

**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 innumerable.

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 semi-diurnal 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, Wallacetown, 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

form. It is composed of a series of similar wedge-shaped radiator sections, each adapted to receive and discharge steam or hot water from and into an integral transverse supply conduit located below each radiator section and integral with it, the sections of the radiator being held together by a bolted connection of flanges on the sections of the steam or hot water supply conduit.

CLOTHES LINE PULLEY.—John J. Leuzinger, West New Brighton, N. Y. The pulley block of this device has a semicircular recess in one face, and there is a grooved pulley journaled in the recess of slightly less diameter than the recess, a band surrounding the block and affording a suspension device for it. The arrangement is such that a line will freely pass around the pulley even when the clothes are attached to the line, novel means for attaching the clothes forming also a feature of the invention.

CLOTHES DRIER.—John McKinnon, Spokane Falls, Washington, and Alexander Jameson, Missoula, Montana. This device consists of a vertical post at the top of which are carried arms to which are secured lines for supporting the clothes, forming a clothes-carrying rack which is revolved by the wind while the clothes are suspended in elevated position. The device is so constructed that the rack may be readily tilted down to facilitate putting on and taking off the clothes.

SUSPENDER HOOK.—Ely R. Dobbs, Poughkeepsie, N. Y. This is a simple device, capable of ready attachment to a garment to take the place of buttons, and consists of a main body having a hook to receive a loop on the suspender end, and a fastening device for securing the hook on the waistband. It can be attached or detached in a moment, and is so made that no part of the clothing can catch upon it, while the suspender end cannot become detached or wear the shirt or vest.

ROUNDAABOUT.—William Mangels, New York City. This is an improvement in swings having a combined rotary and reciprocating movement, and commonly known as the "razzle dazzle." This swing is designed to be operated by a motor, and means are provided so that it shall be completely under the control of the operator when in motion, while the construction is very strong, and the parts are adapted to be readily disconnected and packed in convenient form for transportation.

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