MISCELLANEOUS INVENTIONS.

Mr. Louis C. Lugmayr, of Water Valley, Miss., has patented an improved valve-operating mechanism. The object of this invention is to work the valves of steam engines for cutting off with one eccentric, and also allow reversal of the engine with the same mechanism. The invention consists in a slide block connected with the eccentric and valve rod and carried by a guide pivoted to swing for shifting the valve.

An improved sewing machine work-basket has been patented by Mr. Joseph Le Roy Parkinson, of Cambria, Wis. The device is attached to machines already made, which have side drawers and a side plate or brace, for giving the board additiona support and strength. In new machines there is a brace cast upon one of the legs of the machine for supporting the wing to which the basket is attached.

Drop-light chandeliers have been constructed with a central drop-light; but with this construction the central parts of the chandelier are scorched and defaced by the heat rising from the central drop-light. Mr. John Trigge, of New York city, has patented an improved drop light chandelier in which this defect is avoided.

Mr. Nicholas B. Dennys, of Singapore, Straits Settlements, has patented a violin, which, though plainly audible to the player, cannot be heard at a short distance, thus enabling amateurs and learners to practice without inconvenience to others.

Mr. William H. Metcalf, of Brooklyn, N. Y., has patented a process of treating hide in the manufac ture of counter-stiffeners. The object of this invention is to render hide counters waterproof, so that they shall retain their rigidity under all circumstances. The process consists in saturating with a solution of benzine, paraffine, and drying oil.

An improvement in breech-loading firearms has been patented by Mr. Henry Scott, of Birmingham, England. This invention has reference to breech-loading small arms of the kind commonly called "drop down guns;" and the invention consists in the combination of parts for cocking the concealed or internal hammers of the guns, and in the arrangement of the parts of safety apparatus for preventing the accidental discharge of the guns.

Mr. Edwin E. Glaskin, of Lower Cape, N. B., Canada, has patented an improved fire-kindling block composed of 5 parts sawdust, 1 part resin, and $\frac{1}{16}$ part oil mixed together and densely compacted, so that the block is hard and non-friable.

Mr. Albert Berryhill, of Pittsburg, Pa., has patented an improved nut lock, which consists of two grooved blocks held in a longitudinal slot of a plate placed on the bolts and over a recessed plate, which in turn is placed against the fish-plate or against a plate resting against the fish-plate, which blocks are held against the nuts to prevent them from turning by a locking wedge placed between them and into the recess of the recessed plate, parts of the slotted plate being bent outward to form an aperture to admit the locking wedge.

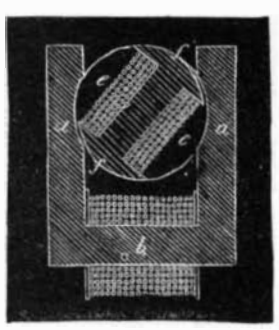

FIG. 2.

The Penetrating Power of Light in Water.

The limiting depth to which light penetrates in water was some time ago stated to be 40 meters for Lake Leman, by Prof. Forel, who used albumenized paper in his experiments. M. Asper has recently made similar experiments on the Lake of Zurich by a slightly different method. He used the photographic plates, called "emulsion plates" (more sensitive than albumenized paper), and immersed them during the night of August 3, to depths of 40, 50, 60, 70, 80, and 90 meters. They were brought up after remaining twenty-four hours in the water, and treated with oxalate of iron. All the plates, without exception, were distinctly affected by the light. Thus the chemical rays penetrate in clear water to at least 90 meters depth.

Cause of the Decay of Teeth.

In a recent work by A. Weil ("Zur Aetiologie der Infectionskrankheiten"), says *Nature*, the author states the cause of the decay of teeth, whether external or internal, to be the schizomycetous fungus, *Leptothrix buccalis*, the mode of entry and propagation and the life-history of which he follows out in detail. The acids which occur in the mouth, especially lactic acid, while they may greatly promote the decay, cannot give rise to it. The fungus can readily be detected by its acid reaction. The author considers further, that, in many cases, diseases of various parts of the body can be distinctly traced to excretions from the mouth and teeth. Other observers had already traced a connection between decayed teeth and septic abscesses, in which was found a fungus similar to that which occurs in decayed teeth.

RABBITS INJURING TREES.—It is said sulphur and lard, when touched here and there, keep rabbits from injuring trees.

A NEW ELECTRIC MOTOR AND ITS APPLICATIONS.

M. Trouvé recentiy addressed to the Academie des Sciences a note relative to the improvements made in coils of the nature of those of Siemens. We give herewith figures of this new motor based on these improvements To show the reader the idea that M. Trouvé has followed up in order to arrive at his results, we reproduce the following passage from his note to the Academie:

"When we trace the dynamic diagram of a Siemens coil, on causing the latter to make one complete revolution between the two magnetic poles which are reacting upon it, we observe that the work is almost null during two quite extended periods of its rotation. These two periods correspond to the time during which the cylindrical poles of the coil, having reached the poles of the magnet, are passing before them. During these two fractions of the revolution (which are each about 30°) the magnetic surfaces designed to react on each other remain at the same distance, and the coil is not then incited to revolve. The result is a notable loss of work. I have gotten rid of these two periods of indifference and increased the useful effects of the machine, by modifying the polar faces, so that instead of being portions of a cylinder whose axis coincides with the old system, they are snail-shaped, and thus in revolving gradually bring their surfaces near those of the magnet up to the moment at which the posterior edge *escapes* the pole of the latter. The repelling action then begins, and a dead center is thus avoided."

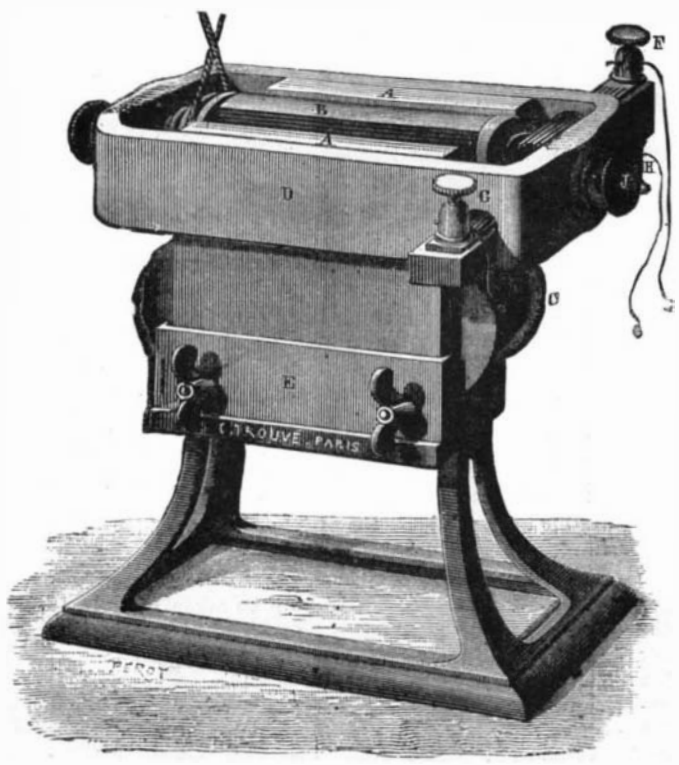

Fig. 1.—TROUVE'S NEW ELECTRIC MOTOR.

FIG. 4. FIG. 5.

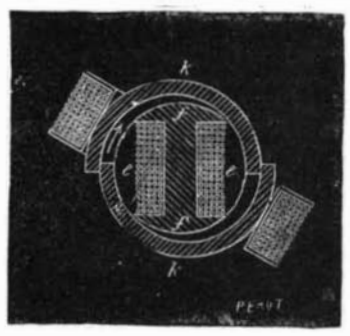

FIG. 3.

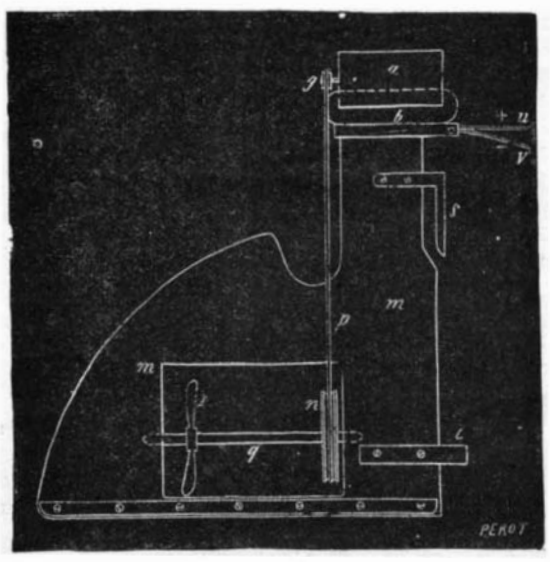

FIG. 6.

Fig. 1 gives a perspective view, one-half actual size, of a motor constructed on these principles, and Fig. 2 gives a vertical section with a horizontal projection of it. The motor is capable of driving a sewing machine with a Bunsen or Reynier pile of a few elements. The prominent features possessed by this new motor may be summarized as follows: (1.) Although of very small size, it has a relatively great power. (2.) The electro-magnetic effects are utilized under the best possible conditions for available work, since the inductor is very close to the armature, which almost completely incloses it (Fig. 2). (3.) The suppression of dead centers with a single movable electro-magnet is complete—a thing of rare occurrence in mechanics, and which would have had an immense influence had it beenapplied to the steam engine instead of to the electric motor. (4.) The direct reaction on each other of two magnets placed in the same circuit allows the power to be indefinitely increased with that of the current employed—this power having for a limit only the resistance of the parts to breakage. (5.) The motor will run with great velocity—even up to two hundred revolutions and beyond per second. (6.) No spark forms at the commutator, the current being never broken. (7.) The motor is reversible, and may, by slight modification, be employed to generate electricity. (8.) Finally, it is moderately cheap. Figs. 3, 4, and 5 are variations of the motor in which M. Trouve has arrived at satisfactory results by making in some cases the inductor, and in others the armature, eccentric. Fig. 6 shows the application of the motor (Fig. 1) to the propulsion of small boats. The arrangement is so simple that it requires even no change in the construction of the boat. The rudder bears within itself all the mechanical elements—motor, propeller, and conductors—and forms a movable unity. The screw and its axle occupy the lower part of the rudder in an aperture made for this purpose, and is actuated by the motor (which is located at the top of the rudder) through the medium of a belt or cord. The electro-motive power furnished by the generator, which is placed in the boat, is transmitted to the generator by means of flexible metallic cords. The rudder is fitted to the boat in the usual manner. In case it be desired to use oars only for propelling the boat, the screw, being no longer actuated by the motor, becomes free, and revolves in the opposite direction. For the last few months M. Trouve has been making numerous experiments with his motor on the Seine with an 18-foot yawl boat used for hunting waterfowl. The game, being no longer frightened by sound of oars, was easily approached. At the very first, the speed of this yawl was about 4 feet per second; but, after certain modification of details, M. Trouve has succeeded in giving it a speed of 6½ feet per second.

M. Trouve does not think that, with their present resources, ordinary workmen will be able to afford the expense of running these motors for their own use, and has therefore turned his attention more especially to making them applicable to the purposes of dentists, watchmakers, and amateurs, who need a cheap and efficient power for running lathes. Professors of physics will find in the machine a valuable acquisition to their cabinets; for it will serve as a powerful aid in the performance of numerous experiments which necessitate the use of mechanical power—such as actuating the Holtz machine, chromatropes, etc., etc. Physicians can also use it for making their electrical machines. Finally, there are undoubtedly in reserve for it numerous applications in the arts and industries.

Experiments with Liquid Films.

Among some interesting experiments with liquid films recently described by Mr. Plateau to the Belgian Academy was the following: A flower like a lily, with six petals each about a inch long, was constructed in outline of fine iron wire, the wire being first slightly peroxidized by dipping it for an instant into nitric acid. This wire frame was then dipped into a glyceric soap solution, which, when it was withdrawn, left soap films over the petals. The stalk of the flower was then set upright in a support, and it was covered by a bell glass placed near a window so that the sky could be reflected in the films. In a few moments a most beautiful play of colors made its appearance. When the solution is in good condition it is found that such films will last for hours, giving a perpetual play of color over the flower. Again as regards the explosion of soap bubbles, we are apt to think that the whole of the film is converted simultaneously into minute spherules. Mr. Plateau has formerly shown that such is not the case, and has analyzed the course of the phenomenon. To prove the contraction of the bubble during its quick destruction, he now points out the following experiment: A bubble of glyceric liquid about eleven centimeters in diameter is blown with tobacco smoke, and placed in a ring. Having waited till the top appears blue, it is to be broken there with a metallic wire; whereupon, the mass of smoke is shot vertically upwards to a distance of a dozen centimeters, and then spreads out horizontally in the shape of an umbrella. It then rises more slowly and becomes diffused.