

Torsion Balance and Experimental Radiometers.

At the *soirée* of the Royal Society, Burlington House, April 5, 1876, Dr. William Crookes, F.R.S., etc., exhibited his new devices for illustrating various phenomena connected with the repulsion resulting from radiation.

1. The torsion balance. A light beam having 2 square inches of pith at one end is cemented to a very fine fiber of glass stretched horizontally in a tube, one end of the fiber being connected with a torsion handle, passing through the tube, and indicating angular movements on a graduated circle. The whole is enclosed in glass and exhausted as perfectly as possible. A weight of 1-100th of a grain is so arranged that it can be placed on the pith or removed from it at pleasure. A ray of light from a lamp, reflected from a mirror in the center of the beam, shows the slightest movement. When the reflected ray points to zero, a turn of the torsion handle in one or the other direction will raise or depress the pith end of the beam, and thus cause the index ray to travel along the scale to the right or to the left. If a small weight is placed on one end so as to depress it, and the torsion handle is then turned, the tendency of the glass fiber to untwist itself will ultimately balance the downward pressure of the weight, and will again bring the index ray to zero. When the weight of the 1-100th of a grain is placed on the pith surface, the torsion handle has to be turned 27 revolutions and 353°, or 10,073° altogether, before the beam becomes horizontal. The downward pressure of the 1-100th of a grain is therefore equivalent to the force of torsion of the glass thread when twisted through 10,073°. One degree of torsion gives a decided movement of the index ray of light, a torsion of 10,073° balancing the 1-100th of a grain, while 10,074° overbalances it: the balance will therefore turn to the 99-100,000,000th of a grain. Weighed in this balance, the mechanical force of a candle 12 inches distant is found to be 0.000444 of a grain.

2. The turbine radiometer. In this radiometer, the vanes are black on both sides, and are inclined at an angle like the sails of a windmill instead of being in a vertical plane. The instrument is not sensitive to horizontal radiation, but moves readily, in one or other direction, to a candle held above or below.

3. Radiometer with the vanes blackened on both sides, showing rotation in either direction according to the way the light falls on them.

4. Radiometer showing the very small amount of residual air which is present. The vanes of the radiometer move past a piece of pith suspended by a silk fiber. Rotation with great velocity scarcely causes sufficient motion of the residual air to move the suspended pith.

5. Radiometer showing rotation of the glass envelope when the vanes are held in fixed space. The radiometer carries a magnet on its arms, and is floated on water so as to be free to move. The vanes are held stationary by an outside magnet. On allowing radiation to fall on the black surfaces of the vanes, the glass envelope rotates.

6. Radiometer having inside it a platinum spiral. The repulsion of the white and black surfaces is equal when the spiral is below redness. Above a red heat the black is repelled more than the white, and rotation takes place.

7. Radiometer with one vane counterpoised by a mirror, showing method of keeping the steel point from falling off the cup.

8. Radiometer constructed of metal, showing reverse movement on cooling.

9. Bar photometer, showing the method of balancing one light by another.

10. Heat engine. A turbine radiometer, having ice below and hot air above, working by difference of temperature.

Sir John Tyndall.

Professor Tyndall, it is reported, has been offered a baronetcy, and his friends are anxious that he shall accept the honor. It is a graceful act on the part of the British government thus to recognize the labors of the eminent investigator, but we think that it will add nothing to his glory. The aristocracy of scientific discoverers and workers is superior to one involving mere social precedence; and a man who by dint of persevering labor has attained a lofty place in the former stands far higher in the estimation of the world than does any member of nobility, however exalted his rank.

GOLD can be applied to glass by mixing it in a powdered state with mucilage and adding a little borax, so that a paste is formed. Having been painted with this compound, the article is heated in an oven. This burns the gum, while the borax vitrifies and so fixes the gold.

Recent American and Foreign Patents.**NEW CHEMICAL AND MISCELLANEOUS INVENTIONS.****IMPROVED SIGNAL LANTERN.**

George J. Cave, Elizabeth, N. J.—This is an arrangement of concentric shells and colored glass tubes, so combined that the mechanism may be readily and quickly adjusted, by a rotary movement, to display a white light, a red light, or a green, or other arrangement of colors, and which shall have no projecting arms, handles, or levers to be in the way.

IMPROVED POCKET BOOK FASTENING.

Daniel M. Read, New York city.—This inventor has devised two ingenious fastenings for pocket books. The first consists of a corrugated base plate, between which and a similarly toothed spring cap plate a double catch hook engages.

IMPROVED METHOD OF JAPANNING BUTTONS, ETC.

Charles M. Rhodes, Taunton, Mass., assignor to M. M. Rhodes & Sons, same place.—This improvement in the art of japanning small articles consists in rotating the painted articles over a fire, and in contact with the products of the combustion thereof, whereby the articles are separated, and their coating is dried, preparatory to baking them.

IMPROVED ELASTIC TRACE JOINT.

Benjamin Franklin Rea, La Fayette, Ala.—This consists of a coiled spring fastened between two sections of the trace by attaching one end to each. Inside the coil are a couple of links, also connected to the trace section, so that, when the spring has been extended as far as is desirable, they come into action and take the strain off the spring. The spring is connected to a ring at each end, and the links connect with the trace sections by a screw passing through the ring and drawing the rings against the trace sections by the links.

IMPROVED SHOE FASTENING.

Conrad Mayrele, Beardstown, Ill.—At each side of the opening a fine wire is longitudinally fastened. Metal clasps then attach the two parts together.

IMPROVED TRUSS PAD.

Charles L. Warner, Homer, Iowa.—This is an improved pad for trusses for the cure of hernia; and it consists of a pad connected to the base plate of a ball-and-socket joint, and suitable detaining devices.

IMPROVED COMBINED TOP AND WHIRLIGIG.

Reuben N. Garrett, Ballston Spa, N. Y.—In using the top as a toy, a top-shaped head is placed loosely upon the end of a pin, and the cord is wound upon the said pin, within the fork of the usual top handle. Then by pulling sharply upon the cord, the pin and the head will receive a rotary motion, and the head will be thrown from the pin, and will spin upon the floor. In using the top as a whirligig, the cord is wound upon the pin, within the fork of the handle, and by pulling upon the cord the pin and the head will receive a rapid rotary motion.

IMPROVED LIQUID COOLER.

John Downing, Binghamton, N. Y.—This consists of an ice chest in which are secured a series of jars. In the case of a water cooler the inlet pipe of the first jar is connected with the water supply pipe, and the outlet pipe of each preceding jar is connected with the inlet pipe of each succeeding jar. The outlet pipe of the last jar is connected with the discharge pipe. By this arrangement the water is drawn from the last jar of the series, which is immediately replaced by partially cooled water from the next jar, and so on, the water from the reservoir entering the first jar, so that cold water can be drawn almost continuously.

IMPROVED CLOTHES LINE.

Elias Stillwell, Rockwell, Mo.—The invention relates to means whereby a clothes line may be gradually run out from a given position convenient to the person engaged in the washing operation. This is done as it receives the garments that are to be dried, so that the washer may not be required to go far from the washroom in order to hang the clothes. It also relates to a mode of tightening the line and protecting it from the weather. Endless lines are carried over two rollers, at a suitable distance, one of which is provided with a crank, by whose aid the lines may be caused to travel back and forth.

IMPROVED PAPER BOX.

Charles A. Whedon and Asbury S. Whedon, Cranford, N. J.—This invention consists of a bandbox, constructed in a simple way of two pieces of paper, and a stand for the hat, which is also contrived so as to be made and attached in a manner to economize the cost of construction, and to facilitate its use in a folding box.

IMPROVED HAT HOLDER.

William H. Hampton, Suray, Va.—The invention relates to a mode of securing a hat in church, so that the owner will no longer be compelled to hold it in his hands, place it on an uncleanly floor, or take up room on the seat with it. It consists in applying to the back of the pew a wire holder that is capable, by a rotary movement, of being carried under the seat, the hat being thus out of the way and not at all liable to become soiled or injured.

IMPROVED SIGN PLATE.

Julius Caesar, New York city.—This is an enameled door or other plate that is secured to a metallic border frame and attached thereby to the door, without requiring the direct passage of the fastening bolts through the plate.

IMPROVED BALE TIE.

William Carson, St. Louis, Mo.—This is an improvement in buckles formed in two parts, one of which is provided with a tongue to fit in a corresponding notch in the other part. They are adapted to be locked together, and also readily disengaged by raising one part vertically off from the other.

IMPROVED LOCKET.

David Untermeyer, N. Y.—This locket is composed of pivoted parts, one holding a picture on both sides, and having opposite rims that fit over and enclose the pictures.

IMPROVED PROCESS OF PRESERVING BURIAL CASES, ETC.

Albert T. Bleyley, Conception, Mo.—This consists in coating wooden burial cases with a composition of glue, alum, saleratus, saltpeter, common salt, bichromate of potash, and water, applying thereto a second coating of glue and bichromate of potash, and a third coating of shellac, alcohol, and bichromate of potash.

IMPROVED AUTOMATIC HEAT REGULATOR FOR FURNACES.

Alvin C. Norcross, Boston, Mass.—This consists of one expanding and contracting part, and another non-expanding part, so placed in the furnaces to be subject to the heat of the furnace for working the regulator by the expanding and contracting part as the heat rises and falls. The part not required to expand is located within a tubular expanding part, having provision for a current of air to flow through it from outside the furnace to keep the other part from heating. The object is to enable a metal rod of ordinary expanding and contracting qualities to be used where a substance of non-expanding properties has been heretofore required.

IMPROVED HORSESHOE.

Henry Gourlier, New York city.—This horseshoe is so constructed that the calks may be readily replaced with new ones when required, and the calks will be held securely in place when the shoe is in use. The tongues, formed upon the bases of steel heel calks, and having projecting forward ends, are beveled and slotted to receive screws, and are caused to enter slots in the same place with the lower surfaces of the shoe.

MACHINE FOR CUTTING STAMENS FOR ARTIFICIAL FLOWERS.

Ambrose Giraudat, Neuve (Norwood P. O.), N. J.—This is an improved machine, including a series of long, straight knives, for cutting threads into suitable lengths for the stamens of artificial flowers. It cuts the threads evenly and does its work rapidly.

IMPROVED SHOT CARTRIDGE.

Thomas Wilkinson, Brooklyn, E. D., N. Y.—This is formed by placing perforated shot upon sets of wires between two wads.

IMPROVED THILL COUPLING.

Levi Moor, Baraboo, Wis., assignor to himself and Willis B. Rich, of same place.—This is an improved device for connecting thills and poles to the axles of vehicles, so constructed as to enable the thills or pole to be easily and quickly detached without the use of any wrench or tool. A spring bar, provided with a point and a flattened bolt, is combined with a thill iron provided with the hole, and a perforated and slotted lug formed upon the yoke of an axle clip.

IMPROVED HORSE BOOT.

Joseph Fennell, Cynthia, Ky.—This is formed with a padded upward extension, and provided with a strap and rubber tube to buckle around the heel of the hoof. The padded upper part is connected with the lower part by flexible straps made flaring upward and downward, and provided with a padded strap to buckle around the fetlock.

IMPROVED MAIL BAG.

E. Walter Roberts, Troy, N. Y.—This invention is an improvement in the class of mail bag locks, whose distinguishing feature is a chain or flexible strap, provided with a series of bolts or hangers, for engaging with a series of staples or keepers. The improvement consists in providing the bag-locking chain, formed of flat links, having hangers, or bolts, increasing in length *seriatim*, with an extension in the form of a leather pull-piece, which projects from the pocket in the flap of the bag. Another part of the invention is the construction of the sliding lock bolt, to which the aforesaid chain is attached, whereby an address card, indicating the destination of the bag and the place from which it was sent, is secured in place.

IMPROVED METALLIC SEAL.

Alphonse Friedrick, Brooklyn, N. Y.—This patent covers certain improvements upon the metallic seal for which letters patent were granted to the same inventor, March 14, 1876. To make the seal more secure, one of the disks is provided with a projecting eye or a perforated ear, through which perforation the ends of a shackle wire are passed before twisting them around the stem. This confines the branches of the shackle wire at the edge of the button, with a continuous ring of metal, and obviates the possible separation of the thin parts of metal forming the flange, and thus prevents the opening of the said flange by pulling apart the branches of the shackle wire.

IMPROVED LIGHTING ATTACHMENT FOR ALARM CLOCKS.

Frank Fischlein, Jersey City, N. J.—This is a device for lighting, simultaneously with the release of the alarm, a candle or lamp; and it consists of the connection of the alarm mechanism of a clock train, by a fulcrumed and spring-acted friction lever, that, on its release, ignites a match secured by suitable supporting and gage devices above the candle or lamp.

IMPROVED COMBINED CALENDAR AND TIME PIECE.

Miner H. Paddock, East Clarkson, N. Y.—This invention relates to the improved construction and arrangement of a calendar in a time piece, so combined therewith as to indicate the day of the week and month and the month of the year. The improvement consists in making the calendar devices independent of the effect of the main spring, so that, instead of being operated thereby, they are actuated by the hand of the operator, through the winding stem in the act of winding, by means of which arrangement the fact of the winding of the watch is indicated upon the dial face, and the question as to whether the watch has been wound or not, is easily ascertained by reference thereto. The improvements also serve to simplify the operating parts of the calendar, and consequently render its construction cheaper and its operation more reliable.

IMPROVED WHIP FERRULE.

Dexter Avery, Westfield, Mass.—This improved whip button is constructed with the braided, woven, or knitted cover of thread turned or folded over the end of the mold into the hold for the stock, so as to make a better finish of the ends than is made when the button is covered after being put on the stocks, and also to make finished buttons independently of the stock.

NEW HOUSEHOLD ARTICLES.**IMPROVED FIREPLACE FENDER.**

Henry C. Wesson, Fulton Station, Ky.—This fender is contrived to disconnect at the middle or thereabouts, and swing open, and also to fold up against the jambs in a compact manner out of the way.

IMPROVED CURTAIN FIXTURE.

Michael Haughey, St. Louis, Mo.—This is a curtain fixture that is made without the use of springs. It consists of a curtain roller to which a weighted band is applied, that raises the curtain, while a weighted pawl, locking into a ratchet of the roller shaft, secures the curtain at any height.

IMPROVED ROCKING CHAIR.

Wm. E. Buser, Chillicothe, Ohio.—This improvement relates to the application of an improved fastening or means of connection between a rocking chair and the base platform upon which it is supported and vibrated. The fastening consists of a slotted plate attached to the platform, a hook or arm attached to the rocker and working in the slot of said plate, and a spring arranged to bear upon the said hook or arm. The slotted plate attaches the chair to the platform, and also holds it in proper position thereon. The spring tends to hold the chair seat level in that it counterbalances the weight of the back, which would otherwise cause the chair to assume an inclined position. It also assists in giving the chair an easy rocking motion.

IMPROVED VEGETABLE STEAMER.

Elias Stangeland, Rock Dell, Minn.—This invention relates to a furnace and steaming apparatus for cooking grain, roots, etc., for cattle, also for heating water. It is designed for the use of farmers, livery stable proprietors, and others having the care of stock. It is portable, the several parts may be easily detached and put together, and the consumption of fuel is very economical, while the steam is so applied as to speedily produce the desired effect.

IMPROVED TACK HAMMER.

Willis C. Avery, Wallingford, Conn.—This consists of a tack hammer with a wedge-shaped pene end, having a dovetailed groove diminishing in width and depth from the body of the hammer toward the sharp edge of the pene. This offers a ready means of sticking the tack in, previous to driving it, without using the fingers.

IMPROVED TILTING CHAIR.

Alanson S. Cushing, Buffalo, N. Y.—This is mainly a novel arrangement of flanged hinged plates, rubber blocks, and springs, the whole forming a convenient and desirable device for pivot or screw chairs.

IMPROVED FIREPLACE HEATER.

Samuel Musser, Beaver Falls, Pa.—This invention relates to certain improvements in that class of fireplace heaters which have a hot air chamber in the rear, which is employed in connection with a flue and registers for heating the upper rooms of a building. The invention consists in the particular construction and arrangements of the parts whereby the construction is simplified and a more economical use of fuel obtained.

NEW TEXTILE MACHINERY.**IMPROVED WEFT FORK.**

Caleb H. Warfield, Whitinsville, Mass.—This is a novel construction, whereby the fingers are readily soldered to the arms in holes connected with a groove, so that a cheap method of securing them is obtained. They can be readily be taken out by the application of a hot iron, and others put in.