

**ON THE CONSTRUCTION
AND THEORY OF THE
DEAD ESCAPEMENT FOR
CLOCKS**

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BENJAMIN LEWIS VULLIAMY

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BY
BENJAMIN LEWIS VULLIAMY,
CLOCK MAKER TO THE QUEEN, THE HONOURABLE BOARD OF ORDNANCE,
THE OFFICE OF WOODS, AND THE POST-OFFICE.

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P R E F A C E.

THE following papers, on the construction of Graham's Dead Escapement for Clocks, were written so long since as the year 1823, and appeared in the *Journal of Science*, edited by Professor BRANDE, and published at the Royal Institution, Albemarle Street. The first on an improved method of constructing the Dead Escapement. The second on the theory of this Escapement, and its employment in Clocks with pendulums beating seconds, or longer intervals. The idea of republishing these papers first occurred to me from the circumstance of my being applied to for a translation, for the purpose of being introduced into a very splendid work on Horology, edited by M. L. MOINET, and now in the course of publication at Paris. I am not aware that any preferable Escapement for Clocks has been proposed, or a better mode of constructing this Escapement suggested, since these papers were originally published: moreover, the work in which they appeared having become scarce and expensive, even supposing it to be practicable to obtain

the single numbers, I have determined on reprinting them for the benefit of the trade at large, and the amusement of such individuals as take an interest in matters of this sort. If, as I believe is the case, this Escapement, when well made, is the best, after all, that can be employed for Clocks intended for astronomical purposes, it becomes important, at a period when the science of astronomy is making such rapid progress, and so many new observatories have been and are about to be erected, to make any information relating to the construction of Clocks intended for astronomical purposes as public as possible.

I have always considered the taking out of patents for all matters connected with science as a thing desirable to be avoided; and the applying the word patent, where, in fact, no patent was ever obtained, or even caveat entered, as an excellent illustration of the puff oblique. Yet this is done daily; I had almost said hourly. Patents are very proper for improvements in articles of general traffic, in which, from their great facility of execution, an interest cannot be secured in any other way; such as corkscrews, snuffers, buttons, and others of a similar description: and the individual who employs this species of monopoly for the sake of any real or supposed pecuniary advantage, must be content to relinquish the station of a man of science for that of a general manufacturer.

On the subject of patents, real or presumed, as connected with Horology, I will notice the following curious

case, which clearly shows how desirable it is that all inventions of this description should be made as public as possible. Some years since, an Escapement was brought into notice, and known by the appellation of the Patent Lever, from the circumstance of a patent having, in this case, really been taken out, to secure to the owner the profits resulting from the use of it, which he effected, by granting permission, for a pecuniary remuneration, to such makers as chose to employ it. This Escapement may be considered as a modification of Graham's Dead Clock Escapement applied to a watch, with the motion communicated to the balance by the application of a rack and pinion; but this mode of construction being found objectionable, several others were adopted which were not secured by the patent; but, nevertheless, the Escapement, in all its varied forms, was, and still is called, by the general appellation of the Patent Lever. Now it is a curious circumstance, that the Escapement, with the rack and pinion, for which the patent was taken, exactly resembles one described by Berthond in his first great work, entitled, *Essai sur L'Horlogerie*, 4to. Paris, 1763. Vol. II. Page 194, Nos. 1933, 1934, Plate 23, Figs. 5, 6; consequently, the patent subsequently taken out was not of any value whatever. Of the other modes of making this Escapement, and which were not secured by a patent, one of the best I am acquainted with, was invented by the late Mr. Mudge, and is described in a work published by his

Son, entitled, *A Description, with Plates, of a Time-Keeper invented by the late Mr. Thomas Mudge*, 4to. London, 1799, Page 173, Plate IX. Figs. 1, 2, 3. This Escapement was first applied by Mr. Mudge to a watch he made for Her late Majesty Queen Charlotte, which is referred to in several letters from Mr. Mudge to Count Bruhl, particularly those dated 6th November, 1772, 3rd January, 1773, and 11th January, 1774; from which it appears that this watch was made about the year 1770. See page 27 and following of the same work.

The account here given of the Patent Lever Escapement, is a very good practical illustration of the little value of patents as applied to watches, whether real or assumed, except for the purpose of advertising; while the motives for affecting the latter, as is too frequently done in the present day, are too obvious to require explanation.

I cannot conclude without returning my very sincere thanks to Mr. MURRAY for the loan of the original Plates, which he has, in the most obliging manner, afforded me.

B. L. VULLIAMY, F.R.A.S., F.R.G.S., A.I.C.E, &c.

ON AN
IMPROVED METHOD OF CONSTRUCTING
THE DEAD-ESCAPEMENT FOR CLOCKS.

THE dead-escapement originally invented by G. Graham, F.R.S., being perhaps practically the best clock escapement known, any improvement in the method of executing it, whereby the practice is made more exactly to agree with the theory than has hitherto been the case, may not be unworthy of notice.

The principle of the dead-escapement is well known; the motion of the pendulum is maintained by the action of the wheel on the inclined planes of the pallets, which occupy a portion of the arc of vibration of the pendulum, equal to the angle of the pallets; during the remainder of the vibration, the tooth bears on the circular parts, or rests of the pallets, which are portions of two circles, concentric with the axis of the verge, or centre of motion of the pallets, and consequently there ought not to be any recoil in the escapement, if properly executed. Various constructions and shapes of pallets and pallet-frames, each supposed to possess some peculiar advantage, have, at various periods, been adopted; but the whole have been executed with the file. The construction of the dead-escapement, of which the following is a description, and which I have employed, is, with the exception of the inclined planes of the pallets, and forming the frame out of the turned piece or pieces, entirely executed in the lathe; and if the parts are accurately turned with a slide-rest, must of course possess a degree of precision, independent of its other advantages, which pallets executed with the file cannot possess.

Fig. 1, Plate 1, of which Fig. 2. is a section, represents a