NEW INVENTIONS.

An improvement in escapements for watches, etc., whereby a more regular and uniform movement is obtained, has been patented by Mr. Edward Wensch, of Vienna, Austria. The invention consists in an anchor rod pivoted on the top plate of the works, and having its lower end T-shaped, with a tooth engaging with the escapement wheel at the ends of this T-shaped part, and the upper end of this rod provided with a fork surrounding an eccentric on the shaft of the balance wheel, above which eccentric there is a plate with a pin at the edge, which a spring presses against for imparting motion to the balance wheel. By these means the escapement wheel does not directly transmit the motive power of the clockwork to the balance, but the movement depends on the power of the above-named spring which always remains regular. For pendulum clocks, the construction is slightly modified.

An automatic flood gate, which can be removed from the flume very conveniently when desired, has been patented by Messrs. Cornelius B. Bradshaw and James Hewett, of Neillsville, Wis. Combined with the flume is a gate arranged to swing on horizontal pivots, and having an excess of weight below said pivots and an excess of superficial area above the pivots, which may fit in upright grooves in the sides of the flume. If the flume is empty the gate will be inclined and closed by the descent of its heavier lower end, and the water as it enters will be stopped by the gate. When, however, the flume is full, the water will act upon the gate to turn it into a horizontal position, or nearly so, and thus permit of the water flowing out of the flume. This automatic gate will be found to be of great service in floating wood, as it collects a quantity of water, and by suddenly releasing it produces a powerful current to float off the logs. It may be easily removed by an ordinary windlass when required, and, if desired, may be provided with an operating lever and a latch for locking it when closed.

Mr. Asahel J. Goodwin, of Brookline, Mass., has patented valuable improvements in invalid bedsteads. The improvements relate to invalid bedsteads having sectional bottoms fitted for adjustment to vary the angle of the sections to suit the comfort of the patient and the necessities of the case. The object of the invention is to permit a larger range and variety of adjustment than has heretofore been possible, and also to obtain durable construction, combined with convenience of manipulation. The bed bottom is made up of a vertically adjustable central section, and two end sections fitted to swing for varying their inclinations, and one of which is in two parts hinged together. A stretcher also is used. The bed bottom sections are pivoted, and the head one works in slotted socket plates having flanges to form bearings for the pivots, heads on which enter the slots that provide for the removal of the section. Said socket plates, which are applicable to other sections and parts, have circular projections at their backs which enter holes in the rails. An ingenious combination of cams, some of which are formed with folding ends to facilitate transportation, ratchets, racks, pinions, levers, and other devices, serve for adjustment of the sections, both separately and collectively, and for retaining them in position, the whole providing for nearly every possible position of the body.

An improved buckle, for use in securing the ends of straps without sewing or rivets, and especially useful in attaching parts of harness, has been patented by Messrs. James W. Sweyea and William H. Lowe, of Walla Walla, W. T. The invention consists of a two-part box buckle, each part being of tubular form and provided with a wedge-shaped tongue. These tongues serve to hold the ends of the strap or straps in between them and enter respectively the box part of the other, and are formed with pins which engage with holes in the strap ends. One of these tongues is hinged to give room for insertion or removal of the ends of the strap, and is provided with a spring catch to hold the two parts of the buckle together when closed. Any strain on the straps tends to draw the two parts of the buckle more tightly together.

A very compact and useful improvement upon baby jumpers, which mothers and nurses will be able to appreciate, has been patented by Mr. Wesley Roberts, of Martinsville, Ill. The invention consists of a baby jumper which is readily convertible into a small table, and which, when extended to adapt it to its primary use, forms a very stable device for the child to jump, whirl, or swing upon with perfect safety. To these ends or purposes the spring pole of the jumper is hinged midway of its length to admit of its being folded into a contracted space and horizontal position. The support within which the pole plays, and which is provided with a pole-sustaining spring, is also hinged to fold up, the platform, which is removable and forms the table top, rests upon a sliding extension, and hinged wings or supports are provided to give an extended base support to the whole structure.

Mr. David Britton, of Jonesborough, Ill., has patented a fruit drier, which has superior drying facilities and offers increased conveniences for inserting, changing, and removing the fruit. It consists of a drying house having a separable strip in its roof to provide for the escape of the moist air and to promote circulation of the heated air, a furnace for heating the incoming air, guiding, and distributing plates for the air to, at the sides of and above the furnace, a series of tracks or ways on opposite sides of the interior of the drying house and arranged one above the other to support tiers of drawers which hold the fruit to be dried, and separable end frames having crossbars and hinged doors to provide for the entry and removal of the drawers with very little waste of heated air.

The International Exhibition and Congress of Electricity at Paris.

OPERA BY TELEPHONE.

The most crowded place in the Exhibition is the *Théâtre de l'Opéra.* Here from eight to eleven on three evenings in the week are to be seen four long *queues* waiting for their turn to enter one of the four rooms where the mysterious music is to be heard. Round the walls of each room are hung telephones in pairs, some twenty pairs in all, and the same number of persons are admitted. On putting the telephones to your ears you hear the music which is being performed more than a mile distant. Some of the singers seem to be on your right hand, others on your left, and it sometimes happens that a particular voice is quite piercing in its loudness. There are in fact ten transmitters disposed along the front of the stage, near the footlights, and ten wires leading from them, two of which are connected with the telephones intended for your two ears. Special precautions are taken to prevent the action of the transmitters from being disturbed by the tremors of the boards under the feet of the actors, the transmitters being supported on India-rubber and loaded with lead. The telephonic apparatus employed is that of the Ader system.

THE DOLBEAR TELEPHONE.

The greatest novelty as regards principle is exhibited in Dolbear's telephone, in the United States department. The receiver has no magnet, but has two parallel metallic plates near together, and electrically insulated from each other. One of them is connected with the line wire, and the other (in the specimen here exhibited) with the return wire. These two wires are connected with the terminals of the secondary coil of a small Ruhmkorff at the sending station; and the voice of the speaker produces variations in the primary current, on the usual plan of varying the resistance in the circuit of a local battery by variations of pressure. The secondary circuit is not completed inasmuch as the two plates do not touch; but the opposite electricities which are transmitted to them attract each other on electrostatic principles, and the plates are thus made to vibrate in unison with the voice of the speaker at the sending station. The instrument exhibited is very effective, and reproduces a whisper with greatly increased intensity. It is claimed that this invention does away with the disturbance experienced in other telephones from currents in the neighboring wires, inasmuch as such currents will not affect the attraction between the plates. We should add that the instrument exhibited speaks fairly even when the plate next the ear is disconnected from the wire intended for it, but of course less loudly than when the connection is made. This is just what one would expect from electrostatic attraction, the attraction of a charged for an uncharged body being less than that between two bodies oppositely charged.

EDISON'S ELECTRIC METER.

We have had an opportunity of seeing the system adopted by Mr. Edison for the measurement of the quantity of electricity consumed in each house which receives a supply from one of his mains. A definite proportion (one thousandth part) of the whole current which goes through the house is shunted through a cell containing two copper plates in a solution of sulphate of copper. The positive plate loses, and the negative plate gains, an amount of copper exactly proportional to the quantity of electricity which passes. There are two such cells in series, one serving as a check upon the other, and the whole arrangement is kept under lock and key, to be opened only by Mr. Edison's agents when they come round to inspect the meters. As the lamps supplied (of a given type) are almost precisely alike in their resistance, and the current, when flowing, is always nearly the same, this arrangement gives a practically accurate measure of the illuminating power supplied.

ITALIAN MAGNETO-MACHINES.

Much interest has been excited by the exhibition of three magneto-electric machines constructed by Prof. Pacinotti, of the University of Cagliari. One of these, constructed at Pisa in 1860, is the earliest example of the principle of the ring-shaped armature, since embodied in the machines of Gramme and Brush. It was originally constructed as an engine to be driven by a current from without; but it was also used as a generator of electricity, and both these uses of it were described in a paper in the *Nuovo Cimento* in 1864. The machine contains an iron ring like an anchor ring, round successive portions of which are wound coils of insulated copper wire in depressions cut in the ring to receive them. The intervening portions of the ring are thus (as in the Brush machine) enabled to come very nearly into contact with the surrounding fixed magnets. These consist of two half rings which are the pole pieces of two straight electro-magnets. The coils above mentioned are connected in a series, and their junctions are in connection with the several segments of a commutator, as in the Gramme machine.

The second machine was constructed in 1873, and described in the *Nuovo Cimento* in 1874. It is a generator of electricity, of the kind now known as the shunt dynamo—that is to say, the current generated is divided in parallel circuit between the fixed electro-magnet and the external resistance. This is done by means of two pairs of brushes making contact with different sections of the revolving commutator. The ring is replaced by a flat cylinder, across which the successive coils are wound in depressions made for the purpose, the directions of winding being the same as in the Siemens continuous current machine, which was invented about the same time. The connections of the successive coils with one another and with the segments of the commutator are the same as in the first machine.

The third machine, which was constructed in 1878 on a model dating from 1875, is of a type of which, so far as we know, it is the only example. The idea of it is taken from the well-known experiment (Arago's rotations) in which a revolving horizontal copper disk causes a large magnetized needle balanced above it to revolve in the same direction. The explanation of the effect was first given by Faraday. It depends on the action of a current generated in the copper disk by its motion in the magnetic field due to the needle. The strongest current flows along that diameter which is parallel to the needle, and the current is completed through the circumferential portions of the disk. Pacinotti virtually cuts away all except the diametral portion and one of the two circumferential portions; in other words, he takes a wire and bends it into the shape of the letter D. This is one convolution of his revolving coil; the next is like the same D tilted a little; the next is tilted a little more, and so on; the straight part of the wire passing through or nearly through the axis of the coil, and the curved part being in the circumference. There is no room for a core in the ordinary sense, as the wires occupy nearly the whole interior space; but pieces of iron are so disposed partly within and partly without the coil as to serve the purpose of a core, by increasing the induction of the fixed magnets.—*Nature.*

Bonnefin's Sugar Process.

Mr. Bonnefin does away with the cane mill, of which one-third of the power is wasted by putting it into motion, and the other two-thirds are unprofitably used in crushing the cane so imperfectly that a proportion of juice, equal to half the quantity extracted, is left and lost in the megass. He substitutes in its stead his "pulpifactor," which consists of two series of vertical saws specially made for cutting sugar canes, and fixed to two frames, the whole working by a reciprocating motion with but small power to lift the tool, which afterwards precipitates itself with its own power, increased by its weight and velocity. Each series of saws reduces at one stroke a bundle of ten canes into slices. These slices, falling into a disintegrator running at high speed, are reduced into a fine pulp, which is pressed by means of two small rollers. The whole of the juice is thus forced out of the cells, and the woody matter is removed in a dry state. The juice thus extracted is mixed with lime as each gallon is produced, and in a proper proportion as it runs to a continuous preparator, when it is heated in a few minutes up to 95° C., or 203° Fah., but never beyond this temperature. During this short time it is cleared of all the suspended matters. This is effected by passing the juice over a table constructed with a series of corrugations forming a long continuous passage, the heat being applied beneath the table. The suspended matters settle by gravitation and are deposited in pockets placed at intervals along the route the juice has to travel.

The juice is now in a favorable state of lightness, fluidity, and temperature for effective filtration in Mr. Bonnefin's capillary elastic filter. This filter consists of a series of metallic rings covered with India-rubber, the internal diameter being twelve inches. The rings are placed horizontally in a press, and over each alternate ring is hung a filter cloth made of pure unspun cotton of the finest fiber. The rings and cloths are closely pressed and held together by means of screws, their number being governed by the rate of filtration required. The sirup is pumped into the press and passes through the whole series of rings and cloths, the solid impurities being intercepted and retained by that portion of the filter cloth which covers the opening in the ring, while the sirup passes by capillary attraction through the surrounding portions of the cloth, and is delivered in a perfectly pure and clear condition at the outlet. The purified juice on leaving the filter is ready for treatment either in the ordinary way, by the vacuum process, or by Mr. Bonnefin's evaporator and concentrator, in which the process of crystallization is much more rapidly performed. In the evaporator the juice is quickly deprived of its contained water, while the concentrator brings it into the condition of sound sugar in a very short space of time. It is claimed by Mr. Bonnefin that by his process all the operations, from the moment the cane is placed in the pulpifactor to the time of the crystallization of the sugar, do not occupy more than one hour. This shows a marked advance upon the ordinary process, which occupies from six to twelve hours. The following are the chief advantages in favor of Mr. Bonnefin's process: With his pulpifactor and accessories he claims to extract from the cane all the saccharine juice. With his continuous preparator, he prevents acidity or fermentation, clears the juice of all the suspended matters, and prepares it for the operation of purification or refining. With his capillary filter he completely purifies the juice, and utilizes all sediments and any washings of the factory. His aim is to make direct from the cane only one quality of sugar, that is, pure white refined sugar, to obtain the uncrystallizable sugar clear and bright, notwithstanding the coloring matters and the foreign salts, and to do this with a palpable economy of time, labor, fuel, machinery, and buildings.

A REMEDY FOR HICCOUGH.—Dr. M. S. Leslie, of Lexington, Ky., says that the best remedy in ordinary hiccoughs is about twenty-five grains of common table salt, placed in the mouth and swallowed with a sip of water.