

The Insolubility of Pure Metals in Acids.

The results of an investigation concerning the cause of the insolubility of pure metals in acids are contributed by Dr. Weeren to the current number of the *Berichte. De la Rive*, so long ago as the year 1830, pointed out that chemically pure zinc is almost perfectly insoluble in dilute sulphuric acid. Dr. Weeren's theory of the phenomenon is as follows: "Chemically pure zinc and also many other metals in a state of purity are insoluble or only very slightly soluble in acids, because, at the moment of their introduction into the acid, they become surrounded by an atmosphere of condensed hydrogen, which under normal circumstances effectually protects the metal from further attack on the part of the acid." The experiments from which this theory has been derived were briefly as follows: The amount of chemically pure zinc dissolved by the acid was first determined. It was next sought to determine what difference would be effected by performing the experiment *in vacuo*, when of course the escape of the hydrogen would be greatly facilitated. The solubility was found under these circumstances to be increased sevenfold. Next the experiment was performed at the boiling temperature of the dilute acid, first when ebullition was prevented by increasing the pressure, and secondly when ebullition was unhindered. In the first case, when ebullition was prevented, the solubility was practically the same as in the cold; while in the second case, with uninterrupted ebullition, the solubility was increased 24 times. Finally, experiments were made to ascertain the effect of introducing into the acid a small quantity of an oxidizing agent capable of converting the hydrogen film to water. When a little chromic acid was thus introduced the solubility was increased 175 times, and when hydrogen peroxide was employed the solubility was increased three hundredfold. The explanation of the ease with which the metal becomes attacked when

the ordinary impurities are present is that the hydrogen is not then liberated upon the surface of the zinc, but rather upon the more electro-negative impurities, leaving the pure zinc itself open to the continued attack of the acid.

Speed of Bicycles.

The *Kölnische Zeitung* gives an account of some interesting experiments which were tried by Major Brix, the commander of the Militar-Turnanstalt in Berlin, in order to test the speed of bicycles as compared with that of horses, for the purpose of conveying dispatches to Berlin and Weissensee. The distances attempted were, from Straussberg to Weissensee, a distance of just under 24 miles, and from Eberswalbe to Weissensee, 32 miles. In the latter journey two cavalry officers rode against two infantry officers mounted on bicycles. The latter accomplished the journey in 215 minutes and 210 minutes respectively, while the two lieutenants on horseback arrived at their destination seven minutes before the first bicycle rider. In the shorter distance the same result was obtained, the riders arriving a few minutes in advance of the bicyclists. In both cases the cavalry officers only rode at a gallop for the first fifteen minutes of the journey, while the bicyclists went at full speed all the way.

Progress of Cotton.

The development of the American cotton crop from 900,000 bales in 1830 to nearly 11,000,000 bales in 1890 represents a vast increase in the world's consumption of this material. Fifty years ago it would have been considered impossible that a demand for such a large supply could have come into existence; and even now, some persons are puzzled to determine how it happens that the consuming power of mankind always adjusts itself to every enlargement of the product. In a recent report, Mr. Carroll D. Wright shows that the increased

consumption is due, not so much to the fact that there are more people, as to the further fact that each person uses more material. The per capita consumption in this country in 1830 was only 5.9 pounds. In 1890 it was 19 pounds, an increase of nearly 300 per cent. In the meantime the western part of the world has become more densely populated, while Europe has for many years been almost free from the desolating and destructive wars which impoverished the people and forbade them to supply their wants. Thus while the consumers all over the world have had large means with which to buy, the wonderful improvements in machinery have reduced the cost of manufacture so that prices here have steadily fallen. The cotton mill of 1890 produces, at a given cost, a quantity of material far in excess of that produced by the cotton mill of 1830, and increasing competition continues to compel the introduction of economies which tend to force prices even to lower figures. It is safe to assert that the product will never exceed the demand.—*Textile Record.*

Patent-Combination-Reissue-Validity.

The United States Circuit Court for the Northern District of Illinois held, in the recent case of the Alaska Refrigerator Company vs. the Wisconsin Refrigerator Company *et al.*, reported in the *Legal News*, of Chicago, that in order to defeat a patent for a combination it is not enough to show that all the elements of the combination, separately considered, were old at the date of the invention, that a reissue cannot be held invalid because of enlargement of claims when the original patent is not in the case, and no evidence is offered to show expansion in the reissue beyond what is justified by the original specification and drawings, and that the presumption is in favor of the validity of a reissue applied for and obtained in less than two years after issue of the original patent.

RECENTLY PATENTED INVENTIONS.**Railway Appliances.**

BRAKE VALVE MECHANISM.—Alfred P. Riggs, Colorado City, Col. This is an auxiliary regulating valve mechanism, the invention relating to a triple valve of fluid pressure brakes, and providing improvements whereby, after the brakes are set, the pressure in the brake cylinder may be reduced to any desired amount, and the auxiliary reservoir receive at the same time an amount equal to that released from the brake cylinder. A novel spring mechanism is also provided for returning the piston to its normal position, and the drip cup has a readily removable strainer.

HANGER FOR CAR DOORS.—Peter A. Laine, Rutland, Vt. This invention provides a novel and simple means for the support of a freight car door from a hanger bar near the top of the car, permitting the door to have a laterally sliding movement. The construction is such that the door may be swung outwardly by lateral pressure, and slide in the space between the outside of the car and the inner surface of the hanger bar, or be moved opposite the door opening in the car side and be swung inwardly to align therewith, thus sealing the opening and aligning the outer face of the door with the exterior surface of the car.

LONGITUDINAL RAILWAY SLEEPERS.—Johann P. E. C. Stromeier, Twickenham, London, England. This is a metal sleeper transversely corrugated, and the rail rests on the crests of the corrugations, to which it is attached by lugs formed by punching and stamping the metal. Wedges are driven into the hollows of the corrugations separating the crests, these wedges also supporting the base of the rail, and pressing its flanges against the under sides of the lugs.

Electrical.

SAFETY DEVICE FOR ELECTRIC WIRES.—John H. Sedlmeyer, Johnstown, Pa. This invention is designed more particularly for application to the trolley wires of electric railways, for giving an alarm at the power station when the line wire is broken or is crossed by another wire. Combined with the main line is a normally dead parallel conductor, a spring-actuated switch lever connected with the line wire, and held in engagement with its contact point by a clock mechanism, of which a detent lever forms a part, adapted for engagement with an armature lever, while an electromagnet is provided for operating the armature, and is electrically connected with the normally dead wire. The invention is also equally applicable to electric light wires.

Mechanical Appliances.

BENCH VISE.—Joseph F. Emmert, Waynesborough, Pa. Combined with the bench and a hinged sleeve adapted to be swung up from a vertical to a horizontal position, is an inner jaw held to rotate on the sleeve and an outer jaw having a bearing in the sleeve, the bearing being adapted to rotate and longitudinally adjustable in the sleeve. The improvement is more especially designed for carpenter's bench vises, providing therefor a vise which can be arranged for substantially universal adjustments, and presenting many advantages over the ordinary vises.

PLUMBERS' PORTABLE HEATER.—William A. Nicholas and Henry Birnbaum, Rapid City, South Dakota. This is a soldering iron and pot heater, and has a base on which is arranged an oil reservoir, with burners on the opposite end of the base, and a detachable hood having a hole and cover and a door. A casing surrounds the burners, there being a transverse partition in the casing and a drip pan on each side of the partition. This heater can be used indoors or out in all kinds of weather, and one or more irons and a pot may be heated at the same time.

ANTI-FRICTION COMPOSITIONS.—Jonathan Harris and George Wass, Painesville, Ohio. This invention covers a process of producing a compound suitable for bearings or wearing surfaces of different kinds, the compound being composed of a metallic base, as any quantity of Babbitt metal, antimony, lead, tin, zinc, copper, or brass, with which is mechanically mixed a certain proportion of plumbago, the mixture being effected in such way that the lubricating properties of the plumbago will remain intact.

LACE HOLE CUTTER FOR BELTS.—Theodore O. Earle, Binghamton, N. Y. This is a neat, light and durable tool, especially adapted for use upon rubber belts, in which it is designed to cut a clean, clear hole, in the thickest belt, without subjecting the layers to undue strain, or disturbing their relation to each other. The body of the device is of the general shape of a C-clamp, one member of which is provided with a revolving cutter, while the other has a table portion to receive the belt, the proper position of which is readily regulated by an adjustable gauge.

VALVE FOR AUTOMATIC FIRE EXTINGUISHERS.—Edwin W. Storer, Philadelphia, Pa. This improvement is adapted for use in connection with a dry pipe automatic system, when the pipes are filled with compressed air instead of water, and connected with the water supply by a valve, the rise in temperature opening the sprinklers and actuating the valve. The valve case has a centrally movable tube with a valve at each end, and a duct having an auxiliary valve leading through the inner valve, while a lever mechanism connects the auxiliary valve with a flexible diaphragm on the outer side of the outer valve. The device is of simple and inexpensive construction and positive in operation, and the valve is held in place by a very small air pressure.

PAD PRESS.—Martin V. B. Bean, Lanesborough, Minn. This invention relates to presses used in making harness saddles, and provides a pad press designed to be easily and perfectly adjusted to the saddle back, while holding the pad in such a manner that it might be conveniently stuffed, and will have a smooth, flat, even bearing face. The base of the press has vertically slotted parallel flanges on its upper side, caps having shoulders on their under sides being mounted on the flanges, while forming plates on the base have bolts extending through slots in the base, and thumb screws extending through the flanges impinging on the forming plates, a glass plate being held between the latter and the cap shoulders. The glass is heavy enough not to be easily broken, while permitting the work to be seen. When the pad is stuffed it is held against the forming plates adjusted against the back of the saddle, and when filled exactly corresponds to the shape of the saddle. The same inventor has obtained an additional patent for clinching plates for use in connection with these pad presses, the plates being quickly adjusted and held in place within the saddle pad, so that the rivets used to fasten the pad linings together may be clinched. The plates are of thin flexible material and shaped to correspond to the pad.

Miscellaneous.

STEAM COOKER AND DISH WASHER.—Huldah A. Shepard, Nelsonville, Ohio. This is an apparatus designed to conveniently cook large quantities of food, and to be easily changed from a cooker into a dish washer. A series of perforated shelves is mounted in the body of the device, which has a removable perforated cover, and a vertically movable dasher secured to a rod is mounted beneath the shelves, the rod being operated by lever, the raising and lowering of which moves the dasher to throw soap and water over the dishes previously placed in position to be washed. For cooking, the articles are placed on the shelves, with sufficient water in the bottom of the

device, which is placed over a fire, and the cooking is effected by the steam generated.

FIRE ESCAPE.—Metrah Makely, New Berne, N. C. This device consists of a clamp adapted to grip a rope, and having handle portions by which the grip of the clamp on the rope may be regulated, in connection with a pair of presses arranged to sustain the weight of a person, whose weight will operate to tighten the clamp on the rope. The rope is passed down to the ground from a secure fastening in the upper portion of a building, and the clamp sections are made to press with a readily regulated pressure upon the rope to control the speed of descent while one is lowering himself to the ground thereby.

FEED BAG RAISER.—George B. Schmidt, New York City. This is a tension device capable of attachment to any feed bag, and so made that the bag will be lifted in proportion to the amount of feed taken from it, so that the animal feeding can at all times readily reach the food. One of the devices is connected with each side of the bag, and the two devices are united by a rope or strap attached to eyes of the yoke, and sustaining the bag from the animal's neck. The improvement not only prevents tossing of the head to get at the feed, but prevents waste of oats, wear and tear of the bag, and the necessity of tying the rope when putting on the bag. The breathing of the horse cannot be interfered with, and he cannot slide the bag on the ground.

BOW FACING OAR.—George R. Merrell, Boston, Ill. Combined with a pivoted bracket and an oar capable of a rocking movement therein is a handle having a link connection with the bracket, while a gravity arm is rigidly attached to the inner end of the oar, and a projection on the upper face of the link connection is adapted for engagement with the gravity arm. The ore is automatically feathered upon its return stroke, and the bracket has two apertures, through either of which it may be pivoted upon the face plate, which is a rocking plate, the outboard aperture giving double inboard leverage over that obtained when the fulcrum is at the inboard aperture.

FRUIT CLIPPER.—Ripley A. Stewart, Leesburg, Fla. This is a device to be held on the hand by loops over the thumb and forefinger, and by a wrist strap, the shear blades being connected by a rivet or screw, which also holds a guard plate. The shear blades have double flanges to receive the thumb and forefinger, and the stem is supported during the cutting operation by the guard.

HOSE COUPLING.—William L. Johnson, Pomona, Cal. In front of one end of the coupling is a latch consisting of a bail, with rearwardly and downwardly extending arms pivoted to the coupling, and semicircular recesses at the junction of the arm with the bail, while a spring-controlled yoke, to which is connected a lifting device, is pivoted to the rear portion of the bail, a lock on the coupling forming a stop for the yoke and holding the bail in locked position. It is a simple device for forming a quick, firm, and close connection with an opposed coupling.

WATCH CASE HINGE.—George Newton, New York City. This invention relates to an improvement in cap joints of cap-winding watches, and provides for strengthening the connection of the pulling knuckles with the joint and cap at the point of attachment of the knuckles with the joint and cap, or dome. A great source of trouble heretofore experienced in this class of watches has been the breakage of the hinge, which is very frail and liable to be torn away from the cap or dome from the extra friction of winding imposed on the cap, a trouble which this improvement is designed to obviate.

WATCH BALANCE STAFF.—James E. Swarthout, Elmira, N. Y. This staff is exteriorly threaded, and the balance wheel has an opening in its

arms of greater diameter than the staff, on which screws a collar adapted to singly fit in the opening of the balance wheel, while locking sleeves are also screwed on the staff, one above and the other below the wheel, the sleeves having recesses in their inner faces. The improvement provides for the ready removal of the staff when desired, and for the convenient adjustment of the balance wheel up or down, without interfering with its true horizontal alignment.

COIN OPERATED SALES MACHINE.—Alphons Brau, Amberg, Germany. This machine is designed to automatically deliver postage stamps and postal cards, railway tickets, etc., on the insertion of a definite coin in a particular opening provided for the purpose. A hollow lever is pivoted to rock in the casing of the machine, and there is a slotted coin-receiving drum on the outer end of the lever, a spring-cushioned rod sliding in the lever having pronged plates to engage the coins, while an angular spring-pressed lever is pivoted in the path of the rod and a goods-carrying plate slides in the path of this lever and has projections engaged by it.

JOIST OR BEAM BRACE.—William Paine, Sr., Brainerd, Minn. This is a bridging for joists, consisting of a zigzag bar or rod of iron provided with seats adapted to receive and clip over the upper and lower faces of joists or beams, one section being apertured and the other slotted to receive a bolt, by which the sections are adjustably held together. Simple and inexpensive braces and supports are thus formed to tie or hold the beams or joists on which the floor of a structure is laid, distributing the weight evenly upon all the joists.

MANHOLES OF SUBWAYS.—Charles W. Hays, New York City. This invention covers an improvement designed to obviate the danger and inconvenience arising from the filling of manholes with gas, whereby explosions sometimes occur, or from their collecting water to freeze in cold weather. For this purpose a removable box is provided, of a size to nearly fill the manhole, the box having suitable handles whereby it may be readily raised, and a nozzle and vent opening through the top, the latter being usually plugged. The box will so nearly fill the opening as to prevent the accumulation of large quantity of gas, and if water should become frozen in the manhole, the ice may be readily thawed by introducing steam into the box through the nozzle.

DISINFECTANT HOLDER.—Edward A. McCartney, New York City. This is a device to be applied to water closets, sinks, etc., to give off a disinfectant at every flush of the closet, to unite with the water in washing down the surface of the bowl. The holder is supported in the bowl by a rod, and is preferably cylindrical in shape, its entire surface, as well as the head and screw cap, being perforated, so that the water used in flushing will come in contact with the disinfecting material through the perforations. The disinfecting agent is to be made in shape to correspond with the bore of the holder, being compounded of substances that will retain the desired shape after being moulded.

THILL COUPLING.—Anton Niekamp, Maria Stein, Ohio. In this device the clip is integral with a hollow body having a slot in its upper face and an opening in its front face, the thill having a head adapted to enter the chamber of the body, the slot in which is closed by a lock bar above the head, while a sleeve on the thill iron engages the body and locks the devices. The coupling is an anti-rattling one, employing neither springs nor rubbers, and the fastening devices are readily loosened and tightened by hand, dispensing with the necessity of a wrench.

WINDOW CLEANING CHAIR.—Abner Barnhart, Brooklyn, N. Y. This chair has a body section to which guard rails are pivotally attached, brace beams having a sliding connection with the rear end of

the body and a pivotal connection with the forward up-rights of the guard rails, and a clamp, engaged by a locking device, held to slide on the forward end of the body. The improvement forms a portable platform which can be held firmly to a window frame, without injuring the casing, and extends beyond the frame, while it may be compactly folded when not in use.

COOKING STOVE.—Miguel N. Piedra, Lagos, Mexico. The ovens extend from the front to the rear of this stove, and the fire chamber, consisting of a central grate portion and lateral extensions, is formed at the rear of the oven, combustion flues from the chamber extending about the ends, tops and bottoms of the ovens. The fire chamber is designed to take in large sizes of wood, while its location at the rear of the ovens is intended to promote the comfort of the attendant during the work of cooking. The draught is easily regulated, and the products of combustion are caused to pass around the ovens in a manner designed to utilize all the heat produced.

PITCHER NOSE.—Augustus M. Herring, New York City. This invention provides a novel shaped nose for pitchers, to prevent dripping. An angular notch is formed in the downwardly turned portion of the nose, the notch being central and extending toward the body of the pitcher, the extremities of the nose at opposite sides of the notch being turned outwardly. When a liquid is poured from a pitcher having this improvement, the last drops will have a tendency to follow the edges of the angular notch to the apex of the angle, and thence flow back into the pitcher.

ORANGE SPOON.—Austin F. Jackson, Taunton, Mass. The bowl of this spoon has at its end a small tip or projection sharpened to a chisel edge, to facilitate dividing the fruit transversely to its axis, previous to scooping out the juice and pulp from the several cells or compartments. One or more grooves or channels also run down into the bowl of the spoon from this sharpened front edge portion, directing the juice from the ruptured cells into the bowl, instead of permitting it to overflow and drip.

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

SCIENTIFIC AMERICAN BUILDING EDITION. AUGUST NUMBER.—(No. 70.)

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- 1. Handsome plate in colors of a row of wooden houses designed by Munn & Co., architects, and erected for Mr. J. H. Shafer at Newark, N. J. Perspective and floor plans. Cost of four houses from \$16,000 to \$18,000.
2. Colored plate of the beautiful and substantial stone residence of S. Clark, Esq., on Riverside Park, New York. Mr. Henry Kilburn, architect. Two perspective elevations and floor plans.
3. A cottage recently erected at Upsal Station, Pa., at a cost of \$6,500 complete. Floor plans and perspective elevation.
4. A picturesque cottage erected at Newark, N. J., at a cost of \$4,963.72 complete. Perspective and floor plans.
5. A round end house after the style of old English homes, erected at Wayne, Pa. Cost \$5,463 complete. Plans and perspective view.
6. Designs for circular stables.
7. View of an iron earthquake church at San Sebastian, Philippine Islands.
8. An attractive residence erected at Brookline, Mass. Cost \$10,518 complete. Plans and perspective elevation.
9. Design for the thirteen story Pabst Building at Milwaukee, Wis. The probable cost of the building is \$500,000.
10. The collapse of the Y. M. C. A. building at Montreal.
11. Illustration of an easily made piazza.
12. The St. Jerome Chapel, Hotel Des Invalides, Paris.
13. A \$1,500 cottage erected at New Dorp, Staten Island. Perspective view and floor plans.
14. St. John's M. E. Church, recently erected at New Rochelle, N. Y., at a total cost of \$63,500. Plans and perspective.
15. A cottage erected at Roseville, N. J. Cost \$2,800 complete. Floor plans and perspective view.
16. A very convenient and attractive cottage recently erected at New Dorp, Staten Island. Cost \$4,950 complete. Perspective and floor plans.
17. A very attractive block of five new dwellings on Seventy-seventh Street, New York City. Plans and perspective elevation.
18. Miscellaneous contents: A millionaire's residence.—An improved hot air furnace, illustrated.—Iron and steel roofing.—Improved woodworking machinery, illustrated.—Architect of the Woman's Building at the Columbian Exhibition, Chicago.—The plain design is the best.—Inside sliding blinds.—An improved tenoning machine, illustrated.—The Cudell trap.—Lightning rods.—Properly anchoring beams in walls.—A proposed universal building law.—Windmills to supply water for houses, etc.—Graphite grease.

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Notes & Queries

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Names and Address must accompany all letters, or no attention will be paid thereto. This is for our information and not for publication. References to former articles or answers should give date of paper and page or number of question. Inquiries not answered in reasonable time should be repeated; correspondents will bear in mind that some answers require not a little research, and, though we endeavor to reply to all either by letter or in this department, each must take his turn. 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.

(3294) F. H. M. asks: Does a permanent magnet part with any of its force (or power) each time its armature is removed? I would like the addresses of some of the leading electrical goods dealers. A. According to Thompson, it is not the removal of the armature that injures the magnet, but replacing it. To avoid injury the armature must be replaced without shock. It would be best to place it at the neutral point and move it to the poles. You will find addresses of dealers in electrical goods in our advertising columns.

(3295) G. A. H. asks: Do you know of any way by which I may locate and discover hidden treasures, money consisting of gold and silver? Is there any way to apply an instrument to discover when known to exist in the radius of small area? A. We know of no royal road leading to the hiding place of the precious or other metals. The reported use of instruments are legends of no truth or value. No treasures have yet been found by their pointing. Iron, magnetic iron ores, some varieties of pyrites, etc., only are susceptible of placement by the magnetic needle.

(3296) J. G. B. asks for a receipt for making curacao. A. Slice the outside peel very thin from 60 bitter oranges, infuse for 15 days with 4 drachms bruised cinnamon and 2 drachms bruised mace in 5 gallons 95 per cent French spirit, stirring every day. Add 25 pounds white sugar dissolved in 2 gallons of water, color with burned sugar (caramel), stir and filter.

(3297) H. W. D. says: There is a difference of opinion as to whether we can think of two, or more than one thing, at the same time. Would like to see an explanation in your paper. A. Yes; it is apparent to thinkers that many things can crowd the memory at the same instant, but the power of expression or articulation is single, and therefore but one at

a time can be delivered. The brain is a vast network of inscribed tablets ever ready, singly or en masse, for expression, but must wait for the organ of selection and expression to grind them out in rotation.

(3298) A. O. T. writes: I have been noticing, from time to time, various accounts given in the SCIENTIFIC AMERICAN in regard to some of those pneumatic dynamite guns, and the question has arisen in reference to the explosive force of fifty pounds of dynamite, the charge that some of them are supposed to take. Is there any way by which you can give us an idea in regard to this? A. Dynamite varies in explosive power. It may have 72 per cent of the power of pure nitroglycerine, or nearly ten times the power of gunpowder. No exact scale of the relative power of explosives can be given, as they vary in quality of explosion as well as in intensity, and the explosion varies according to the circumstances under which it is detonated.

(3299) B. G. asks if copper could not be used instead of carbon in a common bichromate battery. If not, why? And if so, what would be the difference in current, and what is the E. M. F. and amperage of a single cell of bichromate battery plates 3x4 inches and three inches in the solution on short circuit? A. You can use copper in a bichromate battery for temporary purposes, but for continued use it is of no value, because it is soon attacked. The current and E. M. F. is at first about the same as with carbon plates, i. e., 2 volts and from 3 or 4 amperes upward.

(3300) W. F. M. asks: An engine pushes a car along a track at a given rate of speed; on a parallel track another engine pushes two cars at the same rate. If the engines stopped at the same moment, which would go the furthest, the one or the two cars? A. On account of atmospheric resistance, the two cars would go the further.

(3301) P. B. asks: Does the Edison-Lalande cell evolve any gases or create any odor, while in operation? A. No.

(3302) H. C. D. asks (1) how to make a transparent cement that will be waterproof and stand fire. Such has been sold here by agents that claimed it water and fireproof? A. The requirements are almost impossible to fulfill, and the representations of the agents are to be doubted. Caseine cement made by following process comes about the nearest to your requirements. Fresh cheese is boiled in water until it softens to a mass which will draw into threads. To 100 parts of the original cheese, 200 parts of water, 25 of slaked lime and 20 of finely sifted wood ashes are taken. The whole is intimately mixed. It is not transparent. Or try dissolving 5 to 10 parts white glue in 90 parts of nearly boiling water. In a separate vessel dissolve 1 to 2 parts bichromate of potassium in 10 parts of water. Mix and use at once. On exposure to light the glue becomes almost insoluble. 2. How silver soap for polishing plated ware, etc., is made. A. Mix infusorial earth or ground pumice stone or other polishing agent with soap in the process of manufacture. Or remelt good quality tallow soap with water and make the mixture then. Use 10 parts silica to 1 part soap.

(3303) F. H. asks: 1. If a bird is in rapid flight, should the hunter aim directly at it? A. This is a mooted point. In taking snap shots at a bird just flushed or flying among brush it is often a necessity to trust to firing in advance of the bird, estimating the allowance as well as possible, from its distance and rate of flight. In duck and other open shooting where the gun can be moved along with the bird, it is sufficient to fire very slightly in advance. 2. How far south do our migratory birds go to spend the winter? A. Many go to South America and across the equator. 3. Could not the sky lark and nightingale be introduced in this country and successfully bred here? If not, why not? A. Such naturalization has been tried, without any success. Occasionally a nightingale is reported, but very seldom. 4. How do you account for the electricity found in cats? Is it found equally in all? A. There is none in cats more than in other things. Rubbing the fur, which is well insulated by its own nature, generates the charge. The dryness of the fur favors the action. 5. Of what establishments can I get the best stereographic views? Give addresses. A. Consult our advertising columns or apply to any first class dealer in photographs.

(3304) O. S. asks (1) how to make a mat dip for brass and copper. A. Mix 1 volume saturated solution of potassium bichromate and 2 volumes of strong hydrochloric acid. Leave immersed for a few hours. To brighten the color dip afterward into following mixture: Nitric acid (36° B.) 200 parts, sulphuric acid 100 parts, salt 1 part, zinc sulphate 1 to 5 parts. All parts are by weight. 2. Please inform me how the "oxidize" that is put on by electricity is made. A. The silver is first dipped in nitric acid until brightened. It is then immersed in ammonium sulphide, and in contact with it a piece of platinum is placed in the same solution. 3. How the black preparation that is put on fireplate utensils is made? A. In "The Metal Worker's Handy Book," \$2.50 by mail, a number of receipts are given for darkening iron and steel. Crane's "Japon" dead black enameloid can be applied with excellent effect where the articles are not heated in the fire.

(3305) W. W. D. asks: What substance is put on the back of an electric push button that makes it shine in the dark? A. Balmain's luminous paint, described in our SUPPLEMENT, Nos. 229, 249. 2. For list of good paying inventions. A. Their name is legion. Every kind of manufacture has its unsatisfied wants. The trouble in successfully inventing is more in seeing the want, and appreciating just what will fill it, than in the act of invention proper. The discarding of approximate solutions of the problem requires even a degree of moral courage, but is necessary.

(3306) C. H. Y. writes: How can I make gas such as is used in small India rubber balloons? I have bought some balloons and filled them with such gas as they use in making soda water, but somehow they failed to go up. A. Pump them full of coal gas, not water gas. As the gas used in making soda water (carbonic acid gas) is much heavier than air, you decreased

their buoyancy by so filling them. Hydrogen made by acting on zinc or iron scrap with dilute sulphuric acid may be used. It should be washed by bubbling through water and then dried by passing over chloride of calcium before use.

(3307) C. B. C. T. asks a receipt for a cement that will not be affected by gasoline, to be used in fastening glass to tin. A. Cement to resist benzine and petroleum.—Gelatine mixed with glycerin yields a compound liquid when hot, but solidifies when cold and forms a tough, elastic substance having much the appearance of India rubber. The two substances united form a mixture insoluble in petroleum or benzine, for printer's rollers and buffers of stamps, as benzine or petroleum will clean them when dirty in a perfect manner. Water must not be used with this compound.

(3308) A. D. Y. asks for an easy method of applying the gold lettering on lead pencils. A. Use hot type, dust the surface with powdered resin or book-binder's glair, apply leaf and stamp with the hot type.

(3309) N. H. M. writes: How can I make a stove polish (paste) that will not dry up? A. To prevent stone polish drying, add a little glycerin to your mixture.

(3310) P. A. A. asks how rubber can be melted so as to be moulded. A. Vulcanized rubber cannot be thus treated. It can be slightly softened and moulded by pressure. We recommend you "Rubber Hand Stamps and the Manipulation of India Rubber," \$1 by mail.

(3311) A. H. B. writes: Can you give me a recipe for a good cheap glue or paste, for cementing patches on or mending coarse burlap bags, such as feed is shipped in? I have a great deal of mending on my feed bags, as they come home sometimes with three or four holes in them. I have seen bags with the patches stuck on, and seems to do very well. If you know where such a paste can be got, or give me the name of the articles and how to mix them, I will be greatly obliged. A. Use the leaf gutta percha such as tailors employ for cementing cloth. A sheet of the percha is placed between the fabric and the patch and a hot pressing iron applied. The heat melts the gutta percha and cements the patch, waterproof.

(3312) L. H. asks if kerosene oil is injurious to mathematical instruments and fine steel tools that are nickel plated. I have been using it on them to prevent them from rusting, and am told that it will damage them beyond repair if I do not stop its use. A. Good kerosene will not be injurious to your instruments. Vaseline is probably a better application.

(3313) G. B. asks what to use to coat a nickel plated bicycle with to prevent it from rusting, as I wish to take it to Santa Barbara, Cal., for the winter, and fear the salt air will rust it. I want a substance I can get off again without difficulty. A. Vaseline is universally used by bicyclists. You will also find anti-rust applications advertised in sporting papers. Incessant vigilance and putz pomade are to be recommended.

TO INVENTORS.

An experience of forty years, and the preparation of more than one hundred thousand applications for patents at home and abroad, enable us to understand the laws and practice on both continents, and to possess unequal facilities for procuring patents everywhere. A synopsis of the patent laws of the United States and all foreign countries may be had on application, and persons contemplating the securing of patents, either 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

August 18, 1891,

AND EACH BEARING THAT DATE.

[See note at end of list about copies of these patents.]

Table listing various inventions and their patent numbers, including Agricultural implement, Air superheater, Alcohol, producing, A. Springer, Axle box, T. Clements, Axle for cars, adjustable, H. Law, Azie, hollow, J. James, Baby jumper, F. E. Wilder, Baking pan, M. F. Harley, Bale tie, J. J. Yeates, Jr., Baling press, J. F. Ashley, Banjo, V. Kraska, Battery plate, secondary, A. F. Madden, Bearing, anti-friction roller, W. C. Vanneman, Bed bottom, spring, A. F. Purefoy, Bed, cabinet folding, A. A. Zimmerman, Bed, folding, J. G. Sextro, Bed lounge, J. B. Beattie, Belt stretcher, C. Darst, Bending and straightening, electric, E. Thomson, Bending machine, J. R. McNabb, Bicycle saddle, F. H. Bolte, Bicycle seat spring, J. C. Rage, Billiard register, Waterbury & Rankin, Bit, See Expansion bit, Blacking spreading device, liquid, G. E. Meeker, Blind stop, J. F. Roll, Boiler, See Steam boiler, Boiler front, C. R. Smith, Boiler furnace, steam, J. Thurell, Bolt, See Flour bolt, Boutonniere holder, A. H. Overman, Box, See Axle box, Letter box, Bracket, See Scaffold bracket, Brake, See Pressure brake, Brick, R. Bohme, Brush, E. F. Chumard, Buckle, G. E. Adams, Building material, fireproof, J. Eastman, Buildings, floor arch for fireproof, J. Eastman, Burner, See Vapor burner, Button, J. D. B. Alnard, Button, J. Mathison, Button fastening device, M. A. Northrup, Cabinet, suspended rotary, D. F. & P. A. Saum, Cable power, J. Rourk, Camera, See Photographic camera, Can, G. B. Hopper, Can, bodies of irregular shape, machine for forming and fanging, J. H. Clapp, Cans, machine for crimping and double seaming, J. H. Clapp, Car coupling, J. H. Brown, Car coupling, H. J. Cole, Car coupling, T. Eilick, Car coupling, C. F. Johnson, Car coupling, D. Touby, Car coupling and buffer, C. Z. Hubbell