



Watch Escapements.

Messrs. Editors:—I have the pleasure of acknowledging the receipt of your letter, informing me that my Letters Patent for an improvement in watches had been ordered to issue. As watchmaking in this country is fast becoming an important branch of industry, I trust that a few remarks on that part of a watch termed the "escapement," may be interesting to your readers.

The escapement in watches, clocks, &c., is a mechanical contrivance arranged in connection with the last wheel of the train, commonly termed the escapement wheel, which wheel, by means of other parts of the escapement, in connection with the balance, is made to stop at certain short and regular intervals of time, and it is this intermittent action of the escapement that causes that slight sharp sound so distinctly heard in the beating of a watch. Of all the minute and delicate parts composing the machinery of a watch, there are none so essential as the escapement. It is indeed the vital part, and from its pulsatory movement, I can think of nothing more illustrative of its vital powers than to compare it to the human heart—as is the action of the heart in a well regulated human body, so is the action of the escapement in the properly constructed and well regulated watch. It is doubtless this vital importance of the escapement that has given rise to the endless variety which have been constructed by skillful artizans within the last two hundred years, a complete description of which would require a full volume of your paper. I shall therefore only refer, as briefly as possible, to two kinds now in use, viz., the chronometer and lever escapements, years of practical experience having demonstrated that these two escapements are superior to all others for durability, strength, and accurate performance. It is not merely gratifying, but really surprising, to witness the state of perfection to which these two escapements have been brought by the hands of skillful artizans of the present day. Nevertheless, when taken separately there are yet remaining slight objections to both of them, each having some qualities superior and some inferior to the other. The chronometer, on account of its direct impulse, acts with less friction, and consequently imparts more power; for these reasons it has proved itself superior to the lever for marine purposes, and in all places where it can remain in one position; but in a watch where, of necessity, it must run in various positions, and be subjected to violent external motion, the chronometer, notwithstanding its superior principles of action, has proved inferior to the lever for the pocket use. This condition of inferiority and superiority, when placed in different circumstances, I will endeavor to explain as I understand it, and if I am wrong in the premises, I desire to be set right by any one who has greater knowledge and experience in such matters than myself.

I hold that in order to produce accurate time in the pocket-watch, there is one indispensable requisite, viz., a very large vibratory motion in the balance. The mean extent of vibration should never be less than 500° , about 12 revolutions. This large arc of vibration is necessary in order to nullify the errors which unavoidably arise in a greater or a less degree, from the imperfect irons in the balance and its pivots; the action of a compensation balance under different temperatures being such as to throw it more or less out of equilibrium, it is evident that if these little inequalities are made to move through an arc of 500° or 550° at every vibration of the balance, their effects on the time of a watch, when placed in different positions, will be comparatively small to what they would if the balance moved only in a small arc of vibrations. It would also be much less affected by violent external motion, such as it would receive from the wearer by riding in the cars, on horseback, &c. With the lever escapement it is perfectly safe to give the balance an average vibration amounting to 550° ; but with the chronometer, it is not safe to allow the mean vibration to exceed 450° , for the reason that violent external motion would cause the balance to pass so far as to lift the detent the second

time, thus causing the escape wheel to pass the distance of two teeth at one vibration of the balance, the effect of which would be an acceleration of time at a very rapid rate.

In view of these facts, I have undertaken to combine the chronometer and lever escapements, in such a manner as to retain the advantages of the direct impulse embraced in the chronometer, and the conditions of safety and impulse in both directions, as embraced in the lever, at the same time rejecting the objectionable features of both. If my escapement possess qualities superior to any now in use, they will show themselves in due time. It is my intention to prove all things, and hold fast to that which is good.

GEORGE P. REED.

Roxbury, Mass., April 6, 1861.

[We have carried one of Mr. Reed's watches, which are manufactured by E. Howard & Co. of Boston, for about a year, and, though we have not subjected the observation of its rate of running to that delicate and rigid measurement which is practiced with chronometers, from such observation as we have made, we have not been able to perceive any change in its rate, whatever. It is, at all events, a most admirable time-keeper, and it is as finely finished and beautiful a watch as any gentleman would wish to carry.—Eds.]