time entertained as to whether she would reach womanhood: but, under the careful tutelage of her wise mother, she has developed into a healthy, lovable girl; and that she has completely won the hearts of her people, you have only to question the average Dutch man concerning her to learn.

As she is approaching the marriageable age, the question naturally arises whom she will select to be Prince Consort. Rumors are abroad to the effect that Wilhelmina is already betrothed to Prince Bernard Henry, a grandson of the Grand Duke of Saxe-Weimar-Eisenbach, who wedded a sister of William III. Should such an alliance take place, it is questionable whether it would be liked by the Dutch people, for they have no very friendly feelings toward the Germans, who, it would seem, are only waiting for a favorable chance to absorb Holland in the German confederation. Germany, however, being the Queen Regent Emma's natal land, she may very naturally wish her daughter to go there for a husband. Still, she undoubtedly has the Dutch people's interest at heart, and can be relied upon to make or sanction no alliance which would be distasteful to them. As for the Queen herself-and several examples where instinct, thus confronted-accisurely she, more than anyone else, is concerned in the matter-she says she will have no marriage for diplomacy merely; the man she weds must love her deeply and be loved in return, or she will have none of him. Herein she shows a spirit that an American girl will appreciate. She is said, among other things, to have a will of her own, and an incident illustrative of this, which has been widely told, is as follows: When, some few years ago, the German Emperor was making a formal visit to The Hague, Queen Wilhelmina expressed her intention to attend the state banquet. After considerable argument with her mother on the subject, the latter was forced to conduct the young lady to her bedroom, where, as the Queen Regent was about to leave, she rose upon her dignity and said : "I will go on the balcony and tell the Dutch people how you abuse their Queen." Of course, she did not carry out her threat, and the next morning she was sorry for her provisions its nests with a large cricket, which it knows rash words; but the incident illustrates her strength of will and a determination not to be abused. Wilhel- all resistance, and which it drags, not without diffimina has a gentle though firm disposition, and when she ascends the throne as actual ruler it is to be hoped that she will have as great an influence in the purification of the court after the dissolute reign of her father as did Victoria of England upon the court of that country when she succeeded to the throne.

exquisite aquarelles he produces.

Errors of Instinct,

That instinct is not infallible we are assured by M. A. Acloque, who gives in La Nature (Paris, November 14) some interesting instances of the truth of his assertion. The Literary Digest translates part of his article below:

"It may be stated that instinctive impulses are in some degree determined in advance for each species, and in correlation with the different acts that the individual is called upon to accomplish by reason of its own mode of life. Accordingly it is a legitimate conclusion that animals may sometimes be deceived, when the problem that they are called on to solve does not present itself under normal conditions, or when the circumstances in which they are placed are only apparently true. This is in fact what actually happens, and we believe that it will be interesting to cite ficial conditions, finds itself at fault.

nests in the earth and provision these nests, where they deposit their eggs, with the larvæ of other insects, particularly caterpillars, . . . or even with spiders. These wasps do not kill their victims; they are satisfied with paralyzing them. For the young larva that will issue from each of the eggs has delicate tastes, and would not be willing to feed on partially decayed flesh. Thus each victim is pierced with the sting, which finds its way to a nerve ganglion . . . and inoculates the demns the victim to the most absolute immobility, and it thus falls an easy prey to the newly born larva.

"One southern species, the yellow winged Sphex, how to wound in the exact spot necessary to prevent culty, to its nest. This Sphex is an interesting study. When it has got its cricket to the edge of its nest, it never fails to go into the gallery, doubtless for fear lest brings it anew to the opening, and repeats its inspec- light; alumina a whitish yellow.

pher to the Queen, Kameke, whose finely equipped tion of its lodgings. This happens as often as the studio at The Hague is visited often by Americans, and observer pleases to repeat the experiment. If now the who himself has received deserved recognition for the cricket be taken away altogether, the Sphex at first shows great anxiety, turns around, and rushes here and there, not understanding the trick that has been played it. Finally, recognizing that its efforts are futile, it returns to its burrow and sets to work conscientiously to seal up the opening, as if the cricket were within. In doing thus it performs all the acts imposed on it by its instinct to assure, under normal conditions, the nourishment of its larva. Only instinct, since it did not foresee the case of an accidental intervention that should cause the prey to disappear, did not indicate any solution of the problem thus propounded by chance. And the insect, being confused, does a foolish thing."

# Natural and Acquired Immunity.

The natural immunity of many animals to certain diseases, even when the actual virus is injected, has long been known, and various explanations have been given. Quite recently careful investigations have been carried out by MM. Calmette and Delarde in the dentally or experimentally-with unaccustomed or arti- Pasteur Institute at Lille. In their experiments they made use of the following poisons, viz., an animal "The Spegians are a tribe of wasps that make their virus, serpent's venom, and a vegetable poison, abrine, prepared by macerating jequirity seeds (Abrus precatorius) in water. They found that the immunity of pigs and hedgehogs to venom and of fowls and tortoises to abrine could not be due to the presence of antitoxins in the blood previously to inoculation, for the serum of the normal animals had no protective effect on susceptible animals, nor had it any neutralizing effecton the poison when mixed with it outside the body before inoculation, in both these respects differprey-to use the technical term-with a drop of poison ing from serum containing antitoxins. They were also endowed with anæsthetic properties. This poison con- unable to discover any antitoxic substance in the brain, liver, spleen, or other organs of the normal animals. They hold, therefore, that the antitoxic serum is independent of immunity, since that may exist when no antitoxic properties are possessed by the serum. They attribute both kinds of immunity to special characters of the cells of the body.-Lancet.

 ${\bf ILLUMINATING} \ values of mantles made from the follow$ ing oxides per cubic foot of gas: Thoria, commercial, some intruder might profit by its work, and never 60; thoria, pure, 10; zirconia, commercial 310; pure, brings in its prey without going through this prudent 15; ceria, 09; yttria, 52; lanthania, 60; erbia, comdomiciliary visitation If the cricket be removed and mercial, 1.70; pure, 0.6; alumina, 0.6. Ceria gives a redplaced some distance away, the Sphex. after finding it, dish-yellow light; erbia, zirconia and barium a yellow

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For the excellent portrait of the young Queen, which we present herewith, we have to thank the photogra-

## RECENTLY PATENTED INVENTIONS. Engineering.

SMOKE CONSUMING FURNACE.-Charles Groll, Roubaiz, France. This furnace has a rotary grate and a fuel feeder comprising a series of superposed inclined partitions, terminating at different points of the grate, a tube or channel supplying fresh air through nozzles into the combustion chamber. The operation is methodized to get the fresh coal always on coal which is incandescent, to increase the length of the course followed by the gases in the combustion chamber, and conduct them successively from the coolest to the hottest portion of the fuel. The automatic coal feeder of a conveying worm and cylinder with apertures which distribute the coal into chutes leading to partitions one above the other in a channel placed radially with respect to the grate.

METALLURGICAL FURNACE. - William J. Thomas, deceased (Hannah Thomas, administratrix), Canal Dover, Ohio. This is a form of furnace adapted for glass melting, steel making, etc. It has two hearths, at the outer sides of which are gas flues and air flues, while there are chills or air spaces below and alongside the hearths, and between them is a main or central gas flue. It is designed in operation that the air and gas in the outer flues shall be reversed about every twenty or thirty minutes, and the gas in the central flue also reversed, along with the draught of the furnace to the stack, the perfect combustion at the top of the central flue carrying the heat through the hearth on either side as reversed.

VALVE GEAR.-Franklin Pilkington. Anniston, Ala. This gear comprises a rocker arm controlled from the governor eccentric, a yoke on the arm being controlled from the shaft eccentric, while a lever fulcrumed in the yoke controls the slide valve and a link furnace, as heretofore. The invention provides devices connects the lever with the yoke. The improved gear is not liable to get out of order, affords a variable antomatic an electric current generator, and means for subjecting cutoff, according to the speed of the engine, and a con- the wire successively to the action of water, dilute acid, stant closing and opening of the exhaust at the proper and water, after pass no over the contact plates, whereby time to produce highly economical results with but a the wire is cooled :n | sealed, pickled, and the acid single valve. The contact plates are ad-

tions would rotate a valve to prevent the escape of air escaping from the rear section would operate the brakes of the detached section of the train.

RAILWAY SPIKE.-Jens K. Knudsen, Engadine, Mich. The body of this spike has an indentation in one side near the point, and a pliable prong is formed integral with the body and lies normally at its side, the free end of the prong being pointed and curved to lie withm the indentation. As the spike is driven the prong diverges from the body portion of the spike and projects through the side of the tie against which it is clinched, rendering it impossible for it to work loose, although it may be readily withdrawn on bending back the clinched point.

### Electrical.

DYNAMO AND MOTOR. - Charles P. Turner, New York City. As the magnetic permeability of iron in the field magnet cores of dynamos and motors is affected by the presence of carbon, phosphorus, and other impurities, and the alloying of iron with other metals also causes losses, this invention provides for the combination with the polar extremities of the cast or wrought iron field magnet of a facing of pure iron on the surface adjacent to the armature. The polar extremities are formed with an opening enough larger than the armature to allow for the electrolytic deposit on the concave surfaces adjoining the armature of a coating of pure iron, thus increasing the efficiency of the dynamo or motor

ANNEALING APPARATUS.-The above inventor has also devised an apparatus for electrically annealing wire, etc., instead of employing an annealing

COMBINATION BATTERY CELL.-Henry number of apertures, according to this invention, whereby the cell, after its effective term of service as a dry cell has expired, may be revivified and used as a wet cell, it being simply necessary to place the cell in a cup or other receptacle containing a solution of sal ammoniac or other exciting liquid, such double use being due solely to the aperturing of the zinc cup.

ELECTRIC SWITCH.-William W. Doty. New York, and James A. MacKnight, Mount Vernon, N.Y. This invention provides a simple, durable and wholly automatic switch for street car and surface roads, which may be readily controlled by the operator in charge of an approaching car to set the switch according to the intended direction of the car. A pair of solenoids is connected with the switch point and adapted to be alternately energized by a current under the control of the operator on the car. The devices are not liable to get out of order, and moisture is not apt to interfere with the proper working of the parts.

TRAIN CONTROLLING DEVICE. -Christopher A. Shea, Milton, Mass. To automatically set the brakes on a train, should there be danger on a portion of the track section ahead of the train, this in ventor has devised a novel arrangement of a circuit to be automatically controlled to release certain brake operating devices. The track circuit consists of the two rails connected by resistance coils and a short auxiliary contact rail, while a contact lever is carried by the train, and lever, whereby the brakes are operated by the opening or short circuiting of the train or track circuit,

LEATHER WASHING MACHINE.-James from the forward section of the train, which would thus A. C. Anderson, New York City. The zinc cup consti-be left under the control of the engineer, while the air tuting the positive electrode of the cell is made with a this machine revoluble brushes are located one above the other, the shafts of the brush cylinders being revolved by intermeshing gear wheels, and the leather to be washed is fed between the brushes by feed rolls, the arrangement being such that the leather may be passed in and drawn back from between the brushes, without much strain on the working parts of the machine or much exertion on the part of the operator.

### Agricultural.

STOCK WATERING.-Reuben G. Fay, Harlan, Iowa. To facilitate the watering of stock. this inventor has devised a novel connection between the permanent tank or reservoir and the trough, whereby the water in the trough will always be automatically kept at the required level. The mvention comprises a valve casing supporting an arm through which the stem of the valve passes, there being a pulley adjacent to the arm and a float connected with the valve stem. The device is simple and inexpensive and may be readily applied to any form of trough or water reservoir, no matter how far they may be separated from each other.

## Miscellaneous.

BICYCLE SADDLE.—In a design patent granted to Charles H. Young, M.D., 160 West Fortyeighth Street, New York City, for a bicycle saddle, special features of form are shown. The saddle is anaelectric mechanism connected with the air brake valve tomical in all its parts, presenting concave surfaces that accurately fit the convexities of the buttocks and perine um, thereby preventing injurious pressure on these parts in both sexes. Whether made of leather or other male is sustained in the the curves, upon a spring frame adapted to conform thereto. It should be made in different grades to easily fit persons of all ages, so that the curves are propertionate to the size, rendering the saddle always perfect, easy and comfortable to the rider. Manufacturers and others interested may obtain further particulars by addressing Dr. Young as above. BICYCLE SUPPORT.-Thomas Jefferson, Spearfish, South Dakota. This is a device adapted to be carried on the frame of the bicycle and readily swung down to engage the ground and hold the wheel erect when the rider dismounts. It comprises a cross bar which centrally engages the frame, and having at its ends casings in which are pivoted arms adapted to be raised and lowered and locked in either position. The device is very light, strong and inexpensive, and forms a most convenient attachment to a wheel.

sen, Iowa. This is an automatic device for feeding and insure a proper heating of the part of the wire beoil to the cylinder or other parts of a locomotive or traction engine, preventing the oil from getting cold and sticky and feeding it in a uniform and reliable manner. The oil receiver is surrounded by a steam jacket, and the feeding of the oil is effected by steam pressure, its passage being regulated in drops by a needle valve oil regulator.

## \_ . -Railway Appliances.

AIR BRAKE HOSE COUPLING.-Ernest W. Shortridge, Kenova, West Va. This coupling com- the ore being set in the tank, the receptacle having perfo so arranged that, should a train become accidentally sep- with a source of electrical supply to form the other elecarated, the longitudinal movement of separating the sec trode.

for feeding the wire over contact plates connected with

LUBRICATOR.-John C. Bauer, Rem- instable to give the desired resistance to the electricity tween the plates, according to the strength of the current and the thickness and nature of the wire, which may thus be annealed to a perfectly uniform quality throughout.

ELECTROLYTICAL APPARATUS.-A further patent of Mr. Turner provides for the electrolytical separation of precious metals from the ore without mixing the gangue with the electrolyte, the apparatus being simple and durable in construction. It comprises a tank adapted to contain the electrolyte and provided with an electrode, a transversely partitioned receptacle containing prises two sections, each having a longitudinal duct com- rated walls and being made of a non-conducting fabric municating with a flexible tubing, and the coupling is coated with a conducting substance which is connected

#### Mechanical.

RULING MACHINE.-Charles Stoll, Chicago, Ill. This invention provides novel means by which a double ruling attachment may be readily connected with or disconnected from the ordinary mechanism of a single ruling machine, enabling it to do smgle or double ruling at will. The invention comprises an auxiliary frame with rollers and cords co-operating to secure the reversal of the paper, a ruling device being carried on the frame, and there being pivoted arms by which the auxiliary frame may be raised clear of the main frame, and means by which the roller carrying the back strings may be shifted between the main and the auxiliary frames

SAWING MACHINE.-Albert C. Calkins, Santa Barbara. Cal. This machine comprises a vertically adjustable frame supported on upright guides, a yoke forming the lower part of the frame and a block sliding in guides being supported in its upper part, Columbia Falls, Montana. According to this improve erated by a wheel, crank or other power device.

BICYCLE BRAKE.--Frank J. Coombs, while a pendulum rod is pivoted at its upper end to the ment, there is a pedal sleeve on the pedal shaft and cams block and at its lower end to the saw frame. The saw are carried by the shaft and sleeve, on which a ring-shaped is lowered as the log is being cut, and in all positions sprocket wheel is loosely mounted, brake shoes being the saw has a straight line motion, the saw being op- movable into engagement with the wneel by means of | cams, while spring impelled dogs carried by the shoes

are adapted to engage with shoulders in the wheel. The device is wholly hidden from view and protected from dirt and dust, and the brake may be applied by the pressure of the rider's feet on the foot pedals.

BICYCLE CANOPY.-Adolph Mass, Car bondale, Pa. This invention provides a light and simple canopy, which adds but a trifle to the weight of the machine and which may be folded up when not required and compactly strapped to the frame. The upright is adjustable in a standard attached to the frame, and has a swivel connection with the forward portion of the canopy, the latter being adjustable vertically or laterally, and so shaped and supported that it will automatically shift its position to face the wind edge on, returning to normal position as the wind dies out.

SAIL ATTACHMENT FOR BICYCLES.-Thomas Lotherington, Ardmore, Indian Territory. According to this invention a spring roller mounted in a slotted casing carries a sail which is secured to a gaff hinged to the casing, and adapted to close the slot when the sail is wound on the roller. The sail casings are readily attachable to the frame of the machine, without injuring its appearance, and the sails may be readily spread to take advantage of the wind to assist propulsion, or automatically withdrawn and furled in the casings.

TYPEWRITER AND ADDING MACHINE. -Jacob C. Wolfe, New York City. This invention is for an attachment applicable to any typewriter, to be acted upon by the numeral keys of the machine, the device carrying an adding mechanism whereby, as the figures in a column or line are printed by the machine, the sum total appears upon the adding mechanism, having been added simultaneously with the printing of the figures The attachment, when not in use, may remain as a fixture on the machine and not interfere with its ordi nary working, being conveniently brought into action when required.

RULER AND TIME COMPUTER.-Moses Isaacs, New York City. This is a device more especially designed for banks and brokers offices, to show the due dates of time paper, while also adapted for use as a ruler. Extending in longitudinal grooves around the ruler is a tape on which are printed the months and days, and the surface of the ruler is provided with a setting mark and marks indicating different times for which due papers may be drawn. The date band is wholly ex. posed on the sides of the ruler, and is easily moved along in its groove.

ELEVATOR PLATFORM - Alphonzo E. Pelham, New York City. 'This inventor has devised a plattorm of simple and durable construction, more espe cially designed for elevators carrying hods and a wheelbarrow, as well as other articles and passengers. It has a top, with clutches adapted to grip the guide posts on the breaking of the cable, friction rollers bearing on the guide posts, while the platform castings have integral slides engaging the guide posts and bearings for the shafts of the clutches and the friction rollers, the cast ings also forming a support for the top or cover.

MIXING AND HEATING APPARATUS. Augustus S. Cooper, Santa Barbara, Cal. This apparatus has a rotary drum formed of two intercommunicat ing and connected cones, the drum being mounted on an inclined axis and there being a spiral blade in the longer cone. When the drum is turned in one direction the blade forces the material toward one end of the drum, and when turned in the opposite direction the material is forced toward the other end. The drum is suspended in a furnace on hollow trunnions, one trunnion considerably higher than the other, the material being fed in through the upper trunnion and discharged through the lower one. The material is thoroughly agitated during the whole progress of the operation.

GAS REGULATOR FOR WELSBACH BURNERS .- Oren R. Cline, El Dorado, Kansas. To insure an even gas pressure, so that the variations in the flow may not injuriously effect the fragile mantle, this inventor has devised an automatic regulating valve in combination with the burner tube and the encompassing air chamber. The valve is placed in the burner between the initial pressure and the air chamber, and consists of a liquid seal chamber with central opening, an inverted cap with perforated top, while a valve stem attached to the cap descends through the seal and is attached at its lower end to the valve. If a portion of the lights be turned on or off, no change is effected in the feed of gas, a uniform light being always assured.

FIREPLACE. - Franklin E. Humphreys, Mason City, Iowa. According to this improvement, hot air flues extend up by the smoke flue to heat the upper rooms of the house, and the fresh air is supplied by a flue descending alongside the chimney, there being hot air spaces in close proximity to the grate, while the combustion is promoted by what is termed an oxygen burner, which consists principally of an adjustable perforated tube, connected with the grate and the air inlet, and by means of which the flow and distribution of the

eccentric, also formed with external gear teeth rolling off on a fixed internal gear wheel. The device is very simple and easily operated to raise or lower or turn the slats to any desired angle.

CHILD'S CARRIAGE.-Arabella J. M. Hurdle, Southampton, England. The especial object of this invention is to enable the handles of the carriage to be readily adjusted to any required angle to suit the height of the person propelling it, the body of the carriage being kept approximately horizontal. The joint is made by a shoe having cheek pieces with angular openings in which fit the angular ends of an apertured cylinder, there being also a second shoe through the cheek pieces of which and the cylinder a bolt passes, while a strap secured to the second shoe passes around the cylinder and a pivoted lever engages the free end of the strap.

GUITAR, ETC.-Czar Prince, New York City. This invention provides, for guitars and similar instruments, an improved capo tasto attachment for raising the pitch of all the strings. The capo tasto is composed of a support in which rocks a bridge carrier having seats for the spring, the spring engaging the seats to hold the carrier in either of its two positions. With this improvement the key of the instrument can be easily changed.

MITTEN OR LIKE FABRIC.-Isaac W. Lamb, Perry, Mich. In producing knitted fabrics in ribbed work, this invention provides means whereby the blanks may be cheaply and readily made and united to form the hand and receive the thumb. The invention consists principally in extending the selvedge yarns of one ribbed fabric between the front and back loops of the selvedge of the other fabric to form the two fabrics into one piece.

WINDOW CLEANING DEVICE.-John!F. Girtler, Brooklyn, N. Y. To guard against one falling out of a window while cleaning it, this inventor has devised a safety device comprising a belt with which shoulder straps are permanently connected at one end and removably connected at their other ends, cords having hooked members on their forked ends and some of the hooks connecting with the shoulder straps. while keepers to be fixed to the window casing are engaged by the hooks. The device is simple and inexpensive, readily attached to the person, and may be conveniently con nected with the keepers on the window casing.

SOUNDING BOARD -James C. Livingston, Little Falls, N. Y. This is an improvement de signed to insure a fine quality of tone in pianos and other instruments, both in the treble and bass, by a novel arrangement of hard and soft grained wood in the board, at the same time making it possible to utilize short pieces of valuable hard grain board lumber heretofore wasted. The improvement consists principally in making the board in its treble portion of hard grained strips of wood, while its base is made of soft and wider grained strips whereby both the upper and lower notes are brought out more distinctly and purer.

COOKING STOVE. - James H. Fizer Lexington, Ky. In this stove there is an inclined back plate for the fire chamber at a little distance in advance of the vertical front wall of the oven, the top of the back plate leaning against the upper edge of the oven wall, a damper controlling an opening in the lower part of the upright partition, and a damper controlling an opening at the front of a horizontal flue below the oven. The hot air chamber thus provided between the oven and fire pot, with the arrangement of the draughts, is designed to insure an even heating of the oven with but small consumption of fuel.

PIPE CLEANING APPARATUS.-Jacob Fierz, New York City. To clean viscid and ropy deposits from pipes used to dispense beer and other malt liquors, this inventor provides a cask in which is held a ehemical or cleansing liquid, and with which connect tions are so made to the several pipes that, by opening the proper valve, air under pressure will force the cleans ing liquid through the pipes, after which, by opening other valves, clean water will be likewise passed under pressure through the pipes, removing all traces of the chemical wash

FILTER. - Edward Wolford, Ellwood City. Pa. This filter is made with a conical shell and inner similar-shaped filtering medium. the bottom of the shell being closed by a cap, and a brush-carrying shaft having sliding and rotary movement in the casing, contacting with the faces of the shell and the filtering material. This shaft is revolved by a crank at the top of the casing to clean the shell and filtering material, the impurities then flowing out through a faucet specially provided for their exit, but which is closed when water is to be withdrawn through the filtered water faucet.

SORTING TABLE. - Edmond F. B. Bourne, Vancouver, Canada. To facilitate the assorting of mail matter, this inventor has devised a table which takes up but little space and yet will accommodate a considerable number of sorters, the sorting divisions be ing quickly and easily changed. The table has a ringshaped top having inward and outward upwardly extended flanges, a number of radially disposed supporting walls, and means for removably securing the inner edge of the walls together.

be applied to the scalp and rubbed in where the hair is thin or absent, to promote its restoration. Its ingre dients include iron oxide, rum and bear's grease compounded and prepared in a manner specified

CIGAR OR CIGARETTE HOLDER.-Ar thur C. Morrison, Uniontown, Ky. This is a holder formed of a length of spring wire, so bent as to enable the smoker to readily clasp with it the cigar or cigarette, and hold the same with the finger of one hand, enabling the holder to otherwise have the use of both hands. The device is very light and inexpensive.

CIGARETTE BOX.-Howard Watkins, South Orange, N. J. This box is made in two sections one received within the other, the inner section having a tongue with a notch in one side and the outer section having a slot receiving the tongue, with other novel details. The invention affords a cheap and superior box that may be produced from metal, pasteboard, vulcanite, or celluloid. etc.

PESSARY.-Newton E. Charlton, Trinidad, Col. This is a cup-shaped device having a thin bottom, an outer wall in which is an annular chamber, and a spring-pressed plug valve in the casing controlling a port leading from the chamber to the cup.

ANIMAL TRAP. - James M. Kellogg Bozeman, Montana. This inventor has devised a trap especially designed for catching mice, rats, rabbits, etc., in large numbers, without requiring attention. It has a spring-pressed lifting wheel to automatically close the inlet doors, a releasing device for the wheel to permit the latter to close the doors, and an automatic resetting device to cause the wheel to open the doors. The animal. in passing from the entrance chamber from the cage, whence he cannot return, resets the trap.

LIQUID MEASURE DRAIN.-Samuel J. Wisdom, Montgomery, Ala. This is a receptacle adapted for attachment to the head or side of a barrel or like vessel, to support the measures used so that they will drain into the barrel or vessel, also preventing insects from getting into the measures. The receptacle has a contracted base, above which is a partition having slots, a wall of each slot being carried down below the partition to form a lip. The measures are at all times readily accessible, and the receptacle may be conveniently removed and cleaned.

## Designs.

POCKET KNIFE HANDLE. - William Schmachtenberg, New York City. This design is for a metallic handle with dull finished faces and polished ends, the handle slightly tapering from the butt to the blade end, while the blade opening indentations are bev eled and polished.

BOTTLE HOLDER. - Eugene L. Jacques, Waterbury, Conn. For holding ginger ale and similar bottles, this inventor has devised a block simulating ice, in the top surface of which are depressions of the general shape of the bottles.

SPOON HANDLE.—August Miller, Taunton. Mass. This handle is ornamented on its face with a central convex panel surrounded by a raised ornamental border broken into inturned scrolls, and its back has a concave central panel with corresponding ornaments.

ASH PAN.-Mary V. Conner, Tuskegee, Ala. This pan is higher at the back than at the front, is generally of pleasing contour, and has at its front a skeleton handle, whose side members continue oppositely across the bottom of the pan to its rear

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 of this paper.

## NEW BOOKS AND PUBLICATIONS.

INORGANIC CHEMICAL PREPARATIONS. By Frank Hall Thorpe. Boston, U. S. A., and London : Ginn & Com-pany, The Athenæum Press. 1896. Pp. iv, 238. Price \$1.60.

This work, very well selected as regards its subject. touches on the preparation of the most generally used chemicals, from convenient sources. The idea is that a deficiency exists in the usual curriculum, wherein the student on entering the laboratory uses the chemicals supplied to him, takes his course in chemistry and graduates without knowing how a single one of the reagents is made. This deficiency in our present courses of instruction Dr. Thorpe aims to supply, and the work makes an admirable supplement to a chemical course It is written by the instructor in industrial chemistry in the Massachusetts Institute of Technology. The book suggests a system which, if followed, would add to the value of any course in chemistry as given on the usual lines, for the work certainly covers ground which has hitherto been decidedly neglected in our technical schools. THE CAMERA AND THE PEN. By T. C. tifled spirits, 125 parts; distilled water, 125 parts; nitric Hepworth. London: Percy Lund, acid, 65 parts; nitric ether (see No. 5 of copper etching Humphries & Company, Limited. The This capital little work reviews photography from the aspect of the reporter, and gives largely a newspaper man's view of it. It is simply designed to elucidate the application of process and photographic work to the production of illustrations in newspapers, especially of such as are to be executed with the pen for reproduction. The work is not only practical but anecdotal as well, and forms quite good reading. It is well illustrated and the make-up of the book is quite attractive.

## Business and Personal.

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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 tura.
Buyers wishing to purchase any article not advertised in our columns will be turnished 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.

(7127) F. C. W. asks: 1. How many volts are required to run a motor, of one-twelfth to onesixteenth horse power, wound for battery circuit? A. It depends on the winding of the motor. As it needs abont 40 watts and a primary battery, current should be kept low, probably 20 volts would be a fair guess at the figureasked. 2. How many gravity cells would be required to run it? A. Several hundred. This class of cell is entirely unsuited for this work, unless you are willing to use a very large number. The use of such a number entails a great deal of labor in the care of them. 3. How many Leclanche cells would run it? A. The Leclanche cells are still worse. They cannot be used on closed circuit work except for exceedingly small currents 4. Would this motor run an ordinary sewing machine? A. Yes. 5. Is the number of volts produced by a Leclanche carbon cylinder battery as great as that made on the principle of Sampson ? A. They are about the same. 6. Would any power be obtained if above motor was converted into a dynamo? A. Probably very little. Small motors are not generally constructed so as to be available for gen erators. 7. Canyou tell me if a small powder cannon can be fired by electricity, by means of a platinum wire? A. Yes; without difficulty. For other queries address our advertisers of electrical goods.

(7128) H. K. C. says: I am anxious to secure the formula for etching on steel plate or iron, and do not know where I can learn it, unless you will give it to me. If you will do this, I will be very much indebted to you. A. 1. Two ounces copper sulphate, alum 1/4 ounce. salt 1/2 ounce, mixed with 1/2 pint vinegar, and 40 drops nitric acid can be used for frosting the steel. 2. Glacial acetic acid. 4 parts: absolute alcohol. 1 part: nitric acid (s. g. 1.28), 1 part; allow the acetic acid and alcohol to remain for half hour, then add nitric acid carefully. Etch from one to fifteen minutes. 3. Alcohol, 3 parts; water (distilled), 5 parts; nitric acid,8 parts; silver nitrate,8 parts. Wash the plate with very dilute nitrate acid, then apply the solution for three minutes, and wash with 6 per cent solution of alcohol. Repeat if necessary. 4. (Deleschamp's for vertical bite.) Silver acetate, 2 parts; recabove), 16 parts; oxalic acid, 1 part. 5. Iodine, 4 parts; Country Press, Bradford; and Amen Corner, Paternoster Row, London. Pp. 64. With illustrations. (7129) F. C. G. asks: 1. Will the zines (7129) F. C. G. asks: 1. Will the zincs and coppers in a gravity battery waste away if kept in the solution when the battery is on an open circuit? A. Yes; a small current will operate to prevent the deposition of copper on the zincs. 2. How is Faure's accumulator or secondary battery made? A. See our SUPPLEMENT, Nos. 322, 593 and 838. 3. How many quart gravity batteries should it take to run a telegraph line about 1/4 mile long with 3 instruments of 20 ohms resistance each? Line with ground circuit. A. Allow ten cells for this work. (7130) H. G. J. asks: 1. Can you talk over any line with an electric telephone that you can ring a magneto bell over? A. With proper telephone apparatus you can do this. The telephone should have an equal or greater range of action. 2. Has it ever been tried to use a barb wire fence for a telephoneline ? Would It it be possible ? A. This has often been done successfully. line from here to my ranch (ten miles); have a barb wire

air may be most effectively regulated.

STOVEPIPE COUPLING.—Thomas Holland, Spokane, Washington. To positively lock together the ends of stovepipe sections, and also for conveniently locking the upper section to the flue, the adjacent ends of the sections, according to this invention, are apertured and connected together by a simple form of coupling plate or bar, the coupling plate being attached by pins entering the registering apertures and a screw. The up permost or outer pipe section is locked in place by a pin entering a recess in the flue.

VAPOR BATH AND INHALING APPARA-TUS -- Charles W. Draper, Herington, Kansas. This in-vention provides means for giving vapor baths in which the patient is placed within a cabinet for vapor treatment. the head of the patient being exterior to the cabinet, to be treated by any desired nozzle, while the body is subjected to hot air or vapor treatment. The generator is placed at the side of the cabinet, and controlled by the doctor.

VENETIAN BLIND.-Charles L. Miller, New York City. According to this improvement a drum is adapted to wind or unwind a cord, the drum carrying a pinion in mesh with internal gear teeth on a revoluble Portland, Oregon. This invention is for a compound to

DIAPER FASTENER AND SUPPORTER.-Lizzie G. Scully, Rome, N. Y. This device comprises an elastic band with button on one end to engage a loop on a baby's garment, there being also other elastic bands adapted to engage the button, and a locking plate whereby the diaper will be held as adjusted without the use of safety pins.

CORSET FASTENER -- Carlton H. Merrill, Troy, N. Y. This is a simple, strong, cheaply manufactured device, not liable to get out of order, and enables the wearer to simultaneously manipulate the seve ral fastening devices to open and close the edges of the corset. The invention consists of three busks, of which one is movable, the second carries studs, and the third is provided with a rigid jaw pivotally connected with a movable jaw fulcrumed on the movable busk, the jaws teing adapted to engage the studs.

HAIR TONIC. - Micheal J. Fleming,

THE X RAYS. By Arthur Thornton. Bradford: Percy Lund & Company. London: Memorial Hall, Ludgate Circus. 1896. Pp. 63.

From these publishers we have a very pretty treatise on the X rays, constituting No. 10 of what the pub-lishers term "The Popular Photographic Series." It is similar in style to Mr. Hepworth's book and contains' 8. Is there any cheap liquid insulator that can be put on numerous practical suggestions of value to the experimentalist.