and efficient switch-frog with a view of obtaining a convex track-rail both for the main line and switch or siding, and that will be adapted to all kinds of switching whether the switch is operated from a switch-station or a tower. It embodies all the essential features of a safe and reliable switch frog, yet is simple in construction, having no complicated mechanism to break or get out of working order, thus insuring reliable action at all times, with cost of manufacture reduced to the minimum.

**CAR-COUPLING.**—F. KELLER, Allentown, and D. BOWERS, Emaus, Pa. The coupling comprises coupling-heads practically duplicates of each other and constructed interiorly to contain and permit of the working organization of the inner operative devices of the head. A locking-block is used in each coupling-head, combined with which are devices for securely holding same in operative position both when the two heads are in coupled or uncoupled relation, further devices being employed for setting and securing the locking-block in rearward position within the head to enable either one of the coupled cars to be disconnected from the other without the presence of an operator. Action of locking-block of each coupling-head is automatic.

**RAILWAY SPIKE AND TIE-PLATE.**—T. G. PETERMAN, Cumberland, Md. The invention relates to improvements in spikes and tie-plates for railway-rails, the object being to provide a spike so constructed as not only to firmly hold the rail, but effectually to prevent the passing of water down the spike to the tie, thus preventing rotting of the wooden tie at this point and consequent loosening of the spike.

**RAILROAD-TIE.**—J. F. BAILEY, Valdosta, Ga. The tie may be formed of a single plate and afterward divided or may be formed of two plates, and a block of wood is made of larger size than the pocket and driven thereto, thus providing a firm hold for the spike. When the flanges are embedded in the ballast, the tie is restrained both from transverse and from longitudinal movement with respect to road-bed, and by provision of a hinge a tie is formed free from the objections found in the ordinary metallic tie—that is, lack of resiliency. It is resilient and flexible, yet not sufficient to impair alignment of the rails.

**CAR-COUPLING.**—F. A. RAMEY, Woodstock, Va. By this improvement the inventor seeks to provide an oscillating draw-head section and devices for holding the coupling-knuckle in locked position when said section is in normal position and for releasing the locking devices for said knuckle when the oscillating section is moved laterally in either direction out of its normal position.

**ANTICREEPER.**—C. LIEN, Salt Lake City, Utah. The principal object of the invention is not only to check the longitudinally creeping tendency of rails, but also to prevent it entirely. With this and other objects in view the invention comprises a clamp to be secured to the rail and a fastening device for the clamp adapted to engage with a sleeper on the road-bed to prevent movement of the rail transverse to the sleeper.

**CAR-COUPLING.**—B. J. COBB, Leesville, La. A coupling is employed of the ordinary link-and-pin type, comprising coupling members, each practically a duplicate of the other. A specially-constructed coupling member is employed for each of the two cars to be coupled together, associated with which is an ordinary coupling-link, together with a specially-constructed pin-fastening therefor, cooperating with which is a controlling-block of special construction, located and operated interiorly of the coupled member.

**SIGNAL SYSTEM.**—J. H. LYNCH, Red Bank, N. J. Principal objects of this invention are to provide means whereby the passage of a train over a certain part of the road can be caused to set signals in the rear for the observation of the crew of any train approaching from behind, and further, to provide means whereby the setting of these signals will not only permit the crew to understand the position of train in advance, but to automatically stop the approaching train.

#### Pertaining to Recreation.

**GAME-CARDS.**—C. WARNE, Asbury Park, N. J. In the present patent the invention has reference to new and useful improvements in game-cards; and it has for its object to provide a pack of playing-cards with which certain interesting and instructive games may be played. The rules permit of two, four handed, and other styles of games.

#### Pertaining to Vehicles.

**TRUCK.**—D. H. ROWE, Oakland, Cal. The object in this case is to provide a truck which will be capable of carrying baggage and freight with the same facility as such loads are carried by the ordinary trucks, but which, in addition, shall be so constructed as to enable a heavy load to be taken up and down a flight of stairs.

**VEHICLE-WHEEL.**—R. F. MARTINDALE, Memphis, Tenn. More particularly the invention relates to such vehicle-wheels as are portions of draft-wagon running-gears. The object is to provide a wheel very light, durable, and exceedingly strong, well adapted for convenient repair, and not liable to become clogged with clay or the like when the wagon is traversing muddy roads. It is manufactured of metal, and largely from plated metal cut and stamped into form, whereby it is adapted for rapid and perfect production at a low cost.

**MOTOR-VEHICLE RUNNING-GEAR.**—R. B. VAUGHN, Kingston, Pa. The leading object of the invention is to so construct the running-gear and frame of a motor-car or other automobile-vehicle as to dispense wholly or in part with the necessity for pneumatic or other cushion tires on the road-wheels. It is also an object of invention to mount the frame and body so as to permit easy and free movement on the springs, preventing, however, violent and erratic movement.

**TIRE.**—J. C. RAYMOND, New York, N. Y. In operation the parts, a circumferential cushion, a tire-frame, and a base plate are assembled. The frame holds the casing, the cushion, and the inner tube and the plate is applied to secure the casing in engagement with the frame and to form a carrier for the parts ready for application to the frame of the wheel. The plate, with the tire in place, can now be slipped laterally over a rim-plate and screws applied to secure the parts in place.

#### Wearing Apparel.

**HAIR-PIN.**—G. H. BIGELOW, San Francisco,

Cal. The purpose in this case is to provide a pin that will be effective to support the hair, will not accidentally slip from place, and is provided with means for readily and quickly removing the pin from the hair, the handle means being so disposed as to secure an arrangement of the legs of the pin in different planes, so one may readily slide back of the other in pressing the pin into the hair and in removing the pin.

**COMBINED UNDERGARMENT AND TESTES-SUPPORTER.**—W. C. A. BULLOCK, Jackson, Miss. In the present improvement the object of the inventor is the provision of an undergarment for a man with novel features of construction that coat with supporting-bands for the comfortable support of the scrotum and testes when such treatment is found necessary.

#### Designs.

**DESIGN FOR A PLATE OR SIMILAR DISH.**—A. S. HIGGINS, New York, N. Y. A design patent has been granted to Mr. Higgins for a plate. It is round and the width from the central depression to the outer edge is broadly wreathed by beautiful clover blossoms and fern leaves. An ornamental circle in the center of the dish surrounds the head and neck of a cow.

**DESIGN FOR A WOODEN MUG.**—R. P. SPOONER, Cornwall-on-the-Hudson, N. Y. In this case the mug which is somewhat high for its width is designed with a rustic body, slightly and gracefully widening to the bottom. A rustic handle is inserted at the wooden bands encircling the mug.

**DESIGN FOR KNIT FABRIC.**—C. H. FRENCH, Canton, Mass. This ornamental design comprises a field of fabric alternating with comparatively light and heavy bands. The light bands are the narrowest and quite plain, while the heavier and broader ones are reinforced by clusters of irregular and unpatterned forms. Mr. French has also designed another knit fabric wherein the bands are relatively wider and narrower. The darker and broader have the appearance of ragged and indefinite transverse stripes. The narrow bands are plain.

**DESIGN FOR A COOKING-STOVE.**—E. C. COLE, Chicago, Ill. This design includes a round fire pot and stove body and a rectangular oven mounted upon suitable supports above the body, the supports being mounted upon the top, the latter being provided with suitable lids and key plates, and the whole presenting an attractive appearance.

**NOTE.**—Copies of any of these patents will be furnished by Munn & Co. for ten cents each. Please state the name of the patentee; title of the invention, and date of this paper.

#### Business and Personal Wants.

**READ THIS COLUMN CAREFULLY.**—You will find inquiries for certain classes of articles numbered in consecutive order. If you manufacture these goods write us at once and we will send you the name and address of the party desiring the information. In every case it is necessary to give the number of the inquiry.

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Marine Iron Works. Chicago. Catalogue free.

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For logging engines. J. S. Mundy, Newark, N. J.

**Inquiry No. 8044.**—Wanted, address of manufacturer of Cast show case.

"U. S." Metal Polish. Indianapolis. Samples free.

**Inquiry No. 8045.**—For manufacturers of fine quality sewing needles.

Handle & Spoke Mch. Ober Mfg. Co., 10 Bell St. Chazrin Falls, N. Y.

**Inquiry No. 8046.**—Wanted, address of ivory-carving machine manufacturers.

I sell patents. To buy, or having one to sell, write Chas. A. Scott, 719 Mutual Life Building, Buffalo, N. Y.

**Inquiry No. 8047.**—For manufacturers of tinfoil rolling mills for foil in endless lengths.

WANTED.—Patents on bed spring constructions.

Mebane Bedding Co., Mebane, N. C.

**Inquiry No. 8048.**—For manufacturers of machine used in vacuum closed jars.

FOR SALE.—Patent No. 774,043. Self-reversing trolley pole. W. R. Cooper, 640 Morton Ave., Greencastle, Ind.

**Inquiry No. 8049.**—For manufacturers of 20th Century Gyroscope, also manufacturers of novelties and specialties.

Well gotten up typewritten letters will increase your business. \$2 per 1,000.

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**Inquiry No. 8050.**—Wanted, address of dealer that sells a machine to cut noodles.

The celebrated "Hornsbly-Akroyd" Patent Safety Oil Engine is built by the De La Vergne Machine Company Foot of East 135th Street, New York.

**Inquiry No. 8051.**—For manufacturers of preparation called "Koi Span," which is a powder designed to sprinkle over coal and thus increase the heat given out.

I have for sale the U. S. and all foreign rights of new patent improvements in Water Tube Types of Boilers. Great economizer. J. M. Colman, Everett, Wash.

**Inquiry No. 8052.**—For manufacturers of malleable iron thumb screws.

Manufacturers of patent articles, dies, metal stamping, screw machine work, hardware specialties, machinery tools, and wood fiber products, Quadriga Manufacturing Company, 18 South Canal St., Chicago.

**Inquiry No. 8053.**—For manufacturers of skees.

**Inquiry No. 8054.**—Wanted, address of dealers in Jupiter wire cables of small size.

**Inquiry No. 8055.**—Wanted, address of firms installing alcohol lighting plants.



#### HINTS TO CORRESPONDENTS.

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.

Buyers wishing to purchase any article not advertised in our columns will be furnished with addresses of houses manufacturing or carrying the same.

Special Written Information on matters of personal rather than general interest cannot be expected without remuneration.

Scientific American Supplements referred to may be had at the office. Price 10 cents each.

Books referred to promptly supplied on receipt of price.

Minerals sent for examination should be distinctly marked or labeled.

(9944) P. J. L. asks how to make tracing cloth. A. 1. Boiled linseed oil (bleached), 10 pounds; lead shavings, ½ pound; zinc oxide, 2½ pounds; Venetian turpentine, ¼ pound. Boil for several hours, then strain, and dissolve in the strained composition 2½ pounds white gum copal. Remove from the fire, and when partly cold, add oil of turpentine (purified), sufficient to bring it to proper consistency. Moisten the cloth thoroughly in benzole and give it a flowing coat of varnish. 2. Varnish the cloth with Canada balsam dissolved in turpentine, to which may be added a few drops of castor oil, but do not add too much, or it will not dry. Try a little piece first with a small quantity of varnish. The kind of cloth to use is fine linen; don't let the varnish be too thick.

(9945) G. O. W. says: I want to build a stereopticon using a 7-inch Mangin mirror, an acetylene illuminant of six or eight 2-foot burners giving 100 candle-power each, bunching the burners together as much as possible. I want to use condensing lenses 7-inch diameter, 12 inch focus, and a two-third size achromatic projecting lens whose equivalent focus is 12 inches. A. We would say in reference to your inquiries regarding the arrangement of lenses, light, and mirror for a stereopticon, that all such instruments are made adjustable, so that the various distances may be altered to adapt the projection to halls of different lengths. You can determine the proper position for each by trial, and make the parts of the apparatus to correspond. It is not possible from the data you give to make any reliable calculations for the various positions. You say "a 7-inch Mangin mirror." If this means the focal length, then 7 inches is the proper distance for the center of the light. If it is the diameter of the mirror, it does not give any information upon the subject. Proceed as follows: In a darkened room place a candle flame, so that the reflected light emerges as nearly parallel as possible, or so that the beam can all of it enter your 7-inch condenser, and come to a focus after it passes the condenser at such a distance from the condenser as to allow the two-thirds lens to take in most or all of the light. These directions are the best we can do, and give the method we use in the same case. 2. How far the center of the flame must be from the mirror? A. The place for the flame of a stereopticon is a short distance beyond the focus for parallel rays. You can find this focus by placing the mirror in the sunlight and measuring the focal length—the distance from the center of the mirror to the focus of the sun's rays. 3. How far the mirror must be from the condensing lens nearest the mirror? A. The mirror should be at such a distance from the condenser that the beam from the mirror may enter the condenser. Find by experiment. 4. Which would be more satisfactory—to place the flames so that they cover the mirror reflector, or place them in line with the axis of the mirror? The Mangin mirror is concave, so as to throw the rays of light parallel. A. Acetylene flames are usually placed in a straight line in the axis of the lenses. We have never seen more than four used. Seven would make too long a line of flame. Perhaps with so large a mirror and lens the lights might be staggered to advantage. 5. Would it interfere with the intensity of the light to place a thin glass over the mirror, so as to protect it from the heat to prevent breaking the same? A. A thin glass or a sheet of mica is frequently used to protect the condensers from the heat of the calcium light. You can use such an arrangement. 6. The condensing lenses are placed so that their convex sides are together. How far apart ought they to be, measuring from the surface of one at the center to the surface of the other at the center? A. The lenses of a condenser are placed with their convex surfaces toward each other, and as close to each other as they can be without touching each other. Distance not important further than this. 7. How far from the plane surface of the condensing lens nearest the objective to the center of the two-thirds size objective? A. The distance of the objective from the condenser depends upon the distance of the screen from the lantern, or the length of the hall in which the lantern is used. The objective

must be movable, since a thick slide may require an adjustment of the objective to make it sharp after it has been thrown upon the screen.

(9946) H. H. H. asks: 1. In central station telephone exchange work, where they have party lines with as many as four 'phones connected with the switchboard with only two wires, how is the operator enabled to ring any one of the 'phones she wishes without disturbing the others? I understand they use an alternating current for ringing, and that the 'phones are all alike in construction, that any one of them could be used in place of any other one, that is, they are interchangeable, provided that the connections in the instrument are properly changed. Is this right? Of about what potential is the current that is ordinarily used to actuate the ringer movements? A. The methods for selective calling upon party lines of telephones are divided by Miller into three classes: 1. Those employing step-by-step movements for completing the calling circuit. 2. Those employing currents of different directions or polarity. 3. Those employing currents of different frequencies for actuating the different signals, a harmonic system. These several methods are fully discussed and described for 37 pages in Miller's "American Telephone Practice," which we send for \$4, to which we would refer you for further information. 2. In winding the armature of a D. C. shunt motor, to carry a current of say ten amperes, is it necessary to select a size of wire that will carry ten amperes without heating, or is one of a five-ampere capacity large enough? Does not the current, on entering the armature, separate, and flow half around one way, and half the other? And how does the rule apply in the case of a dynamo? A. In a direct-current motor armature as ordinarily wound and connected, the current divides at one brush and goes in opposite directions, uniting at the opposite side at the other brush. Each side carries but half the current, and thus need be wound with wire of a size suitable for half the current. 3. Can you give directions for recharging a battery of dry cells with a dynamo? About how many amperes would you force through, and for how long? Is the voltage of the charging current an essential factor? A. We have had no experience in recharging dry cells with a dynamo or otherwise, and do not think the game is worth the candle. The voltage of the charging current should be about 2 volts per cell in series.

(9947) S. G. B. asks: (1) What strength approximately is required to break an egg held end to end between the palms of the hands, and why the resistance? (2) Can any living man perform this feat, i. e., is any man strong enough? I enclose stamp for reply, although probably you answer no inquiries except through the columns of your paper. A. We have never seen any test of the pressure necessary to crush an egg shell in the direction of its longer axis. It is not probably very great. Any one trying this with his hands is a little uncertain of the result and does not really press so very hard. Doubtless many men can press hard enough to crush the simple arch of the shell. The force required can easily enough be determined by making a plaster cast to fit the two ends of the egg, and then applying pressure till the shell gives way. We answer many more questions by mail than through our columns. Only those thought to be of general interest are printed.

(9948) S. G. B. asks: In your reply March 1 to a question of mine relative to the strength of an egg in the direction of its longer axis you say that probably the resistance is not very great and that many men can doubtless crush an egg held end to end between the hands. With a plaster cast fitting the ends of an egg I applied pressure until the shell gave way. It bore a resistance of 74 pounds. When 7 or 8 pounds more were added the shell gave way. It is very difficult to balance the pressure satisfactorily, consequently I think that an egg offers a resistance of more than 74 to 80 pounds. My theory is that a resistance of 15 pounds per square inch (atmospheric pressure) must be overcome before there is any strain whatever on the egg-shell. An egg probably has from 7 to 10 square inches of surface. Multiplied by 15 this would give a resistance of 100 to 150 pounds. Few men have such strength. Many strong men, local champions, have tried this experiment of breaking an egg between the palms of the hands and failed. A. Your observation of the breaking strength of an egg-shell under direct and equally distributed pressure is very interesting. The figure you give does not seem very large, and is probably quite near correct. We cannot agree with you that the pressure of the air resists the breaking of the shell, since that pressure is upon the outside of the shell all the time, and is balanced by a pressure from within just as it is upon our own bodies. It has no influence either way upon the power required to break the shell.

(9949) A. G. H. asks how to mend tortoise shell. A. Small pieces of good tortoise shell may be joined so as to form one large apparently seamless piece in the following manner: Slope off the margins of the shells for a distance of about 1/4 of an inch from the edge. Then place them so that the margins overlap one another; and thus arranged put them in an iron press and immerse in boiling water for some time. The pieces by this means

become so perfectly united that the joint cannot be seen. The filings and very small scraps may be softened in hot water and consolidated by hydraulic pressure in metal molds. Protracted heating of tortoise shell darkens it, and greatly lessens its beauty.

(9950) T. K. asks: 1. Will you kindly explain, in your notes and queries, the mechanism and working of a wattmeter? A. Wattmeters are instruments which have two coils, one a fixed coil of coarse wire in which the current is proportional to the amperes, and the other a movable coil of fine wire in which the flow is proportional to the volts. The instrument is an electro dynamometer; the flow in the coarse coil produces a magnetic field varying with the current in amperes, and the swing or rotation of the movable coils is made to act upon the index or motion of the indexes upon the dials according to the product of the intensities, of volts and amperes, or watts. 2. How does the feeding and regulating mechanism of an arc light act? A. Most of the arc lamps regulate the feed of the upper carbon by means of a clutch. When the arc becomes too long the current through the arc is reduced, and the current through the shunt circuit which controls the clutch becomes greater, and the clutch releases the upper carbon, which drops a little. Its sliding is stopped by the increase of the current in the arc and the decrease of current in the shunt.

(9951) A. L. R. asks how to make fire-proof roofing. A. After the paper is put on take coal tar and lime (burnt, but not slaked), and boil them together in the proportion of 15 pounds lime to 100 pounds tar. Put it on hot. To pulverize the lime, sprinkle it with a little water and sift it. To avoid the tar boiling over, stir the lime in the boiling tar very slowly. The mixture must always be heated before putting on. The lime and tar form a chemical connection, which is fire proof, cannot be melted by sun heat or dissolved by steam or hot water, and makes a smooth, glazed roof.

(9952) M. C. writes: Referring to inquiry 9916, p. 238, my observation is: On inland lakes, where the ice often melts without wind to disturb it, the surface of the lake will appear to have a quite solid covering of ice, and often will sustain a man's weight after a frosty night, and all disappear in a few hours, which gives the impression that it sinks. In reality, ice in thawing becomes very porous, and if disturbed will fall into "nails," as often described. This may be seen in a block of ice lying in the sunshine a short time. Ice in this condition may be a foot or more in thickness, but a slight disturbance will cause it to fall into the small pieces and dissolve in a few minutes. Persons not noticing carefully think it sinks, which of course is impossible. A. The reason given above for the disappearance of ice on a pond in the spring is doubtless the true one, but the question put to us was as to the origin of the belief that the ice sinks when it disappears. This we cannot give. We should have accounted for the disappearance of the ice as our correspondent does, but this does not explain the belief of some intelligent people that the ice sinks when it disappears. That is evidently another matter. We answered the question which was put to us by our correspondent.

(9953) V. R. K. asks: I would be pleased to have you inform me if there is anything that could be put in water to stop it from freezing. I have used salt, but find that it freezes after it gets a certain amount of cold. It must not contain spirits, so as when heated to cause an explosive gas; it must also flow freely. What action has salt on water against cold? A. Calcium chloride brine, such as is used in cold storage houses for refrigeration, will be what you require. Put 3 to 5 pounds of calcium chloride to the gallon of water, and its freezing point will be reduced to 39 deg. below zero Fahr. Salt and water will freeze at a little below zero. The melting point of a mixture of salt and ice is 7.6 deg. below zero Fahr. Below this temperature the salt and ice are solid; above that point the mixture is liquid. That temperature is its melting point, just as ice has a melting point of 32 deg. Fahr.

(9954) R. G. H. asks: In answer No. 9915, page 238, you say the months "beginning with January," etc. I have read that the old year began March 1. I understand that September (7th), October (8th), etc., were so called when the year began March 1, and when the change was made the names were left. If that is correct, should you not have said, "beginning with March"? A. Our use of the phrase "beginning with January" had no reference to the beginning of the year now or at any other time. It happens that the year as ordered by Julius Caesar began January 1, in order to bring the vernal equinox on the 25th of March as it had been in the time of Numa. This was the 46th year before the birth of Christ. We were asked to explain the number of days in the months, and kept strictly to the question asked. The beginning of the year on January 1 was instituted by England in 1752. Before this time the year had begun on March 25. Scotland had made the change in 1600, and France in 1563. It is not correct so far as the Julian calendar goes to say that March is the first month. The changes in the length of months dates from the Cæsars—Julius and Augustus.

NEW BOOKS, ETC.

BEER BOTTLERS' HANDY BOOK. By Philip Dreesbach. Wahl-Henius Institute, 1906. 12mo.; pp. 765. Price, \$5.

This elaborate book is partially based upon the lectures delivered at the Wahl-Henius Institute of Fermentology, and it is intended to serve as a practical volume to meet the many problems apt to confront practical beer bottlers. The author goes very thoroughly not only into the immediate subject embraced in the title, but in a general way as well into the science of brewing with its many subdivisions. Besides this the business phase of the industry is discussed in separate chapters by competent writers. Even many details of work bearing on the brewing industry, which are usually performed by outside contractors, have been included in the book, and in general we may say that it is probably the most comprehensive work of its kind that has so far been placed before the public.

GRAINING, ANCIENT AND MODERN. By William E. Wall. Somerville, Mass.: Published by the Author, 1905. 12mo.; pp. 137; 50 illustrations. Price, \$3.

The subject under discussion is unquestionably one of the most important phases of modern house painting and decorating, and the author has handled this in as comprehensive a manner as the importance warrants. The book is splendidly illustrated by full page cuts, showing the various grainings of woods in color, and it will prove of the greatest value to members of the trade. The author's experience in work of this character has fitted him to choose the most necessary matters for discussion, and to eliminate such as have no practical value for the practical man. Not only is the actual work of the graining fully explained and elaborated, but the mechanical side of the trade, the necessary paints, tools, brushes, etc., is also discussed.

MODERN DYNAMOS AND BATTERIES FOR AMATEURS AND STUDENTS. By S. R. Bottone. London: Guilbert Pitman, 1906. 12mo.; pp. 172. Price, \$1.

This is the second volume of Electrical Engineering for Students, and in it the author has treated, in a simple and accurate manner, of the construction of many useful appliances required in practical work with current or dynamic electricity. Nearly all the apparatus and machines described can be made by any one possessed of a little perseverance, with the tools usually found at home. The book contains full constructional details and working drawings for making dynamos, motors, battery cells, measuring instruments, and other accessories. A carefully selected list of questions will enable the student to test his knowledge at any time.

THE UNITED-OTTO SYSTEM OF BY-PRODUCT COKE OVENS. New York: The United Coke and Gas Company, 1906. Quarto; cloth; pp. 146; 65 illustrations.

It not infrequently transpires that among the best contributions to scientific literature are the publications of certain of the great manufacturing, engineering, or industrial companies, publications which, while often produced for advertising purposes rather than for the propagation of knowledge, are nevertheless capable of use as reference or text books of the greatest value, and this work unquestionably must be included in the latter category. The book affords general information concerning the by-products coke oven and its operation; and as it is intended primarily for those not familiar with the subject, it avoids to a large extent all unnecessary details of a purely theoretical and technical character. The subject is handled in a most thorough manner, while the language is clear and concise. Among other subdivisions are included chapters on coal, types of ovens, retorts, products, by-products and their use and general arrangement of plants. The book is splendidly illustrated with many engravings, charts, and tables, and is a beautiful example of the printer's art.

PRACTICAL PATTERN MAKING. Edited by Paul N. Hasluck. Philadelphia: David McKay, 1905. 12mo.; pp. 160; 300 diagrams. Price, \$1.

This book contains in a convenient form for every-day use a comprehensive digest of information given by experienced craftsmen and which has previously been published in the Journal Work. The book goes thoroughly into the construction of foundry patterns, core boxes, and patterns and molds for iron columns. Other patterns which are discussed are those for steam engine cylinders, worm wheels, lathe beds, headstocks, poppets, and slide rests. Miscellaneous patterns and core boxes are also described, and the book has three chapters on the jointing and finishing of patterns, and the making of those of circular form. The construction of core boxes and the coring of holes in castings is also discussed.

FOOD AND DIET IN HEALTH AND DISEASE. By Robert F. Williams, M.A., M.D. Philadelphia: Lea Brothers & Co., 1906. 12mo.; pp. 392. Price, \$2.

The section of the book devoted to "Food in Health" is interesting as being based upon the work of the Experiment Stations of the United States Department of Agriculture. Digestive processes, physiology, cooking, etc., are admirably treated. The portion devoted to

"Food in Disease" takes up the subject of diet in a thorough manner. The book will prove of use to the doctor, the nurse, and the layman.

VALVE GEARS FOR STEAM ENGINES. By Cecil H. Peabody. New York: John Wiley & Sons, 1906. 8vo.; pp. 142; 33 folding plates. Price, \$2.50.

There can be little question that there is no feature of steam-engine design of greater importance than the valve and the valve gearing. There are many valuable works on this phase of mechanical engineering, which treat the subject thoroughly from a scientific as well as a practical standpoint. Among the latest publications is the second edition of this book by Prof. Peabody, and it undoubtedly is one of the best contributions to steam engine design. The work is intended to give engineering students instruction in the theory as well as the practice of designing valve gears. As the vast number of valves and gears proposed and in use at the present time would make an exhaustive treatment in a textbook rather difficult, the author's aim appears to be rather to give the learner a firm grasp of the principles and some facility in their application. Graphical methods are used throughout, both for demonstration of principles and for design of gear. In an appendix analytical demonstrations are given of certain principles that cannot be treated in a complete and satisfactory manner by instruction alone. Common and well-known methods and processes have been used in most cases, though certain features are doubtless original. The changes that have been made from the earlier edition have tended to make the book more simple and more easily understood, and the transfer of all analytical work to an appendix has tended to avoid discontinuity in the graphical presentation of the subject.

DAS VERZINNEN, VERZINKEN. By Friedrich Hartmann. Vienna: A. Hartleben's Verlag, 1906. 12mo.; 5 illustrations; pp. 228. Price, 75 cents.

The covering of one metal with a thin layer of another is of such importance to-day, not only for the usual industrial purposes, but for scientific, chemical, and electrical uses as well, that a practical and thorough handbook on this subject is doubtless of value. Recent years have produced in metallurgy countless improvements and innovations, and this also holds true in that phase of the subject discussed by the author. In this, the fifth edition of his work, he has brought it as nearly as possible up to date, and includes therein the best European practice and methods. Considerable space is given to the discussion of the alloy known as magnallium, a mixture of aluminium and magnesium, and which possesses many remarkable characteristics as yet little known among technical men. Electro-metallurgical methods are also thoroughly discussed and developed.

AMERICAN MEN OF SCIENCE. A Biographical Directory. Edited by J. McKeen Cattell. New York: The Science Press, 1906. Large 8vo.; pp. 364.

This book is doubtless a valuable contribution to the organization of science in America. It includes, probably for the first time, a fairly complete survey of the scientific activity of a country at a given period. As a reference book for the field it covers, it may be even more useful in academic circles than "Who's Who in America." Unfortunately, there scarcely exists among scientific men the recognition of common interests and the spirit of co-operation which would help to give science the place it should have in the community, and it is hoped that this work will be of service in making scientific men better acquainted with one another and with one another's work. As far as possible each name is followed by a short historical account, which includes the usual biographical data of birth, residence, etc., as well as the best-known work and the chief field of endeavor.

GLUE, GELATINE, AND THEIR ALLIED PRODUCTS. By Thomas Lambert. London: Charles Griffin & Co.; Philadelphia, 1905. 12mo.; pp. 151. Price, \$1.75.

The glue and gelatine industry has made an immense advance during the last few years. Old methods of working have given way to new, and this changed condition of things, due to a better scientific knowledge of the raw materials and their treatment, necessitates a revision of the literature. The work before us is a good one and deals with the subject from a most practical standpoint.

INDEX OF INVENTIONS

For which Letters Patent of the United States were Issued for the Week Ending

April 17, 1906.

AND EACH BEARING THAT DATE

(See note at end of list about copies of these patents.)

Accordion, mechanically playing, A. Zuleger	817,950
Adding machine, M. Kun	817,786
Advertising device, H. A. de Radio	818,197
Aerating device for pasteurizing, Schallinger & Sondergaard	817,875
Air brake coupling, J. S. Farlow	818,155