

## ENGINEERING INVENTIONS.

A rail joint has been patented by Mr. George H. Williams, of Nashville, Tenn. This invention covers a novel construction and combination of parts to secure a perfectly rigid joint, as solid as the rail itself, in which the jarring and jolting of cars passing over the joint is prevented and the wear of the meeting points reduced to a minimum.

A railway tie has been patented by Mr. Joseph W. Smith, of Mount Carmel, Penn. The invention covers a novel construction and combination of parts to provide a secure fastening for the rails, and which, while holding the rails securely in position, will be sufficiently elastic to admit of rapid traveling without injury to the rolling stock or discomfort to passengers.

A car coupling has been patented by Mr. Charles G. Crosse, of Sun Prairie, Wis. The coupling hook is automatically thrown into engagement with a link or bar brought to bear against it, and is uncoupled therefrom by means of a mechanism connected to the hook and extending to the car, the device being also applicable for coupling a pole or shafts to a carriage.

A car coupling has been patented by Mr. Jonathan Hendershot, of Evelyn, West Va. By this invention the drawhead of the car is provided with a vertically swinging member, having at its free end a downwardly projecting coupling lug, which, after the entrance of the coupling link, may be locked against upward movement by a block sliding in the top of the drawhead.

A mechanical movement has been patented by Mr. James F. Hanley, of Charleston, S. C. A double crank shaft is combined with a vibratory lever pivoted coincidentally with the centered axis of the shaft, the lever being connected upon opposite sides of the shaft by links and rocking arms, and also connected with a rotary shaft, making a compact, evenly balanced arrangement of parts to facilitate running at high speed, and apply power in both directions.

## AGRICULTURAL INVENTIONS.

A cotton chopper has been patented by Mr. William P. Clark, of Elberton, Ga. This invention covers a novel construction and arrangement of parts whereby, as the main wheel revolves while the machine is being drawn forward, a gear is operated to work a chopper with revolving knives, but such gear may be thrown out without stopping the machine, which is simply and strongly built.

A compensating clutch for corn planters has been patented by Mr. John S. Johnson, of Waukon, Iowa. It is an improved gear for connecting the wheels and axles with the seed-dropping device, by which the latter will be governed by the wheel having the slowest movement, and disconnected from the fast moving wheels, thus removing irregularities by slipping in moving over obstructions on the surface of the ground.

## MISCELLANEOUS INVENTIONS.

A drawbridge has been patented by Mr. Oscar F. Balston, of Brooklyn, N. Y. It has tubes supported upon the masonry, in combination with a bridge having trucks, making a longitudinally moving drawbridge, in which no central pier will be required, and so that vessels can lie close to the bridge.

A bolt has been patented by Mr. Jonas Potter, of Morrellville, Pa. It has a spring yoke connection, with means for detaching the bolt from its connection, and is designed to dispense with the use of cotter pins or nuts in retaining the bolt in a given position, while the bolt may be quickly and easily detached, even though badly rusted.

A box for the sale of goods has been patented by Mr. Charles T. Rosenthal, of Batesville, Ark. It is made up of and fitted with a series of partitioned receptacles or compartments, arranged in rows, one in front of the other, and designed to be placed in glass-covered show cases, to conveniently hold and display goods.

A feed for stone saws has been patented by Mr. Neil McIntyre, of Brooklyn, N. Y. It is for saws armed with diamonds or other hard stones used as cutting tools, and the invention provides a novel arrangement of continuous feed, whereby the saw is designed to cut equally well upon the forward and back stroke.

A press has been patented by Mr. Lorenzo D. Gordon, of Tenaha, Texas. This invention covers an improvement in lever powers applicable especially for presses for baling cotton, hay, etc., or for expressing cotton seed, castor bean, and lard oil, the contrivance being one which can be worked or applied either horizontally or vertically.

A check hook has been patented by Mr. William R. Moore, of Unionville, Pa. It consists of a peculiarly shaped spring, formed of a single piece of spring wire, applied to the hook by means of the same bolt that secures the hook to the saddle, making a check hook from which the check rein cannot be accidentally disconnected.

A chicken coop has been patented by Mr. George W. Brown, of McNairy, Tenn. The invention covers a novel construction of coops especially adapted for the transportation of fowls, etc., making a light, inexpensive, and strong structure, in which the stock will have plenty of air and can be conveniently inspected.

A punch has been patented by Mr. Albert Burrows, of Toronto, Ontario, Canada. It is for punching oblong apertures in belts to facilitate lacing their ends together, and has a straight shank with a semicircle at one end, which semicircle continues into parallel sides, forming a U-shaped cutting edge at the lower end of the shank.

A water cock has been patented by Mr. Henry D. Medrick, of Port Jervis, N. Y. It is especially adapted for the water supply pipe of a locomotive, and is designed to filter the water before it passes to the injector, and also to provide means for preventing the cock from freezing up in cold weather, and for quickly and conveniently cleaning it.

A washing machine has been patented by Mr. George F. Dunning, of Deep Water, Mo. It is designed to afford a simple and effective machine, to be operated with economy of time and labor, and is arranged to give easy access to all its parts for handling the clothes or washing fluid, and for cleaning the machine when the work is finished.

A liquid measuring faucet has been patented by Mr. Herman M. Nye, of Corydon, Ind. It is a combined supply and discharge faucet, in connection with an intervening reservoir, on which is marked a measuring scale, with various novel details, making a faucet whereby liquids may be measured as drawn from a cask or receptacle.

A combination tool has been patented by Mr. James Angus, of St. Catharines, Ontario, Canada. The body of the tool is of malleable iron or steel, and it is made of few and simple parts, to be used as a saw set, stove cover lifter, pot hook, can perforator and can opener, screw driver, corkscrew, tack puller, wrench, and a sad iron holder or plate stand.

A method of and apparatus for producing animated pictures of natural scenery and life has been patented by Mr. Augustin Le Prince, of New York City. It consists of a photo-camera and stereopticon adapted to show pictures in the order and time in which they were taken, in quick succession, on a finely ground plate glass, to produce the effect of the objects themselves in motion.

A carburetor has been patented by Mr. Francois J. Lothammer, of Paris, France. Combined with a compressed air reservoir and its supply pipe is a carbureting chamber within the reservoir, a valved pipe leading from the reservoir into the chamber near its bottom, a hydrocarbon receptacle surrounding the chamber, a heating chamber, and various other novel features.

An automatic device for shutting water cocks, etc., has been patented by Mr. James W. Brook, of Lynchburg, Va. This invention covers a novel combination and arrangement of parts whereby dripping water, as it freezes in cold weather, will operate a balanced mechanism to close a valve in the service pipe, or the device may be used to open or close a window and regulate ventilation.

A folding fire escape has been patented by Mr. Ira B. Stillman, of Wellsville, N. Y. It is a sectional folding ladder, the side lengths made of short lengths of wire cord connected by rivets, the rivets constituting the rounds of the ladder, the upper sections of the ladder having means for connection with the building, while the lower round is preferably formed from a bolt, the whole being adapted to pack in a very small space.

An automatic cut-off for water tanks has been patented by Mr. James Pocknell, of Jersey City, N. J. It consists of a bucket on one end of a bell crank lever, in which discharges the overflow pipe of the tank, another weighted bell crank lever being connected therewith, the weight adapted to actuate a lever connected with the valve of the steam supply for the pump, or with a shifting lever connected with the driving belt of the pump.

A safety inkstand has been patented by Mr. Louis B. Prahar, of Brooklyn, N. Y. This invention relates to inkstands wherein the bottle is inclosed by an inner and outer case, each having a cover, and provides for forming the springs and strips carrying the hinges as part of a metal frame shaped to embrace the inner casing, to act on its opposite sides, whereby the inkstand can be made almost entirely by machinery, and will be practical, durable, and comparatively cheap.

An envelope for newspapers, etc., has been patented by Mr. Robert W. Macgowan, of New York City. The invention consists in making two rows of perforations in the wrappers for articles put up in roll form, as newspapers, engravings, etc., the rows of perforations converging to make a central tapering strip which is readily torn out when started at one edge, thus easily loosening the wrapper without risk of the paper or article contained being torn or injured in removing the envelope or wrapper.

## NEW BOOKS AND PUBLICATIONS.

HOME EXPERIMENTS IN SCIENCE FOR OLD AND YOUNG. BY T. O'CONNOR SLOANE, A.M., E.M., Ph.D. Illustrated by 97 engravings. Philadelphia: H. Carey Baird & Co. 1888. Pp. 261. Price, \$1.50.

Those of our readers who have followed the series of articles published in our columns during the last year, by the author of the above work, will doubtless be glad to find them arranged in book form. But while the papers in question form the basis of the work, they are very far from constituting the whole. Much new matter is added, the experiments are placed in systematic order, and the work is brought into such shape that it is really to some extent a manual of physics. In the opening portion the manufacture of apparatus is spoken of. The subjects of wood, metal, and glass working are treated, with the limitation of processes to what the unskilled worker can do, as one great object of the book is to bring experiments within the reach of the teacher, amateur, and youth. The subject of experimental science in general, its place and its importance, is also treated of. Then the main portion of the book begins with a chapter on mechanics. This is replete with experiments and examples of the laws of force, impact, centrifugal force, elasticity, momentum, etc. The principal laws of mechanics being disposed of, the divisions of physics are attacked. Gravitation, hydraulics, and pneumatics comprise the next series of experiments, with many instances of the application of laws, and practical remarks. Atoms and molecules

are treated by themselves, and introduce the subject of molecular physics. Here Professor Osborne Reynolds' new and celebrated experiments in dilatancy are described in *extenso*, so that any child of intelligence can perform them successfully. Capillarity is fully treated, some entirely new examples and experiments being presented. The illustration of the constitution of a water drop, and the formation of bubbles of metallic mercury, are two specially interesting experiments. Soap bubbles come next, and an exhaustive series of illustrations of the phenomena of films, all performed with almost no apparatus, except a few pieces of wire, affords probably the fullest treatment of the subject accessible. Formulae for various soap bubble solutions are collected and given here. Heat, sound, and light follow, with a quantity of experiments, and a chapter on scientific lecturing closes the work. In this last portion the suggestion is made that science lectures should be made a feature of home amusement, so as to take the place of charades and dramatic performances. This certainly opens up a new field for the energies of the young lover of science. The work is beautifully bound in ornamental cloth gilt, and is very fully illustrated with nearly one hundred cuts, and has an extensive table of contents and index. It is emphatically what its title indicates, a manual of experiments. The publishers send free to all who apply by letter, a large illustrated circular, giving the full scope of the work, with samples of the cuts. It will be supplied by mail post free to any address by Munn & Co. or by the publishers on remittance of the price.

## SCIENTIFIC AMERICAN BUILDING EDITION.

JANUARY NUMBER.

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3. Illustrations of the Alcazar, and the magnificent Hot Springs of Leon, St. Augustine, Fla., also engravings showing the Main Entrance, Ladies' Entrance, and Dining Room. Beautiful examples of the Spanish Renaissance type of Architecture.
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"Really, how well you look! You are much stouter, and look ten years younger than when I saw you a few years ago. Then I did not think you were long for this world." "No," my friend replied, "four years ago I little expected to be in the land of the living at this time. It had for many years seemed unavoidable that I should have a sick spell in the latter part of January. So regularly had this been the case that my family looked for it. Four years ago an attack of pneumonia in January was followed in February by an attack of neuralgia of the heart. So violent and sudden was the attack, that although within forty rods of my house I was unable to reach it, and was carried into a house near where I had been standing. I soon rallied and was carried home. This was succeeded by two lighter attacks. After recovering so I could be about, I was taken down with three successive attacks of renal calculi. Recovering from these, I was prostrated with a long siege of diarrhoea, from which the attending physician had little hope of my recovery. I had little strength left; little vitality; recuperative powers seemed gone; felt completely prostrated. No life, no ambition, no power. I then commenced the Home Treatment. In a few weeks I was able to try work again, although quite feeble and not able to endure fatigue or much labor. I resorted to the Compound Oxygen more regularly, and to my surprise all the old bad feelings gradually disappeared. Life assumed a brighter aspect. Strength and the elasticity of youth in a great measure returned. And now, though of threescore and four years, I feel younger, brighter, and more active than I did twenty years ago. To Compound Oxygen I give all the credit; and I would recommend all chronically afflicted to try it. Tell all such for me that it will be greatly to their interest if they will call at the office of Drs. Starkey & Palen, 1529 Arch Street, Philadelphia Pa., and get their advice upon their special cases, which is given free."

A volume of two hundred pages on "Compound Oxygen—Its Mode of Action and Results," will be mailed free to all on receipt of address.

## Business and Personal.

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## A Link Belt Testimonial

from  
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Short line telephones. See illustrated adv., page 28.

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The Railroad Gazette, handsomely illustrated, published weekly, at 73 Broadway, New York. Specimen copies free. Send for catalogue of railroad books.

The Knowles Steam Pump Works, 113 Federal St., Boston, and 33 Liberty St., New York, have just issued a new catalogue, in which are many new and improved forms of Pumping Machinery of the single and duplex, steam and power type. This catalogue will be mailed free of charge on application.

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Curtis Pressure Regulator and Steam Trap. See p. 364.

No. 11 planer and matcher. All kinds of woodworking machinery. C. B. Rogers & Co., Norwich, Conn.

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Tight and Slack Barrel Machinery a specialty. John Greenwood & Co., Rochester, N. Y. See illus. adv., p. 28.

Quint's patent automatic steam engine governor. Correspondence solicited from manufacturers of throttle governor engines. Leonard & McCoy, 113 Liberty Street, New York.

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Notes & Queries

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. 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.

(1) Slip of Car Wheels.—Allow me to make the following remark as to your explanation in regard to the locomotive running over a curve, as question solved in your issue of 17th Dec. I claim that in every case the inner wheels will slip, for this reason: For instance, the locomotive is running over a short curve or long curve at their general speed, as whatever it may be, of course its tendency while it met with the curve was to go in a straight line. Now, the change of its direction is due to the curve of the rails in combination with the flanges on the driving wheels (that is, on the outer ones). Thereby more friction is created on them than on the inner ones, consequently the inner wheels will slip easier. The elevation of the outer rail is supposed to partially compensate for the centrifugal force tending to throw the flanges against the outer rail, and as only the flange of the forward driving wheel impinges against the outer rail, there is no reason for concluding that the inner wheels always slip. The whole weight of the locomotive is tended to go in a straight line, as before stated. Now, by meeting with the curve its tendency is being brought in a centrifugal motion, and hence the force being sustained by the outer rails and wheels, thus decreasing the weight of the locomotive on the inner ones, and adding equally as much on the outer. Consequently the inner wheels will slip easier. This is what is claimed in No. 10, Notes and Queries, for a locomotive when drawing. When running under momentum only, the tilting of the locomotive by the elevation of the outer track and the angular position of the track tends to prevent undue friction on the flange of the forward driver. When the locomotive runs on to a curve reversed, the slip necessarily takes place on the outer rail.

(2) W. H. D. asks how to make a canvas bag to hold hydrogen or oxygen gas under pressure for magic lantern use. A. Rubber bags are used for this purpose, and you can most conveniently make

a canvas bag air-tight by coating it with a layer of rubber cement or a solution of rubber in carbon disulphide.

(3) C. E. asks: What will be the best method to clear a waste pipe where mucus is forming or has formed from waste of beer or water, or what would be best to run through it in order to clear itself? A. Use a strong hot solution of soda.

(4) J. H. A. desires a receipt to stain white pine cherry and rosewood color. A. For cherry stain, take of rain water 3 quarts, annatto 4 ounces, boil in a copper kettle till the annatto is dissolved, then put in a piece of potash the size of a walnut; keep it on the fire for half an hour longer, and it is ready to bottle for use. For rosewood stain, take alcohol 1 gallon, camwood 2 ounces; set them in a warm place 24 hours, then add extract of logwood 3 ounces, aquafortis 1 ounce, and when dissolved it is ready for use.

(5) H. M. P. asks: 1. What battery, what size, and how many cells will it require to run Edison's incandescent 6 candle power lamp, resistance 6 to 7 ohms, requiring 9 to 15 volts E. F. and 1.40 amperes current? A. A series of twenty bichromate cells would give you voltage enough for your lamp. Taking a quart battery, you might allow 1/4 ohm to each cup. This would give ten ohms internal resistance and would give through a 6 ohm lamp a low lighting current, say 1.25 amperes. 24 square inches of zinc in a porous cup cell are allowed by some per ampere on short circuit. 2. Would this lamp be sufficient candle power to light a room 17 by 17 feet? A. The light would be quite insufficient for the room. 3. How should the batteries be connected? A. The batteries in above calculation are connected in tension. The more you use in parallel, so as to bring down the resistance, the less acid and zinc will be used. See SCIENTIFIC AMERICAN, vol. 57, No. 2, page 16, for article on this subject. 4. What would probably be cost of maintenance per hour? A. The cost per hour depends on so many factors that it cannot be given. It will cost probably one or two cents an hour in chemicals and zincs, irrespective of the trouble. 5. Is it possible to run the lamp with gravity battery? If so, how many cells? A. A gravity battery is not available for this work. 6. Will these lamps develop the power as given by manufacturers? A. The lamps can be run far over the rated power, but they wear out sooner. 7. If this lamp is too small for practical purposes, please give battery, etc., required for 16 candle power lamp. A. For a 16 candle lamp 40 cells in series would answer.

(6) F. M. W. writes: Describe the process of polishing horn. A. It must be rubbed first with fine glass paper and then with a piece of wet linen cloth dipped in powdered pumice stone. This will give a very fine surface, and the final polish may be produced by washed chalk or fine whiting applied by a piece of cloth wetted with soapuds. Care must be taken in this, and in every instance where articles of different fineness are used, that, previous to applying a finer, every particle of the coarser material is removed, and that the rags are free from grit.

(7) J. G. M. writes: I have recently fitted my main building, 100 x 40 feet and 35 feet high, with lightning rods, having 4 points 8-feet high and having two connections to the ground. Will you kindly tell me the required size and thickness of copper plate for ground connection, whether it should be soldered to the rod or not and whether it should be put at lower end of rod, 6 feet down, or higher up? A. Use a copper plate having about 20 square feet area. Ordinary sheet copper, such as is used for roofing, or in the manufacture of culinary vessels, will answer. The lower end of the rod should extend across the plate and be soldered. The plate should be buried in earth that is always moist. Another way to make a good ground connection is to dig a trench 10 feet long in earth that is constantly moist. Put a layer of coke on the bottom of the trench; loop the rod and lay it on the coke. Cover the rod with a layer of coke and fill in the trench with earth. The trench should extend away from the building.

(8) H. W. K. asks for a cement which can be used to stick art tile to iron. A. Try a gutta percha cement, made by melting together in an iron pan 2 parts of common pitch and 1 part of gutta percha. Stir them well together until thoroughly incorporated and then pour the liquid into cold water. When cold it is black, solid and elastic; but it softens with heat, and at 100° Fah. is a thin fluid.

(9) C. A. F. desires a receipt for preparing white linen cloth so that it can be written on without blotting, at same time making it stiff and glossy and to cut without fraying. A. 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.

(10) J. H. R. desires a receipt for a wash or any other preparation for the hair that will make it curl. A. Take borax 2 ounces, gum arabic 1 drachm, add hot water (not boiling), 1 quart; stir, and as soon as the ingredients are dissolved add 3 tablespoonfuls of strong spirits of camphor. On retiring wet the hair with the above liquid.

(11) E. H. D. desires (1) recipes for making purple, green, and black copying type writer inks. A. Take any desired shade of aniline dye 1/4 ounce, dissolved in 15 ounces pure alcohol, and 15 ounces glycerine, then apply to the ribbon. 2. Do strong electric or calcium lights produce sensible effect on photographic preparations? A. Calcium light has little effect, but electric light has an effect which, under sufficient exposure, is as great as sunlight.

(12) H. B. asks (1) for directions for making effervescent solution of citrate of magnesia. A. Dissolve citric acid 400 grains in water 2,000 grains, add carbonate of magnesia 200 grains; stir until dissolved. Filter into a 12 ounce bottle containing sirup of citric acid 1,200 grains. Add boiled and filtered water to fill bottle, drop in bicarbonate of potash in crystals 30 grains and immediately cork. Shake until

bicarbonate of potash is dissolved. The sirup of citric acid is made from citric acid 8 parts, water 8 parts, spirit of lemon 4 parts, sirup 960 parts. 2. How much power should I get from a bichromate of potash battery with a zinc plate 3 inches long, 2 inches wide, and 4 arc light carbons 3 inches long and 1/8 inch in diameter, two on each side of zinc, and what is its resistance? A. Your battery would give about 1/2 ampere, with resistance of 4 ohms.

TO INVENTORS.

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