

core must amount to fully one-third of the barrel diameter, and the core must always measure one-third; it should be fused form, and with the beginning of the first inner spring coil, be a complete circle, in order to impart as concentric a motion as possible. A protruding core hook is to be avoided, and that of the barrel must be kept as low as consistent. If all these conditions are complied with, the spring will make about six revolutions, if wound up to within $\frac{1}{4}$ or $\frac{3}{4}$ turn, and there is obtained for a toothed barrel, making four turns, a spring power in its best attainable proportion.

The French pendulum clockmakers have the senseless habit of making the spring arbor hook as projecting as possible, as if experimenting to find out how much the spring would resist. I can explain the proportionately few breakings of such springs only from the reason of their great breadth and thinness, which also protects them against an undue expansion, conjointly with the lubricating, gum like oil, which protects them against any injurious effects of friction in its coils. Finally is the careless treatment and the putting in of the spring with too small a core often the reason for a subsequent breaking.

4. If a spring in a barrel with stopwork, without making use of its duty, is wound to its utmost expansion, and the temperature would suddenly change from heat to cold, a sudden snapping, owing to the molecular change of the steel, would be inevitable; even if the spring were not wound to its utmost, a break may easily occur, because the condensation of the steel takes place suddenly, consequently a change in its outside molecular arrangement; it is well known that a hot lamp chimney will suddenly shatter when exposed to a cold air draught. A breaking of the spring consequently will occur most frequently in spring, fall and winter.

5. All metals subjected for any length of time to tension, crystallize, and exhibit an inclination to return to their previous crude condition. When this happens, they part with their cohesion by exhaustion, and a separation of the molecules takes place sooner or later, in due ratio with the sum of the tension to which they were subjected. Since steel, however, possesses greater cohesion than nearly any other metal, it would resist this natural law longer, if other powers did not combine to decarbonize and consequently to ruin it. The main factors producing this change are heat and electricity.

One is permitted to say heat is electricity, and electricity is heat. Both expressions are synonymous. All metals contain latent heat and latent electricity, which may be excited by nature, by chemical influences, and by friction.

The main factor in an electric machine is a glass plate (isolator) on which by friction an electric current is generated. The same is produced by the friction of a hand on the watch crystal. If of steel, it will be partly destroyed at the point of contact, betrayed by the rust which is formed at this place. This rust is generated by electric heat. The friction of the coils of a watch spring against one another, also engenders electricity, especially in warm weather, when it is assisted by the peculiar condition of the air. The steel becomes decarbonized hereby, and thus is induced the unaccountable, mysterious breaking of the spring during hot weather. A balance spring hardened in fire suffers by its inelastic condition an inner friction of its molecules, hence the tardation of rate during very hot electric weather. Different individuals are better or worse conductors of electricity, hence the difference of the rate of one watch, when worn in succession by different persons. The more humidity a body absorbs, the better a conductor of electricity it is; whence a blue spring with closed parts is not as good a conductor as a white and porous one.

Galvanism, or Voltaic electricity, is generated when two different metals touch each other, and one is influenced by an acid. A brass spring barrel with a steel spring and an oil containing acid together constitute a galvanic battery, set into action by heat. The less acid the oil contains, the less is the quantity generated, but sufficient to keep the spring slippery, and the less is the danger that free galvanism is developed; but the air often furnishes an acid (humidity) causing the battery to become active. Heat is produced by this, and the metal is ruined. If chronometers and watches did not contain so great an amount of brass, and consequently so active a conductor of electricity, radiating it into space, it would perhaps be difficult, to even have a time measure with a balance spring. A marine chronometer is better protected than a watch, because surrounded by bad conductors, or good isolators; from the moment forward that a watch taken from a cold room comes in contact with the heat of the body, the electric current begins. Springs wrapped with brass

wire and oiled with the common olive oil, become so vitreous in one or two years in the tropics that they break like glass. This is my own experience.

Those who wish to inform themselves farther on this point, I would recommend a study of generation of friction or galvanic electricity by steam engines.—*Jewelers' Circular*.

BUSINESS CHANGES FOR APRIL.

P. Taylor, jeweler, Oshawa, Ont., advertising his business for sale; Ridsen Bros., hardware, St. Thomas, Ont., have sold out; Johnston Bros., jewelers, Toronto, dissolved, Geo. T. Johnston continues; E. Rousseau, jeweler, London East, Ont., cleared out; Chas. McKenzie & Co., hardware, Sarnia, Ont., style now McKenzie, Milne & Co. Wiberg & Ashdown, hardware, Stonewall, Man., dissolved. Alf. Ashdown continues alone; M R Counter, jeweler, Seaforth, Ont., offers business for sale; Wm. Clegg, hardware, Blyth, Ont., sold out to Chas. Hamilton and removed to Brandon, Man.; E. Graver, hardware, Barrie, Ont., advertises business for sale; A. E. Kemp, hardware, Montreal, sold out to M Philbin; L Atkinson, jeweler, New market, Ont., assigned in trust; J. F. Austin, fancy goods, Peterboro, Ont., sold out to C. B. Routley; John Egger, jeweler, Montreal, failed; D & L McIntyre, hardware, Lucknow, dissolved, David McIntyre continues; Jos. T. Cote, jeweler, Montreal, failed; R. J. Butler, jeweler, Ottawa, Ont., gone to Winnipeg.

BUSINESS NOTES.

MR. HENRY SMITH, of the firm of Smith & Fudge, sailed for England on Tuesday last.

A SOBERL jeweler, by name of J. B. A. Darcho, has left without notifying his creditors or settling his liabilities, which amount to \$800 or \$1,000.

MR. R. H. SMITH, the well-known saw manufacturer of St. Catharines, on the occasion of his return from Mexico, was entertained at a banquet by his employees.

MR. W. G. H. LOWE, of the firm of Zimmerman, McNaught & Lowe, leaves for England and the European markets in about two weeks. His many friends in Canada will wish him *bon voyage* and a safe return.

We are sorry to learn that Mr. Culp, wholesale dealer in watch material in Toronto, was suddenly taken ill last week and compelled to lay up for a few days. He is now fully recovered and able to attend to business.

MR. FRED. MONSE, the well-known employee of Messrs. L. & M. Samuel & Benjamin, was presented with a handsome gold-headed cane on the occasion of his leaving the firm for the purpose of starting business in Winnipeg, Man.

A COMPANY has been formed for the purpose of manufacturing locomotives, railway cars, etc., to be known as the "Canada Iron Works Co." with works at Hochelaga and a capital of \$250,000. Some prominent names are attached to the application for charter, we note among others Messrs. Jacques Grenier, A. A. Trottier, H. A. Hogel, L. H. Senecal, A. Davis.