The Origin of Petroleum.

In a late number of the Austrian *Zeitschrift fur Berg- und Huttenwesen,* Professor Hoefer sums up the discussion of this subject, and claims a substantial victory for the theory of the animal origin of petroleum, which he has steadfastly maintained since 1877.

The arguments in favor of this theory were at first chiefly drawn from the observed geological conditions of the occurrence of petroleum; and the principal argument against it has always been a chemical one. It has been urged that the absence of nitrogen in petroleum must be fatal to the theory of its animal origin, because an oil produced from animal substances could not fail to be nitrogenous. One answer to this argument was furnished when Dr. Engler actually produced from blubber and other animal fats an artificial petroleum, free from nitrogen, as might have been expected, since the fats are non-nitrogenous. And Engler declares that the absence of nitrogen in natural petroleum is a necessary result of its production from animal remains, because the nitrogenous flesh decays rapidly and assumes soluble forms, so that it would be removed before the fat, which is peculiarly stable, began to be transformed by the slower process of dry distillation. This proposition was confirmed by Dr. M. Albrecht, who treated several thousand mussels and fishes in this way, and found that the ammonia and nitrogenous organic bases incidentally produced were easily removed by reason of their extreme solubility in water.

But Peckham's examinations of the petroleum of California, Texas, West Virginia, and Ohio showed the presence of nitrogen, and led to the general acceptance for these oils of the theory of an animal origin, which was still denied by many for the non-nitrogenous Pennsylvania oil. Prof. Hoefer, however, still held to his former view, declaring the geological conditions of the Pennsylvania and New York oil fields to be such as could not be reconciled satisfactorily with the hypothesis of vegetable origin.

In his latest paper he repeats and enlarges an argument based on the presence in natural gas of more nitrogen than can be accounted for by an admixture of air. If natural gas be admitted to have resulted from the decomposition or distillation of animal remains, the probability of a similar origin for petroleum is greatly strengthened.

The large percentage of nitrogen in the natural gas of Pennsylvania—amounting to something more than 25 per cent—is well known. The gases in Baku have been shown to be nitrogenous likewise. Certain earth gases in Alsatia have yielded by analysis up to 17 per cent of nitrogen. And in all these cases the amount of oxygen, free or combined, revealed by the analysis is too little to account for the nitrogen as derived from an admixture of air.

To these evidences, Professor Hoefer now adds the analyses of the natural gas of Ohio and Indiana, as given by Orton in the *Economic Geology of Ohio* and by Howard in the *Mineral Resources of the United States* for 1888. All three of Professor Howard's analyses and two of the four given by Orton show an excess of nitrogen over the amount necessary to form air with the total oxygen.

Moreover, the gases from the mud volcanoes of northeastern Italy have been repeatedly analyzed; and Professor Hoefer cites 13 analyses, the provinces of Bologna, Florence and Ravenna, in which the amount of nitrogen clearly bears no relation to that of oxygen (here present as CO_2).

A further proof is drawn from the interesting report, published last summer by Gumbel, on the mineral and geological character of the samples taken from the sea bottom during the scientific exploring voyage of the Gazelle. In samples taken from depths of 500 meters and over, fine globules of fat were found—similar in character to the *adipocere* sometimes found in ancient graves, or the fat still remaining in some fossil bones. Director Gumbel recognizes the possible significance of this discovery in connection with the origin of petroleum. It is clear that, to some extent, the *adipocere* of small marine organisms is at the present time accumulating in the ooze of the deep sea bottom. The frequent presence of petroleum in nummulitic Eocene strata is at once suggested as a related phenomenon; and I may add that the petroleum found in the Niagara limestone, and particularly in the pores of *Favosites niagarensis*, seems to be another corroborative occurrence.

The contention of Professor Hoefer may be considered, perhaps, as still lacking complete demonstration—that is to say, it may be said that he has not proved the animal origin of *all* petroleum or absolutely disproved the vegetable origin of that of the Pennsylvania field. But it seems to me that he has made out a strong case, and that the chemical argument once relied upon in opposition to his theory has been much reduced in force, if not entirely destroyed.—*R. W. R., in Engineering and Mining Journal.*

NEW LANTERN EFFECT.

Not every one can go to Europe, but, possessed of a lively imagination, one may go there in spirit, provided only that the scenes are presented pictorially in a truthful and artistic way. Thanks first to the skill of the optician, and secondly to the modern photographic art, any one may be instructed and entertained by the modern lanternist, who will produce storm or sunshine, winter or summer, or the soft effects of moonlight at will upon the screen by the skillful manipulation of the optical lantern with a truly wonderful effect, but there are many effects which seem to be difficult of execution by means of the optical lantern. The saying is, "See Naples and then die;" but what is seeing Naples without seeing Vesuvius in active eruption? Comparatively few European travelers have the good fortune to witness this phenomenon, and until now, so far as we are aware, no one has been able to faithfully represent this awe-inspiring spectacle.

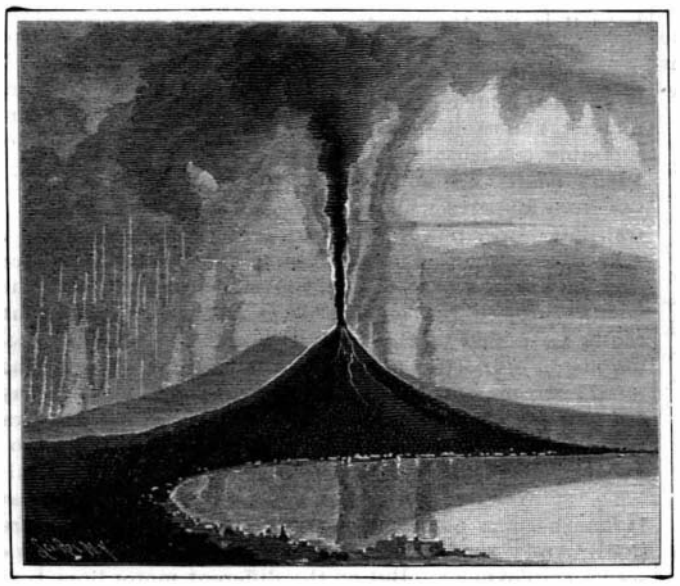

Fig. 1.—ERUPTION OF VESUVIUS.

Mr. H. C. Ogden, of Middletown, N. Y., has come to the aid of the lanternist and the non-traveler, by producing a very simple apparatus by means of which Vesuvius, in full eruption, may be projected on the screen in a very vivid and realistic manner.

Fig. 1 of the engravings shows the scene as it appears on the screen, and Fig. 2 shows the apparatus by which the effect is produced. The main idea of Mr. Ogden is illustrated in this apparatus, but our artist has added an improvement which is designed to represent the flowing lava as well as the upwardly projected flame and smoke.

In a glass tank attached to the lantern are inserted two curved drop tubes, with their extremities placed side by side, and on the rear of the tank is painted a picture of the volcano, which is represented mainly in profile by black varnish applied to the glass. The tips of the drop tubes coincide with the crater of the volcano, and from the crater down the sides there are transparent streaks representing lava. To the side of one of the clamps holding the tank together is attached a spring carrying a strip of metal which extends along behind the opaque portion of the picture, and is provided with teeth, as shown in dotted lines, which are designed to irregularly eclipse the transparent streaks.

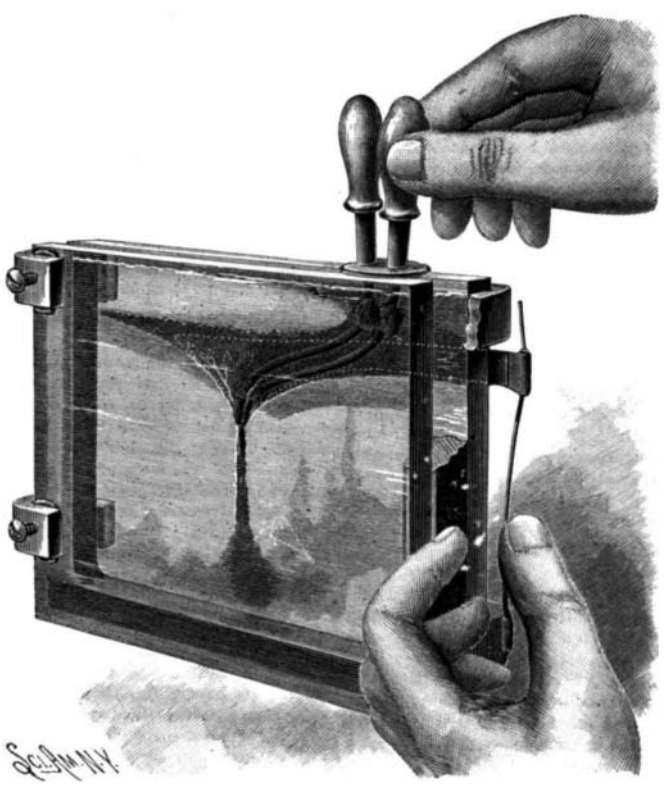

Fig. 2.—APPARATUS FOR PRODUCING THE VOLCANIC EFFECT.

In one of the drop tubes is placed a dark liquid, such as diluted ink, and in the other is placed a bright red liquid, as red aniline ink. The tank is filled with a solution of glycerine and water and inserted in the lantern. Dexterous manipulation of the flexible bulbs of the drop tubes produces red and dark streaks representing fire and heavy smoke, which are forced down in the tank and have the effect of rising in the image on the screen. At the same time the manipulation of the spring at the side of the tank alternately displays and covers the streaks representing the lava.

Electric Cars Run by Waterfalls.

The advance in all electrical matters is really marvelous. Last week we noticed the fact of a village in the Alps being lighted by electricity, the power being derived from a water wheel. And now comes this week's *Engineer* and tells us that in the town of Dover, on the Salmon Falls River, on the division line of Maine and New Hampshire, the water power furnishes not only light and heat to that town but to several distant towns also. Power is also furnished to a street railway seven miles in length. The water wheel has a capacity of 500 horse power.

Greenwood Springs, Col., is in a blaze of electric light; mills, pumps, hoists, and tramways are successfully run miles away from the power station at the falls. During the winter months the Pelton wheels, though incased in ice for weeks together, keep spinning away without cessation.

In the north of Ireland, the Giant's Causeway electric railway, eight miles in length, derives its power from two Alcott turbines, that drive dynamos which deliver electric power to the motors of the railway.

At Burgenstock, near Lucerne, Switzerland, there is an electric mountain railway, which, with its appurtenances, is a triumph of engineering. The Burgenstock is almost perpendicular; from the shore of Lake Lucerne it is 1,330 feet, and it is 2,800 feet above sea level. The total length of the road is nearly a mile, and it is operated by two dynamos of 25 horse power, worked by a water wheel of 125 horse power. Between Pazzala and Lugano, in Italy, there is a large waterfall, which supplies the water conducted through iron pipes to the dynamo room, where two Girard turbines, of 300 horse power each, run two dynamos, one for continuous and one for alternating currents, the former working the tramway motors, the latter supplying nearly 2,000 16 candle power lamps at the hotel and in private buildings.

Haulage of Canal Boats by Locomotives.

At a meeting of the Railway Union in Berlin, says *Iron*, Herr Wiebe described some experiments recently made on two lengths of the Oder and Spree canal, 3½ miles long in all, with a view to ascertain the best method of towing large boats. The submerged chain system is, he states, unsatisfactory, nor has the endless rope system of traction given entirely satisfactory results when practically tested during the course of the experiments, though a great many types of supporting posts and pulleys were tried. The difficulty encountered arose from the rotation of the rope as it moved onward, which tended to twist the boat painter about the rope, and the form of connection between the rope and the painter could not be depended on to stop this action. Further experiments were then made by attaching the rope to the center of gravity of a heavy towing car drawn by a light locomotive, such as is commonly used in mines. If the rope is attached directly to the locomotive, trouble may arise from the side pull of the rope tending to overturn the engine. It is for this reason that the towing car was adopted in the experiments in question. This plan is stated to have proved satisfactory, and boats have been towed by it at the rate of from 10 to 12 feet per second (7 to 8 miles per hour), though a speed of 5 feet (3½ miles per hour) will, in general, be sufficient. The tension on the tow rope in starting three heavy coal barges was as much as 1,764 pounds, but rapidly decreased as the boats gathered way.

Improvement in Microscopic Lenses.

It is stated that an immense improvement has recently been effected in the manufacture of glass for optical instruments by means of the addition to the ordinary materials of phosphorus and chlorine, which in some as yet unexplained way cause the glass to be very much more transparent, and enable it to receive a much higher degree of polish than any optical glass hitherto manufactured. Thus microscopes can be made which will render objects of the diameter of only the one eight-millionth of a millimeter visible, whereas with the best instruments now in use the diameter of the smallest object that can be seen is one sixteen-thousandth of a millimeter. This news, we fear, is too good to be true.

Good and Bad Bacilli.

The microscope seems to be demonstrating that our bodies are made up of little else than bacilli, germs, spores, bacteria, microbes, etc. And as in the old tales there were good and bad fairies who influenced the destinies of mankind, so there are good and bad bacilli. Some of them are necessary to our health. For instance, in the mouth of a well person there are always present no less than twenty-four microbes already discovered, with several outlying districts still to hear from. In disease the number of microbes in the body is multiplied innumerably.

Our friends, the microscopists, have not yet reached that point where they tell us the good bacilli are beautiful infinitesimals and pleasing to look upon, while the disease germs are wicked and ugly little monsters, but plainly, that is how it ought to be, if there is any poetry or justice in the microscope world.

The bad bacilli that play havoc with the human insides and produce illness are called pathogenic, while the good bacilli are called non-pathogenic. These are the little fellows that devour the bad monsters, act as scavengers to the system and make the cheeks rosy and the teeth white. Each disease has its own particular bacillus, and when you have one kind of illness sometimes the bacillus of another ailment will attack and destroy the army of the first one, and thus you are cured of one trouble at least.—*Monson (Mass.) Mirror.*

IN the San Francisco *Examiner* Mr. Collis H. Barton gives a description of a device invented by Prof. Barnard, of the Lick Observatory, for automatically detecting comets. The device appears to be an arrangement in which the properties of selenium are taken advantage of. A prism is placed in front of the object glass, but instead of the ocular there is a metallic diaphragm with slits in the position of the three hydrocarbon bands in the yellow, green and blue. Light passing through these slits falls on to a plate of selenium which forms one side of a Wheatstone bridge, connected to a battery and an alarm. The telescope is made by automatic machinery to sweep the semidiurnal arc in about ten minutes, and then, after shifting northward about two-thirds of the "field," sweeping back again. The light of Sirius is insufficient to disturb the "bridge;" but with the faintest comet the prism analyzes the light, the balance of the Wheatstone bridge is disturbed, and a current is sent to the alarm bell in Prof. Barnard's bedroom, or elsewhere.

The Engineer of the Future.

Since the introduction of electricity into common, matter of fact, every day life, the demands for economical power, says W. D. Tomlin, in *Practical Electricity*, have pressed hard on the brain of the constructing engineer. Some men have boasted that steam as a motive power is doomed and its days are numbered, that electricity is the coming power. Perhaps it is, but the recent developments tend toward the employment of stupendous steam power to produce electricity; simply because electricity can be distributed at a far less percentage of loss than any other motor. You cannot carry steam 200 feet without considerable condensation, but you can distribute electricity nearly 200 miles, and at the point of distribution your amperes will be almost initial. You cannot transmit horse power by gearing, rope, belting, or otherwise without a loss of power by slippage, friction, or kindred causes; but you can distribute electricity through ten miles of lines and give to each renter his pound of electricity through a small dynamo just in proportion as his contract calls for. Young men, I can assure you of one thing: Go into the city and ask for employment as engineer; almost the first thing you are asked is: "Do you know anything about taking care of a dynamo or electric plant?" "No." "Well, we don't want you. Good morning!" It has become almost a necessity that an engineer should know something of electricity if he expects to secure employment. But on the different motor lines, the effect, to an engineer whose earlier experience has been with slide valve, is almost paralyzing. Some form of Corliss valve gear, but the steam expanded through three cylinders and then condensed. The apparent complexity becomes simplicity itself when in the hands of a single man who operates the engine for expansion results, with cylinders 16½", 28", and 42" by 60" stroke at 65 rev., in 150 pounds initial pressure, giving 1,400 horse power. Look through any prominent engineering journal, and you will find from a dozen to fifteen Corliss valve gear motions. An adjunct of the Corliss engine is the indicator; and the time is rapidly coming to us when an engineer's education will be incomplete who cannot use an indicator and adjust the valves of his engine. What the stethoscope is to the doctor, the indicator is to the engineer. Both the professions are thus enabled to examine the breathing organs of the patient. The use of an indicator, while reflecting credit on the engineer who can use it, is a possible benefit to the steam user and owner; because thereby the coal pile is considered. The owner gets the full benefit of every pound of fuel saved, the saving being a *bona-fide* transaction often affecting the balance of a set of books from a debit to the credit account.

The time is close at hand, Mr. Tomlin predicts, when an indicator will be a part of the engine room outfit, and a daily engine log be as carefully kept as the double entry set of books in the general office.

Silvering Iron.

A new process for silvering articles of iron is thus described. The article is first plunged in a pickle of hot dilute hydrochloric acid, whence it is removed to a solution of mercury nitrate, and connected with the zinc pole of a Bunsen element, gas carbon or platinum serving as the other pole. It is rapidly covered with a layer of quicksilver, when it is removed, washed, and transferred to a silver bath and silvered. By heating to 300° C. (572° Fah.) the mercury is driven off, and the silver firmly fixed on the iron. To save silver the wire can be first covered with a layer of tin. One part of cream of tartar is dissolved in eight parts of boiling water, and one or more tin anodes are joined with the carbon pole of a Bunsen element. The zinc pole communicates with a well cleaned piece of copper, and the battery is made to act till enough tin has deposited on the copper, when this is taken out and the ironware put in its place. The wire thus covered with tin chemically pure, and silvered, is said to be much cheaper than any other silvered metals.

TO erase the white stains that occur in some of the bricks in newly constructed buildings, wash with dilute muriatic acid.

RECENTLY PATENTED INVENTIONS.

Electrical.

MOTOR.—Daniel J. Chisholm, New York City. This is an electric motor especially adapted for use on street railway cars, and is of that class in which the armatures are made to revolve in magnetic fields. The armature consists of a common shaft carrying independent pulleys to move between the pole pieces, the pulleys having coils held in sockets on their faces, and means for closing the circuit successively through the several series of armature and field magnet coils. The motor is designed to have great power in proportion to the current supplied, and the commutator has to a certain extent the function of a cut-out, whereby the current may be alternately passed through the different series of coils on the armature and field magnets, by means of which the motor may be easily reversed.

CRANE FOR LAMPS.—Emilio Cardarelli, Sumter, S. C. This is a device especially designed for supporting electric arc lamps, while also capable of other useful applications. A short fixed arm is adapted to be clamped at the desired height on the pole, and to this short arm is pivoted a lamp-supporting arm furnished with a pulley and chain, while a chain is arranged to let the lamp or lamp holder down as the pivoted arm is tilted. A housing is also provided near the bottom of the pole in which the operating chain is fastened.

SURGICAL ELECTRODE.—Josephus H. Gunning, New York City. This is a bipolar electrode capable of being flexed in various directions and having independent insulated conductors with independent tip or cap pieces forming the poles, the conductors being adjustable to vary the distance of the poles apart. It is designed for passing an electric current through diseased organs or parts of the human body requiring treatment, the electric circuit being thereby made direct through the parts affected, and much more effectually than through a pole on the exterior of the body not an integral part of the electrode itself and the other pole a component part of the electrode.

Railway Appliances.

CAR STARTER.—James T. Baird, Rosedale, Kansas. Combined with an adjustable rack frame is a pinion on one of the car axles adapted to engage the racks of the rack frame, while an air-holding cylinder is held in alignment, and its piston rod connected with the rack frame. The power derived from stopping the momentum of a car is designed, by this means, to be stored in compressed air in the cylinder, or in auxiliary tanks connected therewith, to be afterward utilized as an auxiliary power in starting the car.

Mechanical Appliances.

POWER WRENCH.—James R. Robinson, Washington, Pa. This is designed to be a very effective and powerful device for conveniently screwing bits on or unscrewing them from the drill rods of well-boring machines. It consists of two wrenches, of which one is adapted to engage the bit and the other the drill rod, with a mechanism adapted to connect with the wrenches to force them apart in order to turn the bit and rod in opposite directions.

WATER MOTOR.—Eleazar Harryman, Juliaetta, Idaho. A series of inclined shields are made to encircle a vertical shaft on which is fixed a series of wheels between the shields, the wheels having near their outer edges vertical concentric bands connected by diagonally arranged plates, while a flume having a circular opening in its bottom is arranged to deliver upon the upper shield, there being a vertically movable gate mounted upon the shaft and adapted to close the opening through the flume. The motor is of simple construction, and is designed to utilize substantially the entire energy of the water.

Agricultural.

FERTILIZER DISTRIBUTER.—James W. Rozar, Rawlins, Ga. This is a machine designed to be equally well adapted for fertilizing and planting, and with it the operation of fertilizing can be done simultaneously with the plowing. An opening plow, beam and handles are arranged in the usual way, and a hopper is secured by brackets to the beam, there being a vibrating shoe or supplemental hopper pivoted beneath the hopper, below which is a delivery chute. A downwardly projecting regulator slide plate is secured to rear side of the hopper, by the adjustment of which the feed is regulated.

THRASHING MACHINE.—Levi Epps and Enos Kibbee, Beattie, Kansas. This is a band cutter and feeder device designed for easy attachment to thrashing machines, while very simple and durable in construction. It is supported from brackets on the rear end of the machine, where a feed hopper is hung with inclined toothed bottom adapted to discharge at its front end on to the feed board leading to the drum of the thrashing machine. Above the front end of the hopper is an open feed drum carrying transverse knives, the revolving of the drum cutting the bands and at the same time regulating the amount of grain passed to the thrasher.

CUTTER BAR FOR MOWERS, ETC.—Seth M. Carter, Jamesport, Mo. This cutter bar, which is especially designed for mowing and reaping machines, has an offset near the middle, with the outer portion set in rear of the inner portion and in a higher plane, and also twisted about its longitudinal axis to bring its fingers on the same level with the fingers of the inner section, each part of the cutter bar having an independent sickle and driving mechanism. The two sickles are connected with a double crank of the driving mechanism by independent pitmen, so that when one sickle is at minimum speed the other is at maximum, thus overcoming all inertia and preventing the possibility of a dead center.

STUMP EXTRACTOR.—John Cornelius, Oakland, Md. The main frame of this device has steel side plates bolted to flanged shoes, and the construction throughout is intended for extra heavy work, as in the pulling of very large stumps. The construction of the frame is such as not to interfere with the ready manipulation of a chain and wire cable, while improved mechanism is provided for supporting the drive worm, looking to its convenient shifting into and out of mesh with its worm wheel. The machine is designed to secure a combined chain and wire cable pulling action, but in ordinary work the chain may be removed and the cable alone be used.

Miscellaneous.

DENTAL MATRIX.—Christian A. Meister, Allentown, Pa. Clamping means are provided for use with this matrix, which is to be applied to a tooth while being filled. The matrix consists of a tooth embracing a flat flexible band, with hooking or engaging lips at its ends and a jaw-like closing device provided with pocket-forming loops at its free ends adapted to receive and hold the lips of the band within them, and for the ready detachment of the band when required. The jaw-like closing device is of spring construction and is provided with transverse adjusting means.

PENCIL.—Lewis H. Sondheim, New York City. This invention provides a simple and inexpensive pencil having a casing preferably made of wood, but which is not to be cut away or removed as the lead wears off. The casing is adapted to hold a movable lead, which is fed forward to furnish new writing points as required, and the lead may also be pushed backward by pressure on its point to protect it within the pencil casing when not in use.

UMBRELLA HOLDER.—Barbara J. Bonn, New York City. This device consists of a small casing adapted for attachment to the outer edge of a counter, on the back of an opera chair, or other place, and containing a hook operated by a cam and spiral spring, adapted to temporarily receive and hold the handle of an umbrella or cane, to prevent its falling upon the floor or being lost.

CANE SPLICING MACHINE.—Gardner A. Watkins, Gardner, Mass. In the manufacture of cane furniture and similar articles the several pieces or strands of cane are first united to make a continuous strand, which is placed on a spool before the cane is woven to the desired form. This invention provides a machine by which the cane may be readily spliced and evenly reeled. The machine has a bed on which slide opposite reciprocating jaws, one of the jaws having a clasp-holding recess with means for pushing a clasp therefrom, and a yielding plunger arranged to strike between the jaws, the machine being automatic in its principal movements.

POOL TABLE.—William H. Violett, Grand Junction, Col. This invention provides a novel combination and arrangement of parts whereby any one or all of the balls may be removed from the pockets, the players having full control of the balls without being compelled to walk about the table to take the balls out of the pockets and place them in the racks. An attachment is provided to notify the attendant when a game is finished, with registering devices whereby the number of games played will be recorded.

HAIR TONIC.—Lemuel C. Peters, Wallaceton, Pa. This is a compound designed to keep the scalp in a healthy condition, aid in the growth of a good strong hair, and prevent it from becoming prematurely gray. It is made of alcohol, cream, oil of wintergreen, oil of bergamot, oil of bay, aqua ammonia, and other ingredients, in stated proportions, and prepared as specified.

HANDLE FASTENING.—Lester Frank, New York City. This fastening is specially designed to conveniently and securely unite the handle to the vehicle body of dolls' carriages and other toy vehicles. It consists of a sleeve secured to the end of the handle and provided with a projecting tongue adapted to be engaged by the screw or pin fastening the axle to the vehicle body, thereby saving considerable labor and expense.

THILL COUPLING.—Anatoile Plicque, Franklin, Tenn. This is an anti-rattling device consisting of a wedge-shaped key having a transverse depression on its forward face to engage the thill iron, a spring attached to its rear face and bearing against the clip, while a hood is attached to the front of the key at its upper end and extending forward at a right angle, a lip being pivotally attached to the hood. The device is also designed to prevent the turning or shifting of the coupling on its seat.

BREAKWATER AND BEACH.—William L. Marshall, Chicago, Ill. This is a combination construction designed to protect the shore or bank of a river or lake and at the same time form an ornamental beach. It consists of a water-tight paved beach adjacent to and connected with the breakwater at the innermost row of piles and sheet piles, and formed by stone paving blocks laid in hydraulic cement, or formed entirely of artificial stone made principally of hydraulic cement.

SHIPPING AND STORAGE BOX.—Charles P. Moore and Frank M. Wolf, Ravenswood, West Va. This is a box made with wooden end sections, to the edges of which one piece of sheet metal is nailed to form the sides and bottom of the box, while a sheet metal cover has flanges on its sides connected by pivotal nails to form a hinge point, the nails passing through the flanges into the wooden end sections. The box is strong and light and especially adapted for use in hardware stores.

SCALE.—William J. Humphreys, Crozet, Va. This is a weighing and price scale in which the poise has rollers adapted to travel on the beam, while a friction roller extends loosely into a slot in the poise, and a slide carrying the friction roller is adapted to substantially move in line with the beam. The table is divided with numerals and lines differing according to the price and money used, and the operator places the poise in the proper place on the beam to counterbalance the load, the amount and value, and the amount worth any sum of money at any price, being indicated without computation.

JUICE EXTRACTOR.—Gabriel Castanos and Guadalupe Lopez de Lara, Guadalajara, Mexico. This invention relates to improvements in machines for crushing and extracting the juice from various plants, especially the Mexican mescal. The machine has a concave bed, above which is a vertical shaft provided with a spider, in the arms of which conical rollers are journaled, while a radial arm carries a conical brush adapted to sweep the material on the bed gradually outward and off, the juice flowing through a central opening in the bed.

LETTER BOX.—Emma C. Hudson, Seattle, Washington. This is a box for attachment to the interior of the doors of buildings, and in connection with it is provided an improved door plate and bell. The box is so attached to the door that it cannot be easily reached, and the entrance to the letter box is closed by a swinging door plate in such way that the entrance will not be noticeable.

RADIATOR.—Patrick B. Fox, Jersey City, N. J. This is a radiator for use with steam or hot water, and may be of cylindrical or quadrantal